Ross Lake National Recreation Area

~~Draft~~ Final General Management Plan and Environmental Impact Statement

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Acronyms

BLM	Bureau of Land Management
BMU	Bear management unit
CLIP	Climate Leadership in Parks
CUA	Commercial Use Authorization
DOE	Washington State Department of Ecology
EIS	Environmental Impact Statement
ELC	Environmental Learning Center
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FTEs	full time equivalents
GHG	greenhouse gas
GMP	General Management Plan
GMU	Game Management Unit
I&M	Inventory and Monitoring
IMPROVE	Interagency Monitoring of Protected Visual Environments
LCS	List of Classified Structures
MOCA	Managed Owl Conservation Area
NEPA	National Environmental Policy Act
NCI	North Cascades Institute
NFI	noise free interval
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ORV	Outstandingly Remarkable Value
PEPC	Planning, Environment, and Public Comment
POP	persistent organic pollutants
NPS	National Park Service
NRA	National Recreation Area
NOCA	North Cascades National Park Service Complex
RM	River Mile
RNA	Research Natural Area
ROLA	Ross Lake National Recreation Area
SCA	Student Conservation Association
SCL	Seattle City Light
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
VOC	volatile organic compound
WSDOT	Washington State Department of Transportation
WSR	Wild and Scenic River

View of Diablo Lake from Sourdough.

Welcome

You are now in the Affected Environment Chapter. Here are the topics you can read about:

Description of Project Area

Overview of Ross Lake NRA

Natural Resources

Cultural Resources

Stephen Mather Wilderness

Wild and Scenic Rivers

Visitor Use and Experience

Interpretation and Education

Access and Transportation

Socioeconomic Environment

Management and Operations

Volunteer Program

Chapter 5: Affected Environment

The purpose of this chapter is to describe the physical, biological, cultural, and social environments, including human uses, of Ross Lake National Recreation Area that could be affected from implementing any of the alternatives described in the preceding chapter. This chapter contains topics that were identified as important issues by the public and land management agencies during scoping. It also contains additional background data relevant to both NPS managers and a broader audience.

Description of Project Area

The North Cascades NPS Complex includes North Cascades National Park (501,458 acres), Lake Chelan National Recreation Area (62,902 acres) and Ross Lake National Recreation Area (116,798 acres). The park and recreation areas are part of the greater North Cascades ecosystem and international socioeconomic region that stretches from Snoqualmie Pass to the Fraser River in Southern British Columbia, and from the Puget Sound to the eastern edge of the Columbia Plateau.

Approximately 6 million acres of public lands surround the North Cascades. These lands encompass two units of the National Forest System: the Mount Baker-Snoqualmie National Forest and the Okanogan-Wenatchee National Forest. On the Canadian side of the border, several Provincial Parks and protected areas are contiguous to North Cascades. Notable protected areas include E.C. Manning Provincial Park (177,110 acres), Skagit Valley Provincial Park (69,870 acres), and Chilliwack Lake Provincial Park (23,145 acres).

The Washington Parks Wilderness Act of 1988 (Public Law 100-668) designated approximately 94 percent of North Cascades NPS Complex as the Stephen Mather Wilderness(642,332 acres). The legislation designated over 80,000 acres of land as wilderness within Ross Lake NRA, including an additional 5,110 acres in the Big Beaver and Thunder Creek drainages as potential wilderness. The Stephen Mather Wilderness is immediately surrounded by approximately 1.3 million acres of federally designated wilderness: the Pasayten Wilderness (529,477 acres) forms the eastern boundary of the complex, the Lake Chelan-Sawtooth Wilderness (151,435 acres) lies to the southeast, the Glacier Peak Wilderness (570,573 acres) lies to the south and southwest, and the Mount Baker (117,528) and Noisy-Diobsud wilderness (14,133 acres) adjoin the complex on its western flank (acreage sources: http://www.wilderness.net/index.cfm). These wilderness areas collectively represent perhaps the most rugged and remote alpine landscapes in the contiguous United States.

Overview of Ross Lake NRA

Ross Lake National Recreation Area NRA was established in order to "provide for the public outdoor recreation use and enjoyment of portions of the Skagit River, and Ross, Diablo and Gorge lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic and other values contributing to public enjoyment of such lands and waters…" (Public Law 90-544, October 2, 1968). Conservationists fought hard to have what is now the entire complex designated as North Cascades National Park, but Congress compromised and established Ross Lake NRA primarily to accommodate existing and proposed expansion of hydropower developments associated with Seattle City Light's Skagit River Hydroelectric Project (Louter, 1998).

Today, Ross Lake NRA encompasses 116,798 acres of federal land. Elevations range from approximately 350 feet at Bacon Creek on the west boundary, to 8,066 feet on Hozomeen Mountain near the U.S.-Canada border. Approximately 69% percent of Ross Lake NRA (80,043 acres) is designated as the Stephen Mather Wilderness, plus an additional 4% percent (5,110 acres) designated as potential wilderness.

Research Natural Areas

Research Natural Areas (RNAs) are generally intended to be the most protected areas within Ross Lake NRA. RNAs are administratively designated areas identified for unique natural features with essentially no past human influence. Pyramid Lake RNA (164 acres) was established in 1972 by the Director of the National Park Service to protect a small oligotrophic lake and the surrounding habitat of the northern rough-skinned newt (*Taricha granulosa*) (Zobel and Wassem, 1972). Big Beaver RNA (3,356 acres) was established in 1990 by the Director of the NPS for its unique plant and animal species, and diverse plant communities

including mature forests, non-forested uplands, swamps, bogs, and low elevation ponds (NPS, 1990 [from 5/22/1990 memo from NPS Director to PWR Regional Director]). Both RNAs contain trails and allow for recreational use, but camping is not allowed in order to minimize the potential for adverse impacts to educational or scientific values.

Non-Federal Lands and Facilities within Ross Lake National Recreation Area

The largest private land owner within the recreation area is Seattle City Light, a municipal electric utility for the City of Seattle organized under the laws of the State of Washington. Seattle City Light (SCL) owns approximately 1,129 acres of land and has limited rights on approximately 19,300 acres of federal land under the terms of two Federal Energy Regulatory Commission (FERC) licenses, one for the Skagit River Hydroelectric Project (FERC Number 553), and a second license for the substantially smaller Newhalem Creek Hydroelectric Project (FERC Number 2705) (See Table 5.1). Seattle City Light is authorized to utilize federal lands within the hydroelectric project boundary for various purposes related to hydroelectric power generation, including operations of dams, powerhouses, transmission lines, substations, and other works necessary for hydropower production (FERC, 1995).

Table 5.1 Seattle City Light, Fee-simple Land Ownership in Ross Lake NRA

NPS Parcel Number	Acreage
01-128	177.05
01-129	145.10
01-130	49.26
01-131	42.56
01-132	63.07
01-133	127.01
02-100	4.10
02-108	379.01
02-109	25.41
02-110	3.45
02-114	69.08
03-105	43.56
Total Acreage	1128.66

The Master Deed Listing for Ross Lake NRA depicts three remaining tracts of private land totaling 25.19 acres. The most recent acquisition of private land was the Skagit Talc Mine (82.64 acres) located downstream of Shovel Spur on the south side of the Skagit River. There are sub-surface mineral rights on five parcels totaling 746.24 acres; however, the NPS owns the surface estate. The State of Washington also asserts jurisdiction and ownership over approximately 481 acres of the bed of the Skagit River below the ordinary high water mark (Wayne Hill, NPS Lands Resources, pers. comm. 12/10/08).

Skagit River Hydroelectric Project

The Skagit River Hydroelectric Project (FERC Project No. 553) includes three dams and associated facilities owned and managed by Seattle City Light. Construction of the project spanned three decades, with the completion of Gorge Dam in 1924, Diablo Dam in 1936, and Ross Dam in 1952. Ross Dam created Ross Lake, the namesake for Ross Lake NRA and a focal point of this management plan.

The reservoirs of the Skagit River Hydroelectric Project are hydraulically coordinated to supply approximately one-fourth of SCL's power generation requirements, while maintaining instream flows beneficial to salmon reproduction and rearing. In addition, the project provides flood control, water storage, and a variety of recreational opportunities, including hiking, sport fishing, boating, and guided tours. Ross Dam, the project's uppermost facility, impounds Ross Lake, a 22-mile-long reservoir extending about one mile north of the U.S.-Canada border.

Seattle City Light maintains the reservoir near full-pool elevations from July through October for recreational and aesthetic purposes. Reservoir elevations remain high through the migratory and spawning periods of native char (bull trout and Dolly Varden) and rainbow trout, allowing these species access from the lake to spawning grounds in the tributaries. Lands bordering Ross Lake are moderately to steeply sloped and forested; glaciers draining to the basin contribute cool waters that provide important habitat for native bull trout and native rainbow trout. Major tributaries to Ross Lake include Big Beaver, Little Beaver, Ruby, Lightning, and Devil's creeks.

Diablo Dam, located downstream from Ross Dam, creates 4½ mile long Diablo Lake, which is used primarily for daily and weekly regulation of discharge

from Ross. Much of the land surrounding Diablo Dam consists of steep, exposed rock or talus sparsely covered with scattered conifers and shrubs. The remaining areas are moderately to steeply sloped and forested. Thunder Creek is the major tributary to Diablo Lake.

The third and last generating facility of the Skagit River Project downstream from Ross and Diablo Dams, the Gorge Dam and Powerhouse, is located about 4 miles from Diablo Dam. Gorge Lake is the smallest of the three Skagit reservoirs; there is very limited water storage in either Gorge or Diablo Reservoirs when compared to Ross Lake. Gorge Lake is aptly named for the cliffs and talus slopes comprising much of the area bordering the reservoir.

In 1991 SCL entered into a series of settlement agreements with twelve stakeholders as part of Federal Energy Regulatory Commission (FERC) Project relicensing. The stakeholders included federal and state agencies, Native American tribes, and an environmental group. The settlement agreements addressed fisheries, wildlife, recreation and aesthetics, erosion control, cultural resources (archeological and historic resources), and traditional cultural properties. FERC issued a 30 year license for this project in 1995.

Seattle City Light's hydroelectric facility at Gorge Dam.

Newhalem Creek Hydroelectric Project

The Newhalem Creek Hydroelectric Project (FERC No. 2705) is a run-of-the-river facility that derives approximately 2.3 megawatts of power from Newhalem Creek. The facility was built in 1921 to provide power for construction of Gorge and Diablo dams. It now supplements power to the Skagit River Hydroelectric project. FERC issued the most recent operating license for the Newhalem Creek Project in February 1997.

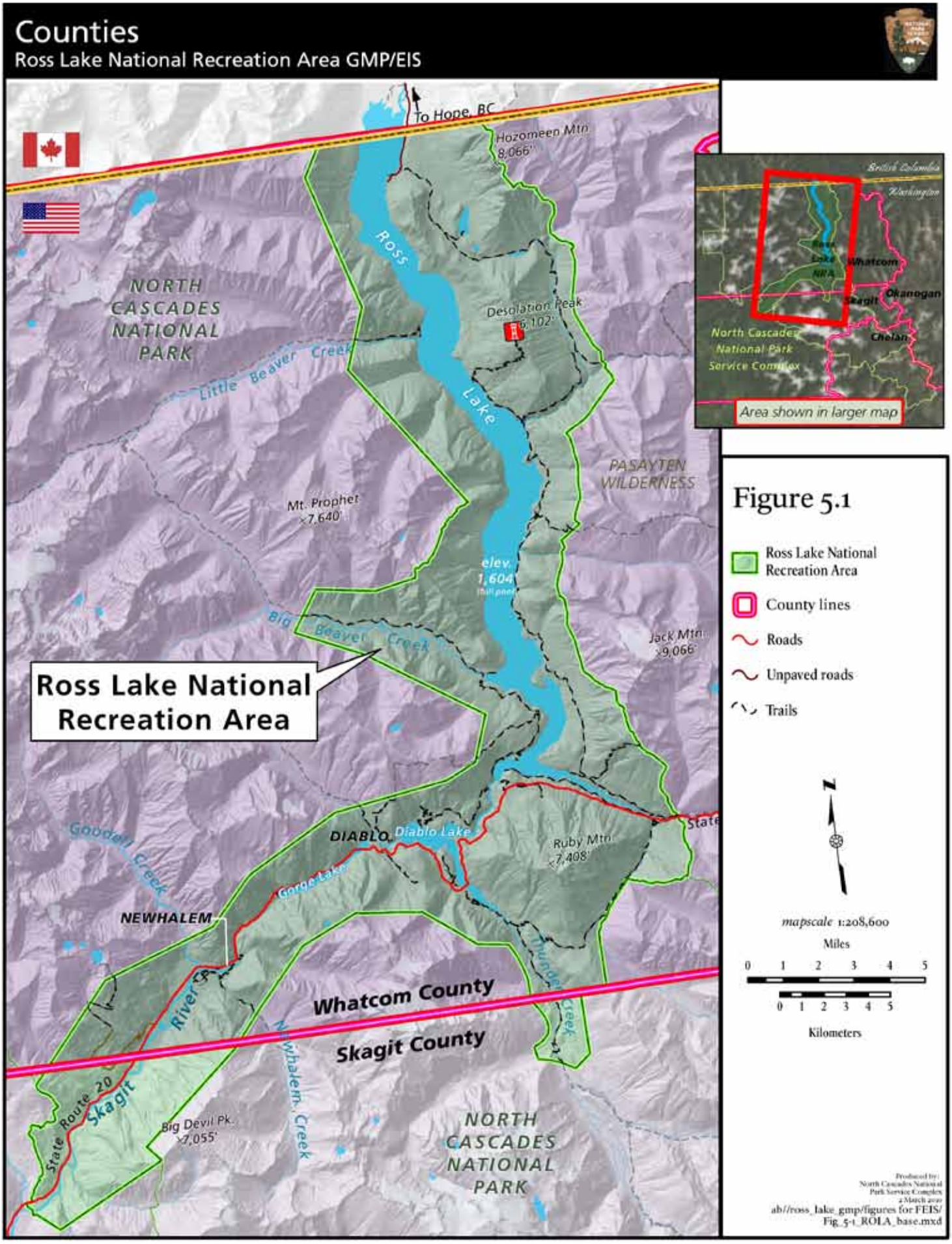
~~The Newhalem Project includes several historic cultural resources and recreational amenities that are also tied to the Skagit River Project. These include the National Register listed "company towns" and associated hydroelectric infrastructure in Diablo and Newhalem, the Ladder Creek Falls Trail and the Trail of the Cedars.~~

North Cascades Highway

The North Cascades Highway, otherwise known as Washington State Route 20, bisects Ross Lake NRA and serves as the only transportation corridor across the northern portion of the Cascade Range, linking the greater metropolitan area of Puget Sound with Eastern Washington. Completed in 1973, the scenic highway is typically open from mid to late spring through November, when heavy winter snowfall and severe avalanche dangers render the highway impassable. Twenty-eight miles of the North Cascades Highway cross through Ross Lake NRA, providing key access to various trailheads, scenic overlooks, campgrounds, and associated facilities. The Washington Department of Transportation operates and maintains the highway in accordance with the terms of a highway easement deed issued by the National Park Service through the U.S. Department of Transportation in May of 2001.

North Cascades Environmental Learning Center

The North Cascades Environmental Learning Center (ELC) is a state-of-the-art facility used for a wide variety of environmental education programs. The ELC is located along the shoreline of Diablo Lake, at the site of a former construction camp for Ross Dam and subsequently Diablo Lake Resort. Seattle City Light funded the majority of the construction ($11.6 million) of the North Cascades Environmental Learning Center as partial mitigation for renewal of its FERC license. The non-profit North Cascades


Counties
Ross Lake National Recreation Area GMP/EIS
To Hope, BC
Hozomeen Mtn
8,066'
Ross Lake
NORTH CASCADES NATIONAL PARK
Desolation Peak
6,102'
Little Beaver Creek
PASAYTEN WILDERNESS
Mt. Prophet
7,640'
elev. 1,604
Big Beaver Creek
Jack Mtn
9,066'
Ross Lake National Recreation Area
Goodell Creek
DIABLO
Diablo Lake
Gorge Lake
Ruby Mtn
7,408'
NEWHALEM
Whatcom County
Skagit County
Skagit River
State Route 20
Big Devil Pk.
7,055'
Newhalem Creek
Thunder Creek
NORTH CASCADES NATIONAL PARK
British Columbia
Washington
Ross Lake NRA
Whatcom
Skagit
Okanogan
Chelan
North Cascades National Park Service Complex
Area shown in larger map
Figure 5.1
Ross Lake National Recreation Area
County lines
Roads
Unpaved roads
Trails
mapscale 1:208,600
Miles
0 1 2 3 4 5
0 1 2 3 4 5
Kilometers
Produced by: North Cascades National Park Service Complex
2 March 2010
ab//ross_lake_gmp/figures for FEIS/Fig_5-1_ROLA_base.mxd

Institute operates the ELC in partnership with the City of Seattle and the National Park Service. Access to the ELC campus is generally restricted to program participants.

In 2009, the facility earned the US Green Building Council's "Leadership in Energy and Environmental Design" or LEED® Silver certification. This certification recognizes a high level of achievement in sustainability and integration with natural systems. Buildings at the ELC have passive solar design and increased insulation, which enhance heating systems and lighting, maximize natural ventilation instead of air conditioning, and reduce energy consumption. The entire project was constructed with more than 90% percent Forest Stewardship Council-certified wood.

Demonstrating earth-friendly design and operations, the tree-sheltered campus features numerous buildings and facilities including:

- multimedia classrooms, a research library and aquatic and terrestrial labs
- overnight lodging for up to 69 participants, graduate students and staff
- a lakeside dining hall with recycling/ composting center
- an amphitheater, outdoor learning shelters, and trails leading into the surrounding landscape
- a dock on Diablo Lake for paddling adventures
- accessible facilities and paths along the lakeshore and nearby Deer Creek

Refer to the Partnerships section later in this chapter for a description of programs offered by the North Cascades Institute.

Natural Resources

Weather and Climate

Climate of the North Cascades is controlled by prevailing westerly winds off the Pacific Ocean and the topography of the North Cascades mountains. The mountains create a large gradient in precipitation and temperature, which is defined by a maritime climate on western slopes (mild winters, cool summers) and continental climate on eastern slopes (cold winters, hot summers) of these ranges. Marblemount, 3 miles from the west end of Ross Lake NRA, is at the eastern edge of the maritime climate zone, has a mean annual temperature of 49°F, and mean annual precipitation of 68 inches. The presence of two high mountain divides on either side of the upper Skagit Valley results in a mixed maritime-continental climate at Hozomeen, where mean annual temperature and precipitation are 46°F and 37 inches, respectively.

Climate also varies systematically from high to low elevation across the area, with precipitation increasing significantly above 4000 feet. Annual snowfall at elevations above 5900 feet is typically 16 - 33 feet and, along with cold temperatures at higher elevations, results in more than 300 glaciers in the park complex.

An important aspect of the area's weather and climate is the large seasonal and interannual variability in precipitation and temperature. More than 80 percent of the annual precipitation falls between October and April, making summers warm and dry. During El Niño events in the Pacific Ocean, winter precipitation tends to be below normal and summer temperatures tend to be above normal. In contrast, La Niña conditions result in above average precipitation and below average temperature. Climate also varies on longer time scales associated with the Pacific Decadal Oscillation, which tends to enhance La Niña conditions during its cold phase.

To understand spatial patterns, trends, and variability, weather and climate are monitored throughout the park complex at a network of sites representing low, medium and high elevations along west (Baker), central (Ross) and eastern (Stehekin) transects. These sites are operated by park staff and cooperators including the National Resource Conservation Service and the National Weather Service.

The NPS glacier monitoring program provides an excellent indicator of long-term trends in climate. Since 1900 the NPS estimates that glacier area has declined 50 percent, resulting in significant reduction of summer stream flow. The park complex began monitoring the mass balance of four glaciers in 1993, including two that drain into the Ross Lake NRA: Silver Glacier in the Ross Lake basin, and North Klawatti Glacier in Thunder Creek. The long-term trend in mass balance of these glaciers shows significant retreat with a net loss of 18 billion gallons of water between 1993 and 2008. Several have retreated more than a mile since the late 19th century.

Climate Change

Climate change is defined by the United Nations Framework Convention on Climate Change as "a change of climate which is attributed directly or

indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (United Nations Framework Convention on Climate Change, 1992). In recent years, scientific data have shown that human influence on climate systems is taking place, and evidence of climate change has already presented itself.

Climate change is a far-reaching and long-term issue that will affect the park, its resources, visitors, and management beyond the scope of this general management plan and its 15-20 year timeframe. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which temperature will continue to rise and whether global emissions of greenhouse gases can be mitigated before serious ecological thresholds are reached.

Climate change science is a rapidly advancing field and new information is being collected and released continually. Because the drivers of climate change are largely outside park control, the National Park Service alone does not have the ability to prevent climate change from happening. The full extent of climate change impacts to resources and visitor experience is not known, nor do managers and policy makers yet agree on the most effective response mechanisms for minimizing impacts and adapting to change. Thus, unlike some other issues, this GMP does not provide definitive solutions or directions to resolving the issue of controlling impacts of climate change on Ross Lake National Recreation Area. Rather, the plan provides some general directions and strategies that can help minimize the park's contribution to climate change. The plan also recognizes that management actions and facilities being proposed in the alternatives need to be adopted with future climate change and impacts in mind.

While climate change is a global phenomenon, it manifests differently depending on regional and local factors. A 2007 report by the Intergovernmental Panel on Climate Change (representing 39 countries and reporting on the greenhouse effect) projected that the average global temperature will increase by 1.8 to 4.0 degrees Celsius (3.2 to 7.2 degrees Fahrenheit) by the end of the 21st century, as compared to 1980-1999 temperatures. Mountain ecosystems are among those identified as likely to be especially affected by climate change. The Intergovernmental Panel on Climate Change projects that warming in western mountains will cause decreased snowpack, more winter flooding, and decreased summer flows (Intergovernmental Panel on Climate Change, 2007).

Climate Change in National Parks

Within lands managed by the National Park Service nationwide, climate change has already had noticeable impacts on both natural and cultural resources. Conditions for sustaining the health and prosperity of animal and plant habitats, glacial, marine, and wetland ecosystems have been diminished and changing patterns of weather and natural hazards such as flooding and wildfires have damaged habitat areas and cultural resource sites. Invasive plants and animals and native and non-native pests and pathogens are expanding into areas where they had not previously survived, threatening ecosystem balances. A 2006 report by the Rocky Mountain Climate Organization and the Natural Resources Defense Council identified the North Cascades NPS Complex as one of the top 12 most at-risk units of the National Park System, citing climate threats such as loss of glaciers and snowfields, changes in vegetation, loss of fishing, and loss of winter recreation opportunities (Rocky Mountain Climate Organization and the Natural Resources Defense Council, 2006).

In response to the increasing need for understanding and action related to climate change impacts in the parks, the NPS is collaborating with the Environmental Protection Agency through an interagency agreement to create the Climate Friendly Parks Program. This program enables the NPS to educate its staff about climate change issues, assess the park's contribution to greenhouse gas emissions, create short- and long-term strategies for reducing emissions, determine potential effects of climate change on park resources, and develop skills and strategies for communicating these effects to the public. The North Cascades NPS Complex, which includes Ross Lake NRA, is a participant in the Climate Friendly Parks program and completed a climate action plan in 2009.

Regional Projections

The University of Washington's Climate Impacts Group has done extensive research on the potential impacts of climate change in the Pacific Northwest. The Climate Impacts Group computer modeling has modeled accelerated warming in Washington State beginning in the 1920s and projected through the 2080s. Climate models indicate an average increase in annual temperature of approximately 2.2 degrees Fahrenheit, on average, within the lifetime of the GMP (2020s). By the 2040s, that temperature increase

is anticipated to rise to 3.5 degrees. Increases in extreme high precipitation in Western Washington and reduction in snowpack in the Cascades mountain range are consistently predicted among regional climate models. High-elevation pine trees are likely to be more susceptible to pests. Snowpack is expected to decrease by nearly 30 percent statewide by the 2020s, and approximately 40 percent by the 2040s. This decrease has implications for altered streamflow timing. Streams are also projected to experience higher temperatures, causing stress to salmon populations because of their dependence on glacial meltwater during summertime. Summer months are expected to be hotter and drier, and regional areas burned by fire are projected to nearly double by the 2020s and nearly triple by the 2040s. Increased energy demand during the hot, dry summers will place stresses on hydropower, which is expected to decline in summer production due to reduced flows (University of Washington Climate Impacts Group, 2009).

Profile of Regional Emissions Sources

A 2002 inventory of industrial emission sites was conducted by NPS staff. This effort focused on sources in Island, Jefferson, Whatcom, Snohomish, and Whatcom counties, as well as sites in the lower mainland of British Columbia. This effort included 51 sites in the five counties, and another 377 sites in Canada thought to contribute to pollution in the park complex. Annual emission output for the U.S. sites in 2002 was approximately 73,000 tons, with nearly half the total coming from Intalco aluminum in Ferndale, Washington (34,500 tons). The majority of the rest is from the Texaco, Arco, and Tesoro refineries on Cherry Point and March Point (25,000 tons). Output data from sources in Canada was not available.

Climate Change in Ross Lake NRA

The climate of Ross Lake NRA is sensitive to change due to its proximity to the Pacific Ocean and location within the global westerly winds. Climate change is also natural, and evidence collected within Ross Lake NRA by geologists indicates that mean annual temperature during the last ice age 25,000 years ago was 7°C (12.6°F) below today. Within the current interglacial period, geologic evidence indicates that mean annual temperature has varied by about ±3°C (±5.4°F), although within the last 1,000 years before the 20th century mean annual temperature varied by ±0.4°C (±.72°F). Variation in precipitation over long time periods is more difficult to quantify.

Climate of Ross Lake NRA is currently warming rapidly; mean annual temperature has risen about 1°C (1.8°F) since the end of the 19th century, as illustrated by the loss of half the glacier area in the park complex. This change is beyond observed temperature variation over the past millennium. Projected future climate changes for the Pacific Northwest will be influenced by rising sea level warming sea surface temperatures, which may enhance El Niño conditions. Rapid warming will result in stronger coastal winds, less snowfall, continued rapid loss of glaciers, higher treeline, and intense periods of rainfall and associated flooding. A stronger Sonoran High pressure cell in summer could result in longer, more severe seasonal and interannual droughts. Average climate model projections of mean annual temperature increases in the coming decades for this region are 0.45°C (.81°F) per decade. Mean annual precipitation is expected to increase by as much as 14 percent by the 2040s (Climate Impacts Group).

Ross Lake NRA Carbon Emissions Inventory

Ross Lake NRA's 2007 carbon footprint was analyzed using the Climate Leadership In Parks (CLIP) tool, a greenhouse gas emissions inventory model jointly developed by the EPA and the NPS. Most of the data needed to perform the calculations was taken from existing reports and records. These items included the amount of electricity purchased, waste sent to the landfill, and fuels consumed. Additional motor vehicle data was derived from a combination of road counter data and visitor use surveys. The findings show that motor vehicle use is the largest contributor to greenhouse gases (approximately 87 percent of emissions). In comparison, emissions resulting from solid waste disposal, stationary combustion, purchased electricity, refrigeration, and other greenhouse gas (GHG) sources were negligible (5 percent or less). These findings provide a rough initial look at the carbon footprint of Ross Lake NRA. Further monitoring and analysis using the CLIP tool will be continued into the future and compared against the 2007 baseline. (See Table 5.2).

Air Quality

Air quality at Ross Lake NRA is strongly influenced by the region's climate and topography. Deep mountain valleys, downslope winds, and frequent summer temperature inversions in Ross Lake NRA can restrict air flow and exacerbate air quality problems. Westerly winds bring pollutants to the park complex from sources in the Puget Lowland, as well as Asia.

Table 5.2 2007 Baseline Emission Results for Ross Lake NRA - Metric Tons Carbon Dioxide Equivalent								
Park Unit	**Stationary Source**	**Purchased Electricity**	**Mobile Source**	**Refrig-eration**	**Waste**	**Other GHG Sources**	**Gross Emissions**	**Net Emissions**
Ross Lake NRA Operations	159	115	35	13	248	20	590	590
Visitors	1		4,578	80		0	4,659	4,659
Ross Lake Resort	0	0	120	0	0	0	120	120
Other Permitted Activities	16	0	0	1	0	81	97	97
Gross Emissions	176	115	4,732	94	248	101	5,466	5,466
Net Emissions*	176	115	4,732	94	248	101		
*** Net Emissions = Gross Emissions - Carbon Sequestration**								
Ross Lake NRA Operational Data **Stationary Combustion: 24,943 gallons of propane; 100 cords of wood (Seattle City Light)** **Purchased Electricity: 247,999 kilowatt hours (purchased from Puget Sound Energy)** **Mobile Combustion: 618,476 vehicle miles traveled (Park Operations); 12,890,500 vehicle miles traveled (Visitors)** **Solid Waste: 159 short tons**								

The Clean Air Act of 1977 established North Cascades National Park as a mandatory Class I area, along with adjacent Glacier Peak and Pasayten Wilderness areas, while Ross Lake NRA was designated as a Class II area. Class I areas are afforded the greatest protection under the act, which seeks to prevent significant deterioration of air quality, particularly in Class I areas. A formal process exists whereby the NPS can request the State of Washington to redesignate the Ross Lake NRA airshed from Class II to Class I.

Various metrics of air quality have been monitored in and near Ross Lake NRA since 1984 by several agencies and programs. The NPS Air Resources Division in Denver coordinates these activities, while sites are maintained by park complex staff. Review of applications for new point source permits is conducted by the Washington State Department of Ecology. Analysis is based on regional computer models that incorporate weather conditions from meso-scale climate models.

The North Cascades air quality monitoring program has included several data collection systems, including acid deposition, visibility, haze, ozone, and wet/dry deposition. An IMPROVE site (Interagency Monitoring of Protected Visual Environments) near the Ross Dam contains an aerosol sampler that continually samples and analyzes air every week for substances such as sulfates, nitrates, organic carbon and particulates. A nephelometer provided by Washington State Department of Ecology was also installed at the Ross IMPROVE site, but due to a lack of funds its use was discontinued in 2006.

The objectives of IMPROVE are to establish current visibility and aerosol conditions in mandatory Class I areas, to identify chemical species and emission sources responsible for existing man-made visibility impairment, and to document long-term trends for assessing progress towards the national visibility goal. This monitoring is a response to the Regional Haze Rule, which dictates that regional haze monitoring shall be done in protected federal Class I locations. In addition to the IMPROVE monitoring, in 2003 a visibility web camera, which takes images hourly, was installed at the North Cascades Visitor center to monitor regional haze. Although IMPROVE data have been collected at Ross Dam since 2001, there is no apparent trend in visibility through 2007. While the period of record is short, and data from 2003 and 2004 substandard, data from the adjacent Pasayten Wilderness also show no trend. During periods of high forest fire activity the nephelometer at Ross Dam did record several week-long periods of reduced visibility.

Acid deposition has been monitored at Marblemount since 1984. Sensors monitor pH of precipitation,

as well as sulfate, nitrate, ammonium, calcium magnesium, sodium, chloride, and potassium, as part of the National Atmospheric Deposition Program. There were no apparent trends between 1996 and 2005 in sulphate and nitrate at Marblemount. Recent sampling of lichen detected increased levels of nitrate with higher elevations.

Dry deposition of sulfur dioxide, particulate sulfate, nitric acid, particulate nitrate and particulate ammonium was monitored, as part of the Clean Air Status and Trends Network, in Marblemount from 1996 – 2008. Dry deposition is relatively low for all compounds; the park complex ranks in the lowest 10th percentile of network sites nationwide. Data indicate that dry nitrogen deposition is about 10 percent of wet deposition, while dry sulfur deposition is about 8 percent of wet deposition (i.e. most loading during rain events).

Ozone was monitored at Marblemount from 1996-2008. Before measurements were discontinued, ozone monitoring showed diurnal cycles in low-level ozone production, with high concentrations in the range of 30-40 parts per billion that were not high enough to exceed human health standards or harm sensitive vegetation. A recent research project involved installing passive ozone monitors at higher elevations in the Stephen Mather Wilderness, but no results have been reported.

Recent research has focused on atmospheric pollutants deposited in snow, from fog, and in surface water systems. Preliminary results from the Western Airborne Contaminants Project and other research indicate that we are receiving mercury and pesticide pollution from sources adjacent to the park complex as well as across the Pacific Ocean. Elevated levels of mercury and organochlorine compounds have been found in snow and fish tissues from high elevation lakes. The park complex was the only park in the western US where heptachlor was detected, while concentrations of polycyclic aromatic hydrocarbons, endosulfans, historic use pesticides and other chlordane compounds ranked above median values for 20 National Parks. A wide range of pollutants were also detected in vegetation samples, and an increasing concentration of polychlorinated biphenyls and pesticides in lichens with elevation.

Air Quality has been measured since 1984 for Ross Lake NRA.

Natural Soundscapes

A soundscape can be defined as the aggregate of all the sounds in an area, including sounds inaudible to the human ear. Soundscapes are typically composed of a variety of both natural ambient sounds and human-caused sounds. The NPS is required to preserve *natural* soundscapes, which are composed of the natural sound conditions in a park that exist in the absence of any human-produced noises (park units that possess cultural sounds are also required to preserve the cultural soundscape). Examples of natural sounds commonly heard in Ross Lake NRA include flowing water, bird songs, and wind. Examples of human-caused sounds commonly heard in some areas of Ross Lake NRA include human voices and sounds produced by vehicles, motorboats, and jet airplanes. Human-caused sounds and sound levels (or loudness) may be appropriate or inappropriate depending on the management zone of an area.

The NPS recognizes natural sounds as inherent components of the resources it is required to protect under the Organic Act. Natural sounds are vital to the natural functioning of ecosystems; birds, insects, mammals, and amphibians rely on sounds as part of complex communication networks. In habitats where wildlife vocalizations signify mating calls, danger from predators, or territorial claims, hearing these sounds is important to animal reproduction and survival. The natural soundscape is also a key element of the visitor experience in national parks. As was reported to the U.S. Congress in the "Report on the Effects of Aircraft Overflights on the National Park System," (1994) a system-wide survey of park visitors revealed that nearly as many visitors come to national parks to enjoy the natural soundscape (91 percent) as come to view the scenery (93 percent).

There are three major sources of noise intrusions that occur within Ross Lake NRA: vehicles, motorboats, and aircraft. Because of the topography of the highway corridor (deep, narrow valleys surrounded by 7,000'+ peaks), sounds can be magnified within the valley. For example, a party climbing Colonial Peak at 7,444' can clearly hear motorcycles on the highway below, even though they are well within designated wilderness and what feels like a long distance from the highway. Noise intrusions from motorboats and occasional float plane landings occur most frequently on Ross Lake, where many visitors go to seek a more primitive lake recreation experience using self-propelled boats or on foot along the shoreline. Overflights by commercial jets, airplanes, propeller aircraft, helicopters, and military aircraft can also be heard within Ross Lake NRA. Helicopter use for NPS administrative purposes occurs frequently within Ross Lake NRA during the summer.

Soundscape Monitoring

In 2006, NPS resource managers began collecting acoustic and sound source data as part of a complex-wide soundscape monitoring effort. Data was collected at four sites within Ross Lake NRA; from north to south, these sites were located at Hozomeen, just north of Rainbow Point along Ross Lake, along the north side of Ruby Arm, and near Colonial Creek Campground (See Figure 5.2). Monitoring locations were chosen primarily to characterize the soundscape associated with different human uses within Ross Lake NRA; accessibility to each site was also a key factor.

Data collected at the four sites includes sound pressure level (measured in decibels (dB)), continuous digital audio recordings, and on-site sound source listening. Sound pressure level data helps in determining how loud sound sources are, while digital audio recordings and on-site sound source listening assist in the identification of those sounds sources. These measurements allow the calculation of a variety of metrics, including ambient sound levels, time of audibility, noise free intervals, and time above specific decibel levels. These metrics, described below in more detail, are used to characterize the soundscape at each of the sampling sites.

Median A-weighted existing ambient: describes normal daytime and nighttime sound levels audible by the human ear (in Decibels Audible (dBA)).

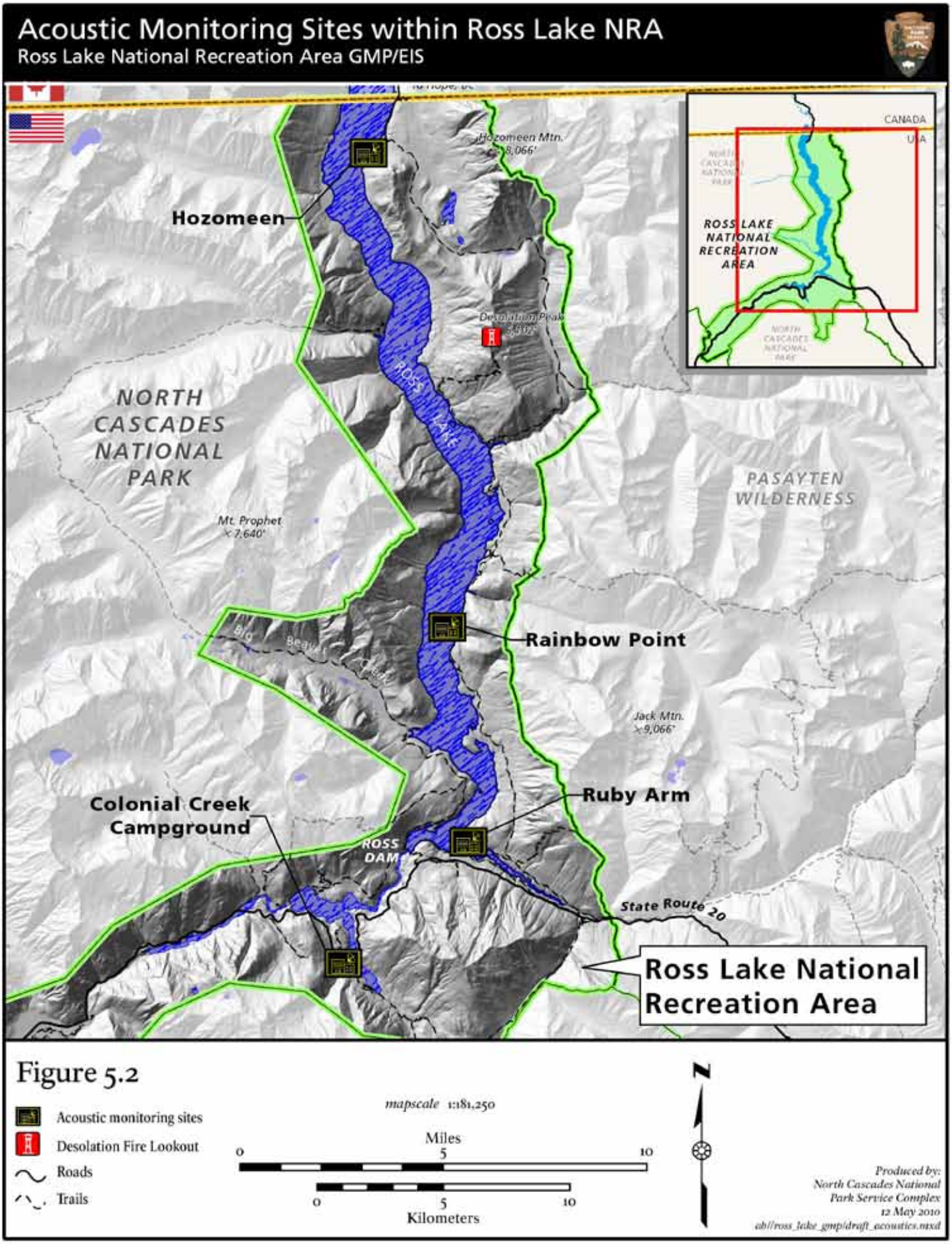
Median A-weighted natural ambient: describes normal daytime and nighttime sound levels audible by the human ear when all human-caused sounds are removed from the existing ambient (in dBA).

Mean percent time audible: indicates the average amount of the 24-hour day that is affected by human-caused sounds.

Noise free interval (NFI): indicates the amount of time between human caused sound events during the daytime. This is reported using maximum and average intervals.

Time above 35 dBA: indicates the percent of time above 35 dBA (level at which sound can have adverse effects on blood pressure while sleeping).

Time above 45 dBA: indicates the percent of time above 45 dBA (level below at which the World


Acoustic Monitoring Sites within Ross Lake NRA
Ross Lake National Recreation Area GMP/EIS
CANADA
USA
ROSS LAKE NATIONAL RECREATION AREA
NORTH CASCADES NATIONAL PARK
Hozomeen Mtn.
8,066'
Hozomeen
Desolation Peak
5,102'
ROSS LAKE
NORTH CASCADES NATIONAL PARK
PASAYTEN WILDERNESS
Mt. Prophet
7,640'
Rainbow Point
Jack Mtn.
9,066'
Ruby Arm
Colonial Creek Campground
ROSS DAM
State Route 20
Ross Lake National Recreation Area
Figure 5.2
Acoustic monitoring sites
Desolation Fire Lookout
Roads
Trails
mapscale 1:181,250
Miles
0
5
10
0
5
10
Kilometers
N
Produced by:
North Cascades National Park Service Complex
12 May 2010
ah//ross_lake_gmp/draft_acoustics.mxd

Health Organization recommends noise levels should be inside bedrooms).

Time above 52 dBA: indicates the percent of time above 52 dBA (level at which speech interference would occur during an interpretative program; speaker talking in a "raised voice" is 10 meters away from audience).

Time above 60 dBA: indicates the percent of time above 60 dBA (level at which speech interference occurs between individuals speaking at normal level, one meter away from each other).

Preliminary Monitoring Results

Colonial Creek Campground

Results indicate that Colonial Creek Campground is the loudest of the four monitor sites (See Table 5.3). The daytime existing ambient is 39.4 dBA and the nighttime existing ambient is slightly quieter at 37.0 dBA. Both the daytime (37.6 dBA) and nighttime (36.8 dBA) natural ambient sound levels (with human sounds removed) are not significantly quieter than the existing ambient and they are also by far the loudest of the four monitored sites. The source of these natural sounds is likely running water of streams and drainages surrounding the campground. It is probable that the pervasive sound of running water masks some of the human-caused sounds, effectively lowering the amount of time that human-caused sounds are audible (37.4 percent of the time) in this location. Despite the likelihood that some human sounds are masked by natural sounds, the longest daytime period recorded without human sounds (maximum NFI) was still only one minute and 56 seconds (1:56), and the average NFI was a mere 0:20. A closer look at the sound sources reveals that vehicles, including cars, trucks, motorcycles, and RVs are largely the source of human-caused sounds in this location. Percent Time Above metrics (See Table 5.4) also show that this site is the loudest. Sounds are above 35 dBA 99.9 percent of the time during the day and 100 percent of the time during the night. These values are so high due to the constant sound of running water in the vicinity of the campground. The percent time that sounds are above 45 dBA, or the level below at which noise levels should be inside bedrooms, drops considerably to 8.8 percent during the day and 1.3 percent during the night. Sounds were greater than 52 dBA (day and night) and 60 dBA (day) less than one percent of the time, and never greater than 60 dBA during the night.

Ruby Arm

The monitor site along Ruby Arm is second loudest after Colonial Creek Campground with an existing ambient of 35.5 dBA during the day and 28.4 dBA during the night. This site holds the biggest difference between daytime and nighttime ambient sound levels; this can probably be attributed to the drop in traffic that occurs at night, which is more perceptible at this location due to lower natural ambient sound levels (32.5 dBA daytime and 27.8 dBA nighttime). This site is also a close second behind Colonial Creek Campground with human-caused sounds being audible 36.7 percent of the time, the maximum daytime NFI at 5:30, and the average daytime NFI at 0:45. The source of most of the human-caused sounds at Ruby Arm is highway traffic with a small amount of watercraft. Percent Time Above metrics show that sounds are above 35 dBA 55.9 percent of the time during the day and 24.1 percent of the time during the night. Daytime sound levels above 45 dBA are slightly higher (9.7 percent) at this site during the day than those at Colonial, whereas nighttime sound levels are slightly lower at 1.2 percent of the time. Sounds were greater than 52 dBA (day and night) less than one percent of the time and never greater than 60 dBA at any time.

Rainbow Point

The monitor site at Rainbow Point ranks third for daytime sound levels with an existing ambient of 32.6 dBA and a natural ambient of 30.9 dBA. Nighttime ambient levels are almost the same for existing (28.4 dBA) and natural (28.3 dBA), meaning that there are very few human-caused sounds that are audible at Rainbow Point during the night. This site has the lowest figure for percent time that human sounds are audible over a 24-hour period at 18.7 percent. Noise free intervals are by far the longest at this site, with a maximum NFI of 25:21 and a mean NFI of 3:07. The largest source of human-caused sounds in this location is watercraft, though aircraft noise also contributes. Percent Time Above metrics show that sounds are above 35 dBA 33.1 percent of the time during the day and 17.6 percent of the time during the night. Sounds above 45 dBA occur less than one percent of the time during both day and night, and never go above 52 dBA.

Hozomeen

The quietest of the four sites monitored is Hozomeen. The daytime existing ambient, 24.4 dBA, is over 15 dBA lower than what was recorded at Colonial. The

Table 5.3 Ambient Sound Levels, Percent Time Audible, and NFI							
Site Location	**Median A-weighted Existing Ambient (in dBA)**		**Median A-weighted Natural Ambient (in dBA)**		**Mean % time human sounds are audible**	**Noise Free Interval (NFI)**	
	Day (7am – 6:59 pm)	**Night (7pm - 6:59 am)**	**Day (7am – 6:59 pm)**	**Night (7pm - 6:59 am)**		Max **(min:sec)**	Mean **(min:sec)**
Colonial Creek Campground	39.4	37.0	37.6	36.8	37.4%	1:56	0:20
Ruby Arm	35.0	28.8	32.5	27.8	36.7	5:30	0:45
Rainbow Point	31.8	28.6	30.9	28.3	18.7	25:21	3:07
Hozomeen	24.2	22.2	23.0	21.8	32.3	10:53	1:54

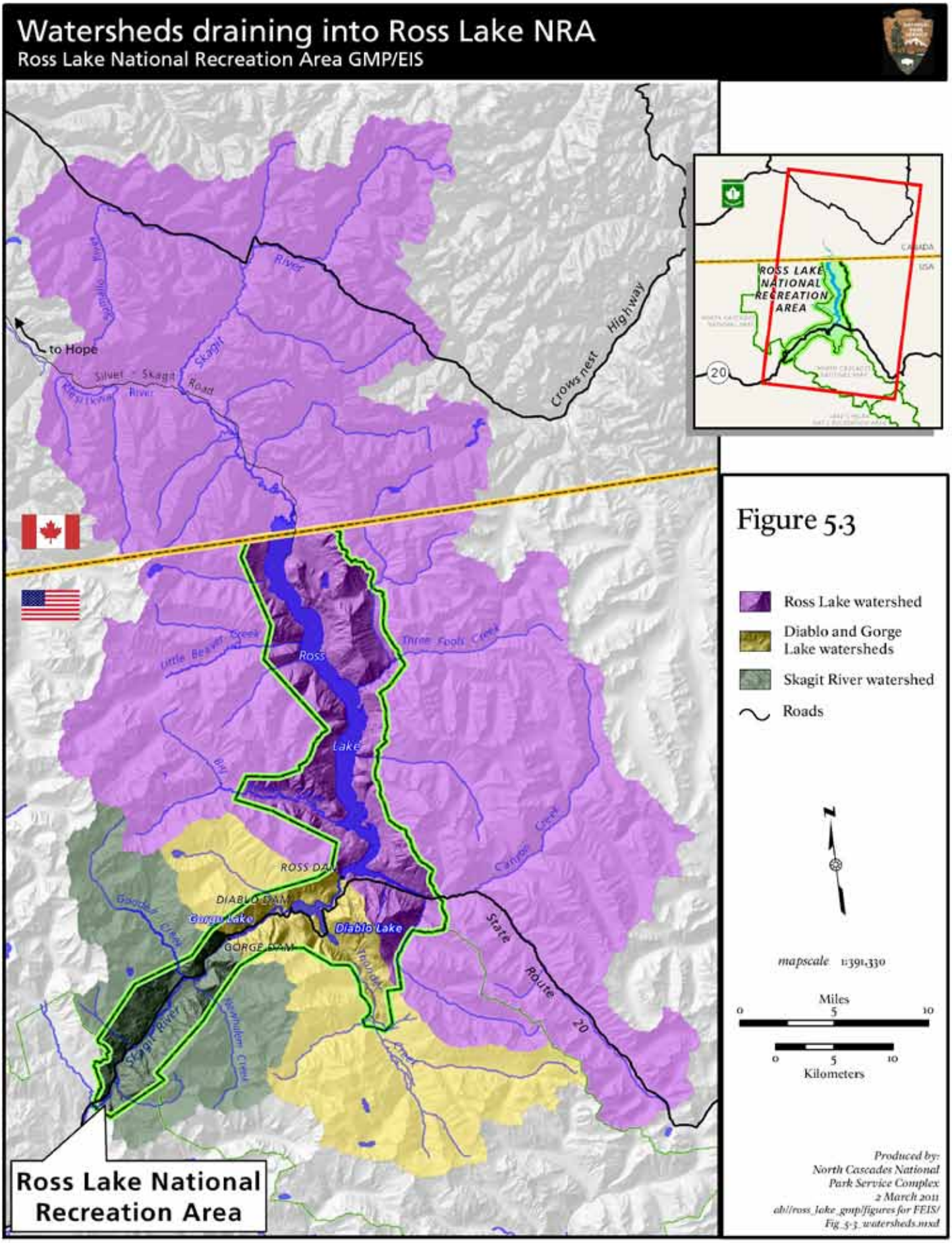
Table 5.4 Ambient Sound Levels, Percent Time Above dBA								
Site Location	**> 35 dBA**		**> 45 dBA**		**> 52 dBA**		**> 60 dBA**	
	Day (7am – 6:59 pm)	**Night (7pm - 6:59 am)**	**Day (7am – 6:59 pm)**	**Night (7pm - 6:59 am)**	**Day (7am – 6:59 pm)**	**Night (7pm - 6:59 am)**	**Day (7am – 6:59 pm)**	**Night (7pm - 6:59 am)**
Colonial Creek Campground	99.9%	100.0%	8.8%	1.3%	0.8%	0.1%	0.1%	0.0%
Ruby Arm	55.9	24.1	9.7	1.2	0.7	0.1	0.0	0.0
Rainbow Point	33.1	17.6	0.9	0.5	0.0	0.0	NaN	0.0
Hozomeen	5.9	0.5	0.7	0.1	0.2	0.0	0.0	NaN
dBA: Decibels Audible NaN: no number was generated because no sounds were above this decibel level								

nighttime existing ambient is 22.2 dBA. Removing human-caused sounds, the natural ambient becomes 23.0 during the day and 21.8 during the night. Although ambient sound levels at Hozomeen are much quieter than those at Colonial, human-caused sounds are still audible 32.3 percent of the time. In contrast to Colonial, where higher natural ambient sound levels are likely to mask some human-caused sounds, at Hozomeen lower natural ambient sound levels allow for most human-caused sounds to be heard and recorded. Hozomeen has the second-longest maximum daytime NFI at 10:53 and an average NFI of 1:54. The main source of human-caused sounds at this location is aircraft with a smaller amount attributed to watercraft. Percent Time Above metrics also show that this site is the quietest. Sounds are above 35 dBA 5.9 percent of the time during the day and 0.5 percent of the time during the night. Sounds above 45 dBA occur less than one percent of the time during both day and night, and only go above 52 dBA 0.2 percent of the time during the day.

Water Resources

Watersheds

Ross Lake NRA straddles the Skagit River, which drains an area of 3,000 miles^2 before reaching Puget Sound, including parts of Canada, two national forests, and private and state lands in Whatcom and Skagit Counties in the United States. There are three primary watersheds within Ross Lake NRA above the three hydroelectric dams (See Figure 5.3). The Ross Lake watershed is the largest and encompasses 1,017 miles^2 (650,880 acres) that is drained by seven major tributaries including Big Beaver, Little Beaver, Lightning, Devils, and Ruby Creeks in the U.S. The NPS is a minority land owner in the Ross Lake


Watersheds draining into Ross Lake NRA
Ross Lake National Recreation Area GMP/EIS
to Hope
Silver Skagit Road
Skagit River
Crowsnest Highway
ROSS LAKE NATIONAL RECREATION AREA
CANADA
USA
20
Ross Lake
Three Pools Creek
Little Beaver Creek
Big Beaver Creek
Canyon Creek
ROSS DAM
DIABLO DAM
Gorge Lake
Diablo Lake
GORGE DAM
Goodell Creek
Thunder Creek
Stetattle Creek
Skagit River
State Route 20
Ross Lake National Recreation Area
Figure 5.3
Ross Lake watershed
Diablo and Gorge Lake watersheds
Skagit River watershed
Roads
mapscale 1:391,330
Miles
0 5 10
0 5 10
Kilometers
Produced by:
North Cascades National Park Service Complex
2 March 2011
ab://ross_lake_gmp/figures for FEIS/Fig_5-3_watersheds.mxd

watershed. The combined area of Diablo and Gorge Lake Watersheds is 174 miles^2 (111,400 acres), and includes two main tributaries, Thunder and Stetattle Creeks, which are managed mainly by the NPS with small in-holdings owned by Seattle City Light. The lowest point in Ross Lake NRA is 354 feet above sea level where the Skagit River meets Bacon Creek at the western edge of Ross Lake NRA.

The Skagit River is the only stream that crosses the Skagit hydrologic crest, a major hydrologic divide running from Cascades Pass to Mt. Redoubt. Geologic data indicates that the river used to flow in two directions from the crest; west to Puget Sound and north to the Fraser River (Riedel et al., 2007). The Ross Lake portion of the Skagit watershed lies between the Skagit Crest and the Pacific Crest to the east.

Glaciers are a significant resource within the Skagit watershed, with more than 300 glaciers identified in a recent inventory (Granshaw, 2001). Most of the glaciers are found along the Skagit Crest, with only a few small glaciers on the Pacific Crest. Nohokomeen Glacier at the headwaters of May Creek and Challenger Glacier in Little Beaver valley are the largest glaciers at 444 acres and 871 acres, respectively.

Floodplain and Channel Migration Zones

Geologic mapping indicates that only about 3 percent of the Skagit watershed is floodplain, but most of this area has been inundated by waters impounded by the three main hydroelectric dams. The largest remaining extensive floodplain along the Skagit River is found between the town of Newhalem and the western boundary of Ross Lake NRA. This floodplain has also been significantly impacted by the Skagit Hydroelectric Project. In general, flood storage behind Ross Dam has reduced extremes in discharge and virtually eliminated sediment supply from the upper portion of the valley. The elimination of large floods on the river below Newhalem has stabilized the position of the river on the floodplain. Only minor modification of in-stream bars and islands is evident since 1956. The primary effect of increased stability has been to decrease the movement of sediment from the river banks and upper watershed into the river. Changes in channel shape and elevation of the bed of the river have been minor since project construction. Degradation of the river bed by 0.6 ft. between 1943 and 1950 at the Alma Creek gauging station is related to closure of Ross Dam. A large 1967 flood, however, caused aggradation of the bed at the same site to within 0.2 ft. of its pre-Ross level. Stable bed elevations at a gauging station farther upstream may be due to armoring of the bed with coarse clasts. Changes in bed material size and sediment movement were not addressed.

Reservoirs

Ross Lake, Diablo Lake and Gorge Lake compose the three impoundments of the Skagit River created by the Seattle City Light hydroelectric project. Ross Lake, the largest of the three reservoirs, is located in the northeastern part of Ross Lake NRA. At full pool Ross Lake has a surface area of 11,700 acres, with 1186 acres (480 hectares) located in British Columbia. It is 22 miles long and extends one mile into British Columbia at full pool. The northern portion of Ross Lake is shallow with an average depth of 49 feet and the lake has a maximum depth of 400 feet at the base of the dam. Water level fluctuations in Ross Lake vary annually and may range from 1,602.5 feet above mean sea level to 1,475 feet mean sea level, a range of 127 feet. The volume is 770,000 acre-feet (Looff 1995).

Diablo Lake lies below the Ross Lake reservoir and receives 86 percent of its inflow from Ross Lake and 14 percent from Thunder Creek. Diablo Lake has a surface area of 910 acres making it the second largest reservoir in Ross Lake NRA. Its maximum depth is 207 feet near the base of the dam and stores 89,880 acre-feet of water at full pool (Burgner 1977). Full pool elevation is 1,205 feet mean sea level and annual water level fluctuations range from 10 to 12 feet.

Gorge Lake, the farthest downstream reservoir, is also the smallest. Gorge Lake has a surface area of 240 acres, a maximum depth of 118 feet and stores 9,758 acre-feet of water (Burgner 1977). It fluctuates only a few feet from its full pool elevation of 875 feet mean sea level.

Manipulation of reservoir level contributes to erosion by seasonally focusing wave energy on different parts of the bank. During pool drawdown and filling, material previously eroded is transported downslope, preventing the establishment of beaches or equilibrium shore profiles. As a result wave energy at full pool is dissipated directly on bluffs. Shorelines on Ross Lake have receded as much as 135 feet above full pool over the life of the reservoir. Bank recession rates estimated by two methods vary for individual stretches of shore and vary with time. Measurements of bank recession rates range from 2.4 inches per year to over 6 inches per year. These rates are within the range of those reported for other reservoirs in North America. Assuming an average recession rate of 30 cm (4.8 inches) per year for all eroding shorelines on Ross Lake, approximately 1.7 acres per year are lost to

erosion along the entire 60 miles of shoreline. Similar rates of recession were measured on Diablo and Gorge lakes.

Erosion of areas below full pool on Ross Lake has removed as much as 9 feet vertically of sediment on steeper slopes. In most areas erosion has completely removed pre-reservoir soils leaving behind a lag deposit of coarse gravel and cobbles. The lag deposits protect the bank from further recession, but are prone to downslope movement as the reservoir level falls.

Lakes and Ponds

Ross Lake NRA contains 68 small lakes and ponds. These water bodies range in size from 0.1 to 39 hectares (.25 to 96.4 acres) in size (See Table 5.5). Lake origin is variable, however almost 60 percent of the lakes are maintained or strongly associated with beaver activity. Eleven of the ponds are old gravel pits, created during the construction of Skagit Hydroelectric Project as a source for aggregate for the concrete used to build the dams. The aggregate ponds are not fed by significant surface runoff, and their water levels are tied to the ground water table.

Wetlands

Wetlands are important resources to both Ross Lake NRA and the communities downstream. These systems provide many ecosystem services by moderating flood events, controlling erosion, filtering fine sediments and nutrients, storing water during seasonal low flow periods and episodic droughts, providing fish and wildlife habitat, as well as opportunities for education and research.

Diablo Lake is a reservoir in Ross Lake NRA.

The National Wetlands Inventory generated by the US. Fish and Wild Service identified 643 acres of paulustrine wetlands in Ross Lake NRA at 1:24,000 scale. This information should be considered a baseline measure for wetlands in Ross Lake NRA as on-the-ground surveys often reveal more extensive wetland complexes. Nonetheless, it does indicate the significance of this area regarding wetland conservation. These wetlands are predominantly located in four general areas: Big Beaver Creek; the mouth of Thunder Creek; Lightning Creek above the Three Fools Creek confluence; and riparian areas adjacent to the Skagit River downstream of the Goodell Creek confluence. Riparian wetlands constructed on the floodplain of the Skagit River provide essential habitat for rearing Coho salmon.

Hydrologic Processes

In Ross Lake NRA area, both spring and fall floods significantly contribute to the level of Ross Lake and the amount of sediment delivered into it from tributary systems. Major flooding in the North Cascades can occur at two times per year. During fall (late October through December) rain-on-snow

Table 5.5 Well Known and Prominent Lakes and Ponds in Ross Lake NRA

Water Body	Size (Acres)
Bouck Lake	10.9
Colonial Ridge Pond	0.0
County Line Pond	2.5
County Line Pond	1.2
County Line Pond	0.7
County Line Pond	0.5
Hozomeen Lake	97.4
Miner's Pond	0.2
Newhalem Ponds	14.6
Newhalem Ponds	4.9
Panther Potholes Lower	0.5
Panther Potholes Upper	0.2
Pyramid Lake	0.5
Ridley Lake	10.9
Ross Resort Pond	0.7
Ruby Mtn Lake	0.5
Thunder Lake	6.7
Unnamed beaver pond	13.6
Willow Lake	16.8

events, heavy warm rainfall exceeding 10 cm (3.9 inches)/day over several days triggers the largest magnitude floods. These floods rise and fall rapidly, with flood peaks often occurring in a day or less. This type of flooding dominates lower elevation west-side streams, including the Skagit River and its tributaries.

Flooding also occurs in the mountains due to rapid melt of heavy winter snowpack in May and June. Larger spring floods occur later in spring and can extend over several weeks into early summer. Peak flows for spring floods at lower elevations are lower than fall rain-on-snow events. At higher elevations above the rain–on-snow zone, and in colder east tributaries such as Ruby and Devil's creeks, spring flooding is dominant. Occasionally, summer floods occur as a result of intense convection and downpours associated with thunderstorm activity. The intensity and magnitude of these floods is greatest in small first- and second-order watersheds.

The NPS has monitored the mass balance of Silver and North Klawatti glaciers since 1993. These data are used to estimate glacial changes as well as glacial melt water contribution to summer streamflow. For the Ross Lake watershed, glaciers contribute from 3-14 percent of summer runoff, with an average of 5 percent (91,500 yards^3). Thunder Creek watershed, which is the main stream draining into Diablo Lake, receives on average 33 percent of its summer runoff from glaciers, which equals about 143,800 yards^3/year. Stream flow is monitored at a number of locations within the Skagit watershed by the U.S. Geological Survey and Seattle City Light. Main stem Skagit gages are located in the town of Newhalem and at Marblemount, while there are gages on tributaries Thunder Creek and Newhalem Creek. Records at these sites extend to the early 20th century. At several other sites temporary gages were placed on several Skagit tributaries in the mid 20th century and operated for three to four years to characterize the timing, magnitude, and annual variability of runoff into the reservoirs.

Water Quality

The water quality of the lakes, streams and rivers in Ross Lake NRA is generally in excellent condition and supports the beneficial uses identified by the Washington State Department of Ecology. However, several specific areas of concern currently exist within Ross Lake NRA that have either been listed as impaired under the Clean Water Act in the past or are at an elevated risk of impairment:

Newhalem Creek.

A watershed scale risk assessment was conducted for the park complex as part of a water quality monitoring effort for the North Coast and Cascades Network of National Parks (Rawhouser in prep). This assessment evaluated land-use, road development, recreational use and both historic and active mining activities for 122 catchments that drain into the Ross NRA (See Figure 5.4). The results of the risk assessment identified 27 catchments that are believed to be at an elevated level of risk for water quality impairment in the Ross NRA.

Water quality assessments of several tributary streams to the Skagit River in British Columbia have indicated these streams are potentially impaired due to urban development, cattle grazing and mining activity (Perrin 2008, 2009). Currently, no water quality assessments have been conducted to determine if these impairments are affecting the water quality of the main-stem of the Skagit River where it enters Ross Lake. However, the Skagit River, which is one of the major tributaries draining into Ross Lake, could become a primary source of environmental stress with increasing population growth in the town of Sunshine Valley, BC and if the Copper Giant, BC mine is expanded as currently planned.

Mill Creek, a tributary to Ruby Creek, has exceeded EPA water quality criteria for sulfides, arsenic, zinc, copper, lead and cadmium. Mine tailings, waste rock and contaminated soil from the Azurite Mine and mill site located adjacent to Mill Creek are the sources of this contamination. This site has been identified as a potential EPA Super Fund Clean-up site under the Comprehensive Environmental Response, Compensation, and Liability Act and negotiations are currently being undertaken by the USFS (the land owner) and ASARCO Inc. (operator of the Azurite Mine) for the removal or capping of the contaminated materials.

An assessment of the benthic invertebrate communities of Ruby Creek indicated these communities may be responding to environmental stress from a combination of mining activity and the effects of the North Cascades Highway (Rawhouser 2008).

Two dump sites immediately adjacent to Gorge Lake and Goodell Creek are potential contaminant sources into these waterbodies. The Gorge Lake dump site is currently covered with soil and functions as the Gorge Campground. The exact contents of this dump are unknown, however, it is believed that this site was primarily used to hold refuse from the town of Diablo and it could potentially hold industrial waste from Diablo Powerhouse. During the construction of the Gorge Campground household refuse, medical waste and construction debris was uncovered. The Goodell Creek dump currently functions as a levee constraining Goodell Creek and was filled in by the mid 1980's. The exact contents of this site are also unknown, however it has been reported that this site holds industrial waste and is probably contaminated with arsenic and lead from sand blasting waste.

Three sites (Ross Lake adjacent to Ross Lake Resort, Gorge Lake Campground and the Skagit River near Diablo Townsite) have exceeded DOE fecal coliform criteria for water quality in the past (Kuntz, in prep). While it is believed that the sources of this impairment have been eliminated, continued monitoring is recommended since these areas were last monitored in 2000.

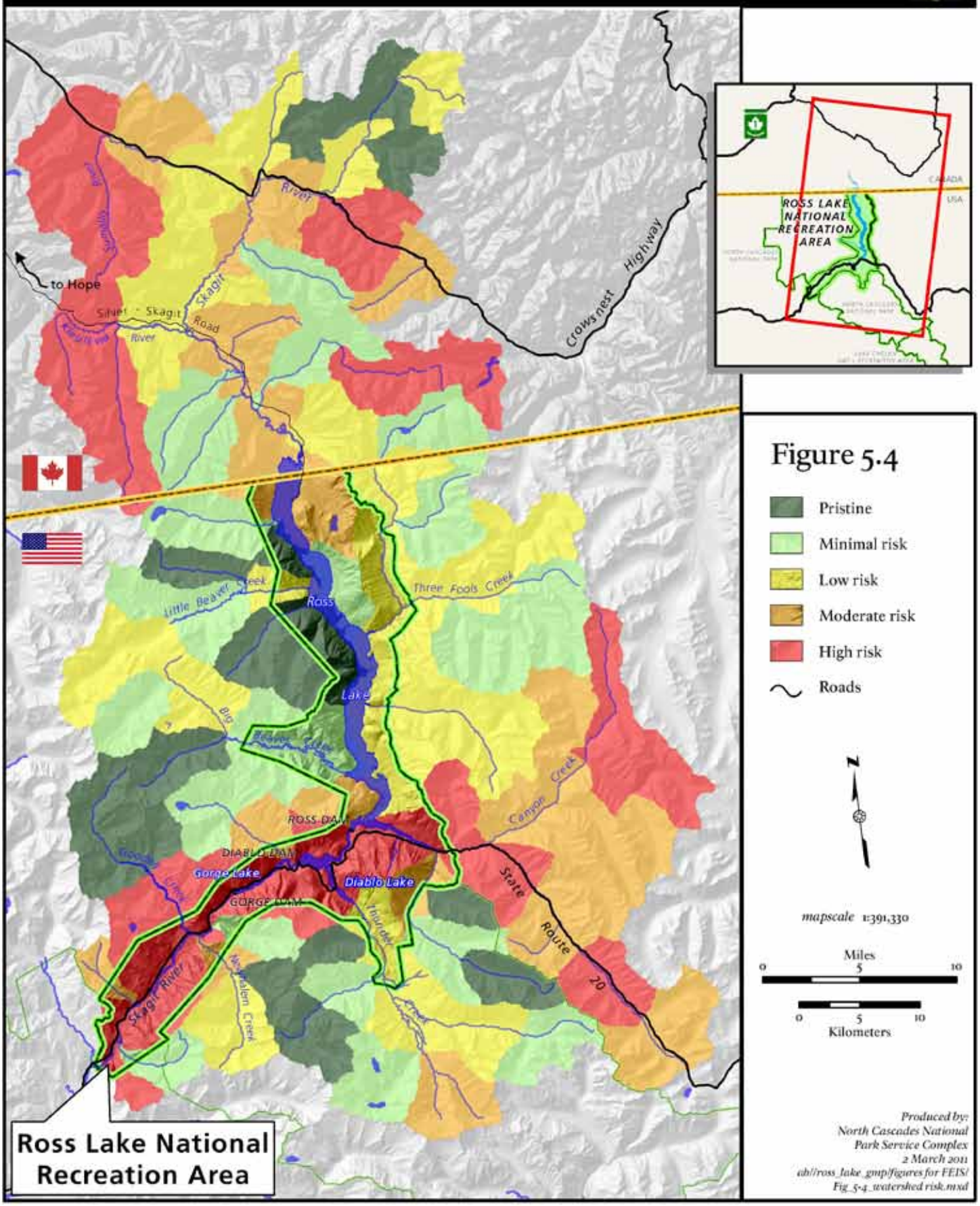
Seattle City Light operates three hydropower projects in the Ross NRA and each of these projects is a large scale industrial operation that increases the risk of water quality impairment. The characteristics of the environmental stressors from these projects is highly variable and projecting future SCL operational activity also adds to the uncertainty on setting the best course for protecting water quality. For example, on June 19, 2008 approximately 150 gallons of transformer cooling oil leaked from a heat exchange unit at the Ross Powerhouse into Diablo Lake. This oil contained traces of PCBs which bioaccumulate and are persistent in the environment. Since this event SCL has taken measures to prevent future discharges into Ross Lake NRA waters, however the possibility for such leaks still exist due to the large scale hydropower operations in the area. Seattle City Light is also planning on drilling a second tunnel for the Gorge powerhouse which will involve removing 130,000 cubic yards of material, adding another industrial operation to the Ross NRA for several years.

Flow alteration at Newhalem Creek due to the operation of the Newhalem Creek hydropower project caused this water body to be listed under section 303(d) of the Clean Water Act for lack of flow. Since the listing, SCL has implemented new management strategies to mitigate flow concerns and improve habitat for fish.

Studies involving high elevation lakes within North Cascades National Park have been particularly useful in proving a link between air pollution and

Water Quality Risk of Watersheds Draining into Ross Lake NRA

Ross Lake National Recreation Area GMP/EIS



water quality. Recent research by the US Geological Survey has documented elevated levels of mercury and organochlorine compounds in fish tissues from the park complex's high elevation lakes. In addition, giardia has been found in some surface waters.

The Washington Dept. of Ecology just released a summary of fish tissue toxicity for 16 sites across Washington State from collections made in 2007. Ross Lake was included in this survey, and reported high concentrations of mercury and PCB. While Ross Lake is below any 303(d) criteria for persistent toxic compounds, there are some reasons to be concerned(Seiders and Deligeannis 2009).

The Pacific Northwest snow component of the Western Airborne Contaminants Assessment Project sampled for a range of pollutants in the air, snowpack, and in vegetation. Results for the park complex indicate the presence of a host of semi-volatile organic compounds, including hexachlorobenzene, endosulfans, chlorpyrifos, hexachlorocyclohexane, polyaromatic hydrocarbons, heptachlor, and chlordanes. Vegetation samples from the park complex were above median values for all of the other 20 parks studied.

A study of surface water chemistry on Thornton and Newhalem creeks was conducted from 2005 to 2006 by the U.S. Geological Survey. Inorganic nitrogen was found to be high due to Puget Sound emissions, while wet sulphur deposition tended to increase with precipitation (Clow and Campbell, 2008).

Geologic Resources

The bedrock geology of the Ross Lake NRA is some of the most complicated in the world. The North Cascades mountains are located at a geologic crossroads that is the overlap between the older Coast Mountains to the northwest and the younger Cascade Mountains to the south. The region's geologic history is summarized into five major events, which included numerous periods of uplift, faulting, granitic intrusion, and mountain building. These events are driven by the continuing collision of the North American continental plate with oceanic plates, and have created a diverse mosaic of bedrock types, all of which respond differently to surficial processes.

The geology of Ross Lake NRA is divided into three major crustal blocks bounded by deep, high angle faults including the Straight Creek, Easton, Ross Lake, and Hozomeen fault zones. Topographic expression of these faults is strong, and includes saddles on ridges, depressions, and deep canyons where streams have exploited weak rocks along the faults.

Between the Easton fault at Damnation Creek and the western Ross Lake NRA boundary are rocks metamorphosed by high temperature and low pressure such as Cascade River Schist and soapstone. Several inactive soapstone quarries are located within this area (Tabor and Haugerud, 1999). Bedrock east from Damnation Creek to the Ross Lake Fault near Ross Dam is composed of Skagit Gneiss and Chilliwack granite, which is known as the crystalline core of the North Cascades. East of the Ross Lake fault zone is the Hozomeen Group, which includes greenstone, radiolarian chert, and minor limestone (Tabor et al, 2003). The east half of Desolation Peak is composed of sandstone and argillite deposited 150 million years ago as part of the Methow terrane.

Despite the occurrence of several major faults in Ross Lake NRA, there has been little seismic activity in the last century. In fact, several of these faults may not have been active for many millions of years. The largest recorded earthquake in the region occurred in 1872 and had a magnitude of 7.2. Although the exact epicenter of this fault is not known, it is believed to have occurred somewhere between the south end of Ross Lake and the north end of Lake Chelan. The most recent earthquakes to have shaken Ross Lake NRA have had epicenters located to the west of the park, and relatively small magnitudes in the 3-4 range.

Topography

Several important topographic features dominate Ross Lake NRA, including glaciated summits, deep glacial valleys, Skagit Gorge, and the asymmetry in shape of the valleys on either side of Ross Lake. Local relief in Skagit valley is 7875 feet from the floor of Skagit Gorge to the summit of Jack Mountain just outside the Ross Lake NRA boundary, which is some of the most extreme vertical topography in the lower 48 states.

These topographic features were created primarily by multiple ice age glaciations that included both alpine and continental ice sheet styles of glaciation. Alpine glaciers flowing off of adjacent mountains cut deep, straight U-shaped canyons, while the ice sheets flowed out of Canada to the south. The primary effects of ice sheet glaciations were to enlarge valleys like the upper Skagit that trend north-south, round-off low summits and ridges, and to create the Skagit Gorge. These two types of glaciers had dramatically different sizes. Alpine glaciers filled valleys to depths of several

hundred yards, but the Cordilleran Ice Sheet was greater than 1.5 km (a mile) thick at the latitude of Ross Lake.

Along with Ross Lake, the Skagit Gorge is the other primary feature of Ross Lake NRA. The Skagit is the only stream that runs across, or perpendicular to the northwest-southeast structural and topographic grain of the region. Continental glaciation by the Cordilleran Ice Sheet caused the drainage throughout this region to be rearranged. Valleys that used to drain north, like the Skagit, were blocked by the advancing ice. These ice dams created several lakes which in turn drained south, cutting deep canyons in several watersheds. As a result, when the ice sheet retreated, major rivers and creeks were re-directed to drain south. The Skagit is the most prominent example of this stream piracy; another is Lightning Creek.

The difference in the shape of valleys on either side of Ross Lake is a dramatic illustration of the effect of climate on processes like glaciation that form valleys. Major tributaries on the west-side of Ross Lake have wetter climates than those entering from the drier east side. As a result, glaciers west of Ross Lake were large and cut deep, broad, U-shaped canyons from valley heads to the Skagit. In contrast, alpine glaciers on the drier east side of Ross Lake were much smaller and confined to the upper 12.4 miles of Three Fools, Devils and Ruby creeks. As a result, these streams enter Ross Lake as deep, narrow, winding, water-cut canyons.

Landforms and Surficial Geologic Processes

Several geologic processes continue to shape the topography of Ross Lake NRA, including glaciation, mass wasting, and erosion and deposition by rivers. Surficial geology of the area has been mapped by the NPS as part of the North Cascades landform inventory, which is focused at the 1:24,000 scale and is linked to the National Hierarchical Framework of Ecological Units (See Figure 5.5, Table 5.6, and Table 5.7). There are 37 distinct landforms mapped in Ross Lake NRA, which represent geologic events that occurred millions of years ago, or as recently as the last season.

Nearly 1/2 of the upper Skagit valley is classified as valley wall consisting of steep bedrock slopes with discontinuous cover of hillslope and glacial sediment. Valley walls are the source area for most major landslides, and the inventory identified a total of 189 mass movements classified into one of six categories based on failure type and material. These include debris avalanches, rock falls/topples, debris torrents, sackungs, slumps, and snow- avalanche impact landforms.

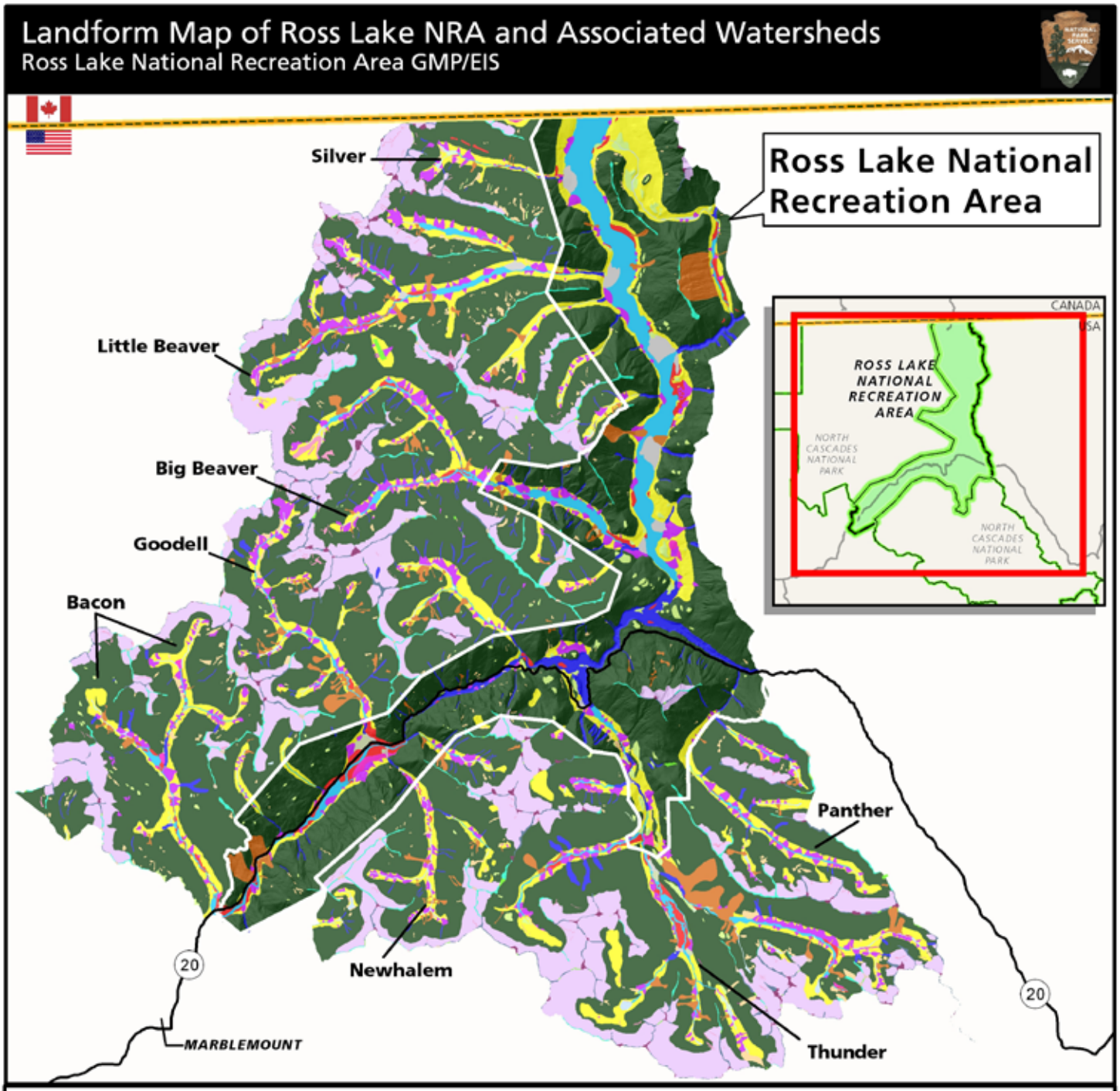
Debris avalanches have garnered the most interest since they are significant sources of sediment and capable of blocking the largest streams for extended periods. Several large landslides have been mapped along the main stem Skagit River. Hummocky deposits from two massive landslides, one off of the west face of Desolation Peak and another from the west valley wall across from Devils Creek, are submerged beneath the waters of Ross Lake. Big Beaver, Little Beaver and Lightning creeks also have been impacted by large landslides. The Damnation Creek landslide blocked the Skagit River from about 8,000 to 6,000 years ago, creating Lake Ksnea (Riedel and others, 2001). The largest rapids on the Skagit River (a.k.a. the S curves, or Portage) below Newhalem occur where the river cuts through the landslide dam.

Heavy precipitation in December 2003 triggered two large debris avalanches that are impacting the North Cascades Highway. A debris avalanche in Skagit Gorge released several hundred thousand cubic yards of rocky debris that remain perched above the highway in the headwaters of Afternoon Creek. In November of 2003, the Goodell Creek landslide delivered approximately 3.8 million cubic yards of debris that temporarily blocked Goodell Creek and formed a large lake. As this material is carried by the river downstream two miles, it is causing aggradation of lower Goodell Creek which is resulting in increased flooding and erosion that threatens the North Cascades Highway bridge over Goodell Creek and the Lower Goodell Group Camp and Goodell Creek Campground.

Debris torrents are another class of mass movement that occur in steep first and second order stream channels on valley walls. Two of the most active debris torrent systems in Ross Lake NRA are Rhode and Sourdough creeks. Both of these streams faithfully follow the Thunder Lake Fault, which provides abundant sediment that, under natural conditions, is flushed out of canyons every 25 years or so. Removal of sediment from the debris cones at the bottom of these streams has triggered instability.

Soils

The National Resource Conservation Service is in the process of producing a soils map for the entire complex. Since the terrain of the complex is inherently difficult to map as a traditional soil survey, the National Resource Conservation Service is using a GIS-based


Landform Map of Ross Lake NRA and Associated Watersheds
Ross Lake National Recreation Area GMP/EIS
Ross Lake National Recreation Area
Silver
Little Beaver
Big Beaver
Goodell
Bacon
Panther
Newhalem
Thunder
MARBLEMOUNT
20
20
CANADA
USA
ROSS LAKE NATIONAL RECREATION AREA
NORTH CASCADES NATIONAL PARK
NORTH CASCADES NATIONAL PARK
Figure 5.5
Alluvial fan
Arete
Bedrock bench
Cirque
Debris apron
Debris cone
Delta
Fan terrace
Floodplain
Horn
Little Ice Age Moraine
Mass movement - debris avalanche
Mass movement - debris torrent
Mass movement - fall/topple
Mass movement - sackung
Mass movement - sail
Mass movement - slump/creep
Other mountain
Pass
Pleistocene moraine
Ridge
River canyon
Terrace
Undifferentiated
Valley bottom
Valley wall
N
mapscale 1:313,000
Miles
0
5
10
0
5
10
Kilometers
Produced by:
North Cascades National
Park Service Complex
1 March 2011
ab//ross_lake_gmp/figures for FEIS/Fig_5-5_landforms.mxd

model that incorporates vegetation, surficial geology, hydrology, and topographic data to map soils. The model is verified by soils test pits dug at dozens of locations within a given watershed. Known as RASP (Remote Area Sensory Proxy), this model has already been applied to the 29,000 ha (71,661 acres) Thunder Creek Watershed (Briggs, 2004). In that study, 120 pedons were observed and described to represent the major combinations of soil-forming factors. The authors of the study found that the surficial geology layer was beneficial in predicting the soil properties because it summarizes parent material, landform age and slope stability. Four main soil orders have been identified, including entisols, spodosols, inceptisols, and andisols. Most floodplain and recent mass movement deposits are entisols and inceptisols. Andisols form on older landforms and in debris accumulation zones at the toe of valleys walls where volcanic ash deposits are concentrated. Spodosols are found on the oldest surfaces that date to the end of the last ice age beneath conifer vegetation. Preliminary application of these results in other watersheds is revealing a similar pattern.

Geologic Hazards

Steep topography, narrow valleys, and heavy precipitation combine to produce the primary geologic hazards within Ross Lake NRA. Valley walls produce snow avalanches, rock falls, debris avalanches, and debris torrents. Canyons such as Skagit Gorge are particularly hazardous locations due to the frequency and size of these events. As a result, the North Cascades Highway through Skagit Gorge is often closed in winter due to hazards from rock falls, debris avalanches, and snow slides. A 1999 snow avalanche at Afternoon Creek in Skagit Gorge deposited snow 33 feet deep across a 328-foot swath of the North Cascades Highway.

Flooding in narrow canyons also presents a hazard to park staff and visitors. Steep valley walls and small streams deliver water quickly to larger streams, which

Table 5.6 Landform Information for Ross Lake NRA

Landform Type	Count	Acres	% of Watershed
Alluvial Fan	14	1,575.337	1.41
Arete	15	78.08285	0.07
Bedrock Bench	129	1,997.552	1.79
Cirque	13	712.2219	0.64
Debris Apron	154	12,323.2	11.02
Debris Cone	153	3,220.263	2.88
Fan Terrace	15	168.3011	0.15
Floodplain	16	8,765.861	7.84
Horn	6	45.09699	0.04
Little Ice Age Moraine	3	4.410049	0
Mass Movement_debris Avalanche	31	3,050.276	2.73
Mass Movement_fall/topple	139	491.1332	0.03
Mass Movement_slump/creep	10	9.021201	0.44
Mass Movement_debris Torrent	9	32.19498	0.01
Other Mountain	1	9.424371	0.01
Pass	5	29.98753	0.03
Pleistocene Moraine	10	417.5375	0.37
Ridge	28	654.0554	0.58
River Canyon	86	4,165.02	3.72
Terrace	104	2,083.313	1.86
Valley Bottom	6	217.2307	0.19
Valley Wall	60	71,803.74	64.19
Totals	1007	11,323.25	100.00

Table 5.7 Landform Information for Ross Lake NRA and the Tributaries within the North Cascades NPS Complex that Drain into Ross Lake NRA

Landform Type	Count	Acres	% of WS
Alluvial Fan	20	1,813.413	0.48
Arete	182	3,014.94	0.80
Bedrock Bench	228	2,767.581	0.74
Cirque	366	48,400.3	12.91
Debris Apron	681	33,307.59	8.89
Debris Cone	641	12,795.94	3.41
Delta	2	2.93418	0
Fan Terrace	23	276.4056	0.07
Floodplain	41	12,365.18	3.30
Horn	84	1,101.052	0.29
Little Ice Age Moraine	209	989.3603	0.26
Mass Movement_debris Avalanche	150	8,952.748	2.39
Mass Movement_fall/topple	486	3,410.099	0.91
Mass Movement_sackung	1	2.883965	0
Mass Movement_sail	2	1.935	0
Mass Movement_slump/creep	34	23.73603	0
Mass Movement_debris Torrent	76	291.5944	0.08
Other Mountain	53	445.4589	0.12
Pass	92	355.8845	0.09
Pleistocene Moraine	31	675.8117	0.18
Ridge	147	4,023.645	1.07
River Canyon	264	6,640.779	1.78
Terrace	256	3,519.66	0.94
Undifferentiated	20	180.4859	0.05
Valley Bottom	49	1,601.479	0.43
Valley Wall	88	22,7901.2	60.81
Totals	4226	37,4862.1	100

in turn rise fast and have high velocities. Crossing of mountain streams during periods of rapid spring snowmelt or heavy rainfall are particularly hazardous.

Vegetation

Terrestrial Communities

Ross Lake NRA has some of the most unique and diverse plant communities that can be found within a relatively small area in the Pacific Northwest. This diversity is a result of several factors such as topography, precipitation, disturbance, parent material, and aspect. Elevation ranges from approximately 400 feet near the Ross Lake NRA western boundary to 6000 feet on Desolation Peak. Precipitation amounts range from approximately 79 inches/year in Newhalem to a low of 30 inches on Desolation Peak. These extreme elevation and precipitation gradients within a narrow distance result in a high diversity of vegetation. Four major forest cover types or zones are found in Ross Lake NRA (See Table 5.8) and are discussed below.

Lowland Forest Zone: These forests dominate the low elevation areas within Ross Lake NRA. They are dominated by western hemlock (*Tsuga heterophylla*), Douglas fir (*Psuedotsuga mertensiana*), and western red cedar (*Thuja plicata*). This type, commonly referred to as the Douglas fir or western hemlock forest type,

Table 5.8 Vegetation Zones of Ross Lake NRA		
Vegetation zone	**Dominant Tree Species**	**Elevation**
Low forest zone -Western Hemlock/ Douglas Fir	*Tsuga heterophylla/ Psuedotsuga mertensiana*	1200′ on wet sites to 4200′ on drier sites
Montane forest zone-Silver Fir	*Abies amabalis*	2800′ on wet sites to 6200′ on dry sites
Mountain Hemlock	*Tsuga mertensiana*	2800′ on wet sites and 4000′ on dry sites
Subalpine Fir	*Abies lasiocarpa*	Occurs mostly above 5000′

is the widest spread cover type in Ross Lake NRA and Douglas fir and western hemlock are the dominate trees. Tree species occurring less frequently include lodgepole pine, ponderosa pine, and silver fir.

Montane Zone: This zone is found above the lowland forest zone and below the mountain hemlock zone. It is dominated by Pacific silver fir (*Abies amabalis*). The Pacific silver fir forest type is found in cooler and wetter sites than those of the western hemlock type. This type occurs where winter snow peak ranges from 4'-6'. In Ross Lake NRA, Pacific silver fir is found at relatively low elevations at Colonial Creek as a result of cold air drainage. Common associates of this dominate are western red cedar, Douglas fir and Engelman spruce (*Picea engelmanii*).

Mountain Hemlock Zone: This zone occurs between the Pacific silver fir zone and the subalpine fir zone. This type is dominated by mountain hemlock (*Tsuga mertensiana*). This zone has cold winter and cool summer temperatures. Winter snow accumulations may reach 10 feet. Common associated tree species are Pacific silver fir and subalpine fir.

Subalpine Zone: The subalpine zone is dominated by subalpine fir (*Abies lasiocarpa*) and mountain hemlock (*Tsuga mertensiana*). This zone occurs at the highest elevations of any forest type and is characterized by cold winters, with significant snow accumulation, and relatively warm, dry summers. This forest type also occurs with larch (*Larex lyallii*) and whitebark pine (*Pinus albicaulis*) which are relatively rare in Ross Lake NRA.

Unique Vegetation Types

Ponderosa pine

Ponderosa pine (*Pinus ponderosa*) occurs outside the normal range of the species on the east side of Ross Lake in areas of low rain fall, such as on the west facing slopes of Desolation Peak near Lightning Creek. These stands are open woodlands with a grass and herbaceous understory. This type also occurs with species thought of as "east side species" such as Rocky mountain juniper (*Juniperus scopulorum*), balsamroot (*Balsamohiza sagittata*), and pine grass (*Calamagrostis rubescens*)

Lodgepole pine

Several lodgepole (*Pinus contorta* var. *latifolia*) stands are found within Ross Lake NRA. These stands occur on bedrock benches in areas surrounding Ross Lake, west to Sourdough Mountain, and as far west as Newhalem. This forest type is relatively restricted on the east side of the Cascade Crest. Recently, these stands have been infested with mountain pine beetle (*Dendroctonus ponderosae)*. These infestations have caused widespread mortality throughout these stands.

Whitebark pine

Whitebark pine (*Pinus albicaulis*) is found on the high ridges surrounding Ross Lake NRA, such as Desolation Peak. This is an important species to Ross Lake NRA as it is considered a keystone species throughout its range due to its importance as a food source for such vertebrate species as the Clark's Nutcracker and the red squirrel. Whitebark pine is being threatened throughout the west by a non-native pathogen.

Cedar forest

These forests are associated with the wetlands in the Big Beaver drainage where several stands of large old growth cedar are found on the valley floor. Some trees measure up to 80 inches in diameter (DBH, or as measured at 4.5 feet from the ground). These cedar forests, and their potential destruction, became a focal point of public outcry against the proposal to raise Ross Dam in the 1970's.

Wetlands

Several low elevation wetlands occur in Ross Lake NRA. The most notable is the Big Beaver wetland system. Wetlands are also found at the mouth of Thunder Creek and along the shoreline of Thunder Lake. These wetland communities are a rare habitat within Ross Lake NRA and within the North Cascades NPS Complex. These wetlands are very important fish, amphibian, and bird habitats as well as habitats for several rare vascular and nonvascular plant species.

Quaking aspen

A few small stands of quaking aspen (*Populus tremuloides*) occur on the east side of Ross Lake as well as a short distance up the Little Beaver drainage. This species is rarely found west of the Cascade Crest.

Riparian and avalanche tracks

Throughout Ross Lake NRA there are extensive forests dominated by deciduous tree species which are most frequently associated with rivers, streams, and avalanche tracks. These forests are dominated by alders (*Alnus rubra* or *Alnus viridis* ssp. *sinuata*), maple (*Acer macrophyllum* and *Acer circinatum*), cottonwood (*Populus balsamifera* ssp. *trichocarpa*), and have an understory of willow species (*Salix* sp.).

Non-Native Plant Species

Within the entire North Cascades NPS Complex there are over 200 known species of non-native plants, but the total number of non-native species within Ross Lake NRA is unknown. The most common and widespread species within Ross Lake NRA are reed canarygrass (*Phalaris arundinaceae*), common tansy (*Tanacetum vulgare*), cheatgrass *(Bromus tectorum),* knapweed species *(Centaurea spp.),* scotch broom (*Cytisus scoparius),* orange hawkweed (*Hieracium aurantiacum*), herb Robert *(Gerianium robertianum),* St. John's wort (*Hypericum perforatum),* knotweed species (*Polygonum spp.)* and oxeye daisy *(Luecanthumum vulgare)*. These species are associated with the perimeter of Ross Lake, the North Cascades Highway corridor, and other disturbed areas. Invasive plant control in Ross Lake NRA continues to be an on-going activity. Prior to 2002 most control was accomplished through manual techniques. Chemical control of specific species has been used on the North Cascades highway road edge, along the perimeter of Ross Lake, and along the Skagit River. The extent and distribution of weed species is unknown for Ross Lake NRA. Some mapping and inventory efforts have included cheatgrass mapping in the Desolation/ Lightning Creek area, mapping of weeds in the trail corridors and backcountry camps, mapping of knotweed along the Skagit River, surveys along Diablo and Ross lakes, and mapping of reed canarygrass along Ross Lake. In October of 2008 reed canarygrass was identified within the Big Beaver wetland. The extent of this species is still unknown.

Disturbance

Disturbance via windthrow, fire, avalanche, and floods causes major vegetation changes within Ross Lake NRA. Fire and avalanches cause the largest and most frequent disturbances within Ross Lake NRA. Windthrow events tend to be small and localized. Floods on the Skagit, although they do occur, are mitigated by the presence of dams. Floods on the tributaries can cause localized vegetation removal and sedimentation can cause tree death and a reduction in shrub cover. These disturbed areas are places where non-native invasive weeds may become established.

Hazard Trees

A hazard tree is any tree, either alive or dead, which, due to detectable defects, has potential to fail (in part or in its entirety) and strike a person or property within a developed area. Developed areas include; campgrounds, buildings and other infrastructure, parking areas, picnic sites, and designated campsites such as backcountry camps. Persons or properties that could be damaged by hazard trees are referred to as targets. For a tree to be deemed hazardous, a tree must have a potential to fail and a target. Roads and trails are not considered targets due to the transitory nature of people in these sites. If there is no identifiable target then a tree is not considered hazardous.

Developed sites are surveyed yearly by qualified park staff. Trees are monitored and when necessary the hazard is mitigated. Backcountry sites are monitored in a five year rotating schedule or more frequently if

resources allow. These surveys are generally completed by the trail crew.

Trees with a high or very high hazard rating (as defined by the park's *Hazard Tree Management Plan*) will require some type of abatement/mitigation. Abatement/mitigation options include: removing the target, permanent site closure, temporary site closure (the site is closed until the hazard tree fails or until the hazard is mitigated), pruning the defective parts of the tree, reducing the height of the tree below striking distance of the target, or tree removal.

Wildlife Habitat

Surrounded by several million acres of designated wilderness, Ross Lake NRA provides essential habitat for a diverse array of wildlife species that require large tracks of remote, mountainous land to survive. Species represented by these attributes include grizzly bear, gray wolf, wolverine, mountain goat, white-tailed ptarmigan and Clark's nutcracker. Ross Lake NRA is inhabited by 265 species of mammals, birds, reptiles, and amphibians (NPS files 2008).

The Skagit River watershed is one of the few remaining major watersheds in the Cascades that supports significant and pristine wildlife habitat. Within the watershed, habitats range from low elevation western hemlock / Douglas-fir old-growth forest to high elevation, treeless, alpine meadows with snowfields and rocky ridges. Other significant habitats found within the Skagit River watershed include western Washington's largest cottonwood overstory riparian area along the lower Skagit River within and near Ross Lake NRA (See the Vegetation section of this chapter, above).

Alpine/Subalpine

There are significant amounts of alpine/subalpine habitat within Ross Lake NRA. Alpine habitat includes all vegetated areas above treeline and many open areas just below treeline. Alpine areas are dominated by sedges, grasses, hardy forbs and dwarf shrubs such as heathers. They have low mean temperatures, high winds, prolonged snow cover, and intense ultra-violet radiation. Subalpine habitat is characterized by patchy mosaics of herbaceous and dwarf shrub meadows and tree islands or scattered trees with 10-30

Indian paintbrush is a common wildflower found in Ross Lake NRA.

percent canopy cover. Tree species most common to this habitat type are mountain hemlock, Englemann spruce, and subalpine fir. Wildlife species have adapted to these environments by migrating to warmer areas during the most extreme times of the year (such as winter) or hibernating for long periods of the year. Common species found in these habitats include mountain goats, hoary marmots, pikas, white-tailed ptarmigans, Clark's nutcrackers, American pipits, and gray-crown rosy finches.

Coniferous and Deciduous Forest

Coniferous/deciduous forest habitats are characterized by a diverse set of structural attributes with complexity increasing with stand age. Older forests typically have multi-storied canopies with developed mid-story vegetation, plentiful standing dead wood, and an abundance of down, decaying wood. Within Ross Lake NRA, common forest cover types include Douglas-fir, western hemlock, western red cedar, Pacific silver fir, red alder, and bigleaf maple.

Riparian

Riparian zones along the Skagit River, its tributaries, and along lakes are numerous in Ross Lake NRA. These riparian habitats have the greatest diversity of wildlife species of any habitat type within the complex. They are characterized by high plant species diversity and vegetation structure. Their linear shape creates a high degree of edge, the boundary between two or more habitat types, which increases species diversity. Riparian corridors serve as migration routes, and they include many habitat features necessary for foraging, nesting/breeding, and cover for terrestrial wildlife.

Open Water (Reservoirs)

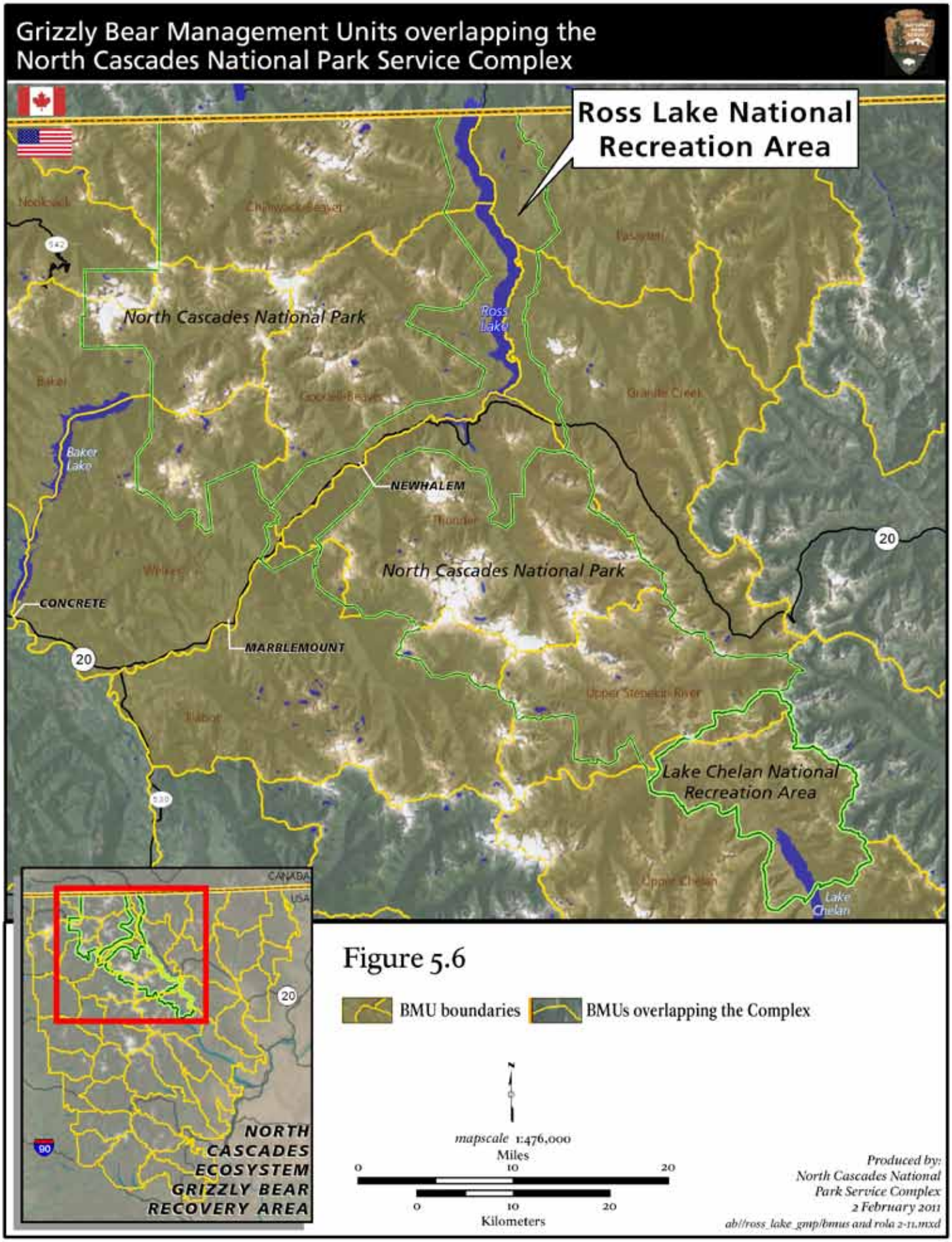
Open water habitats greatly increased with the development of the three hydro-electric projects. Large expanses of riparian habitat along the mainstem Skagit River were lost with the creation of these reservoirs. While these reservoirs do provide habitat for some wildlife, most of these species are rare and transient, or were not found in Ross Lake NRA before the existence of the reservoirs. Extreme changes in water levels results in un-vegetated shorelines during much of the year. This open zone between water and vegetation does not provide the necessary cover for secretive species or nesting waterfowl at the time they need it. Ross Lake Reservoir now presents a major barrier to east/west mammal movements due to the length and width of the reservoir.

Grizzly Bear Core Area

The North Cascades ecosystem is one of six grizzly bear recovery zones in the coterminous states. The ~~North Cascades~~ ecosystem is comprised primarily of the North Cascades NPS Complex and~~,~~ the Mt. Baker – Snoqualmie and Okanogan-Wenatchee National Forests, between Interstate 90 in the south, north to the international border, and roughly following national forest boundaries on both sides of the Cascade Range (see Figure 5.6).

Grizzly bears are not territorial but occupy large~~,~~ and usually overlapping~~,~~ home ranges. They are long-lived omnivores with very low reproductive rates. Grizzly bears' requirements for food and space vary depending on a multitude of environmental and behavioral factors, and on the experience and knowledge of each individual bear (US Fish and Wildlife Service 2007). Basic needs are for seasonal foraging and denning habitats secure from human disturbance. What this comprises varies widely in relation to food resource availability both across and within foraging seasons and years; the density of the bear population; reproductive status (females); sources of mortality and other stressors (e.g. Smith et al. 2005, Weaver et al. 2002, Hood and Parker 2001, Olson et al. 1997).

As explained in CEM – a Model for Assessing Effects on Grizzly Bears (USFS 1990), "in an area as large as a grizzly bear ecosystem it is necessary to divide the area into smaller units referred to as Bear Management Units (BMU) in order to: (1) assess the effects of existing and proposed activities on grizzly bear habitat without having the effects diluted by consideration of too large [or too small] an area; (2) address unique habitat characteristics and bear activity/use patterns; (3) identify contiguous complexes of habitat which meet [grizzly bears' yearlong needs] and (4) establish priorities for areas where land use management needs would require a cumulative effects assessment". Each BMU is an approximation of what could be a home range for a female grizzly bear accompanied by young. ~~The North Cascades ecosystem has been divided into 42 Bear Management Units (BMU), each an approximation of homerange of a female grizzly bear accompanied by young. The~~ BMUs include entire drainages/ sub-drainages, encompassing a complete array of elevations and seasonal habitats to meet a grizzly bear family's annual requirements for feeding, cover and denning. BMU boundaries follow natural features rather than administrative lines. The North Cascades ecosystem has been divided into 42 BMUs. No grizzly bear habitat use data exist for the North


Grizzly Bear Management Units overlapping the
North Cascades National Park Service Complex
Ross Lake National
Recreation Area
North Cascades National Park
Ross
Lake
Baker
Lake
NEWHALEM
North Cascades National Park
CONCRETE
MARBLEMOUNT
20
Lake Chelan National
Recreation Area
Lake
Chelan
CANADA
USA
NORTH
CASCADES
ECOSYSTEM
GRIZZLY BEAR
RECOVERY AREA
90
Figure 5.6
BMU boundaries
BMUs overlapping the Complex
mapscale 1:476,000
Miles
0
10
20
0
10
20
Kilometers
Produced by:
North Cascades National
Park Service Complex
2 February 2011
ab//ross_lake_gmp/bmus and rola 2-11.mxd

Cascades ecosystem, so the units were delineated based on local habitat characteristics compared with habitat use data from similar ecosystems (such as McLellan and Hovey 1995 and, 2001, Jacoby et al. 1999, Almack et al. 1993). The North Cascades NPS Complex Ross Lake NRA falls within 11seven BMUs (See Figure 5.6).

The BMUs overlapping the North Cascades NPS Complex Ross Lake NRA have some of the highest percentages of Core Area within the North Cascades ecosystem, during both early and late seasons. The taskforce identified Core Areas for grizzly bears as being free of motorized traffic and high levels of human use. Core Area within this ecosystem is defined as any area more than 0.3 miles (500 meters) from a road or high use trail. These BMUs are largely within designated wilderness (Stephen Mather and Pasayten), with large, contiguous areas of relatively low human use. Habitat within and immediately surrounding the North Cascades NPS Complex Ross Lake NRA is highly diverse with regards to elevation, aspect, ecotype and available cover. Excellent denning habitat occurs upslope of critical low elevation spring habitat; high meadows provide isolation and predictable food resources. Several valleys wWithin the Complex Ross Lake NRA, the Big Beaver and Thunder valleys provide superb low elevation spring bear habitat, at a premium in an ecosystem in which most valleys are developed to some degree. The inundation of the upper Skagit River Valley by the Ross Lake reservoir makes the preservation of habitat such as found in these Big Beaver and Thunder Creek valleys all the more essential to grizzly bears, as well as many other species. AbundantThe avalanche chutes and meadows throughout the Complexon the slopes above Ross Lake provide important grizzly bear habitat for both during the spring ("early season") and summer/fall ("late season") foraging periods.

History has demonstrated, and research has shown, that grizzly bear populations have survived where frequencies of contact with humans were relatively low (Ciarniello et al. 2007, Schwartz et al. 2006, Suring et al. 2006, Boyce & Waller 2003, Mace et al. 1996, Kasworm and Manley 1990, McLellan and Shackleton 1988, Mattson et al. 1987). Reported responses of large carnivores to roads and trails have included spatial avoidance, decreased survival, and altered temporal activity patterns. Grizzly bear females with young generally avoid areas with high levels of human use when feasible, or potentially spend less time foraging within visual proximity of high human use (Gibeau et al. 2001, White et al. 1999, Wakkinen and Kasworm 1997, Mace and Waller 1996, Purves et al. 1992, Gunther 1990, Kasworm and Manley 1990, McLellan and Shackleton 1988). In addition, road and trail access has been directly attributed to mortality of bears as a result of legal and illegal shooting (Ciarniello 2007, Garshelis et al. 2005, Benn and Herrero 2002, Mace and Waller 1996, Knick and Kasworm 1989). By managing human access in grizzly bear habitat, the following objectives can be met: minimize human interaction and potential grizzly bear mortality, minimize displacement from important habitats, minimize bear-human conflicts developing over competition for food resources (improperly stored food and garbage, etc.), and provide relatively secure habitat where energetic requirements of bears can be met (IGBC 1998).

In 1994, the Interagency Grizzly Bear Committee (IGBC) identified a task force to develop a consistent analysis process for determining the existing level of human access and defining the area within which road and trail density should be measured (IGBC 1994/ 1998). The basis upon which habitat effectiveness for grizzly bears would be determined was the amount and quality of "core areas" within a BMU. Core areas were defined as areas with the following characteristics: (1) No motorized use of roads and trails during the non-denning period. (2) No roads or trails that receive non-motorized, high-intensity use. "High intensity use" was defined by the US Forest Service (1990, under the purview of the IGBC) as trails receiving an average of 20 or more parties per week. (3) A minimum of 0.3 miles (500 meters) from any open road, motorized trail, or high use trail. The 0.3 mile buffer was determined from a review of available research on the relationships among grizzly bears, roads, trails and habitat use (Mattson et al. 1987, McLellan and Shackleton 1988, Aune and Kasworm 1989, Kasworm and Manley 1990, Mace et al. 1996, Mace and Waller 1996).

The importance of managing motorized access, one of the most influential parameters affecting habitat security, has been well documented for grizzly bears. This research has demonstrated that when it is feasible, grizzly bears avoid areas within at least .3 miles of motorized roads/ trails (Proctor et al. 2005, Graves et al. 2004, Mueller et al. 2004, Gibeau et al. 2001a, Interagency Grizzly Bear Committee 1998, Mace and Waller 1996, Mace et al. 1996, Aune and & Kasworm 1989, McLellan and Shackleton 1988, Mattson et al. 1987) and that motorized road access in particular is positively correlated with higher grizzly bear mortality rates (Ciarniello et al. 2007, Ciarniello

et al. 2004, Benn and Herrero 2002, Aune and Kasworm 1989, Knick and Kasworm 1989). Grizzly bears, particularly females with young, generally also avoid areas with high levels of human use when feasible, or potentially spend less time foraging within visual proximity of high human use (Proctor at al. 2005, Gibeau et al. 2001b, White et al. 1999, Wakkinen and Kasworm 1997, Mace and Waller 1996, Purves et al. 1992, Kasworm and Manley 1990, McLellan and Shackleton 1988).

The *Interagency Grizzly Bear Committee Taskforce Report on Grizzly Bear/Motorized Access Management* (IGBC 1998) contains recommendations in order to provide a consistent approach to access management within and between grizzly bear ecosystems. The taskforce report identified "Core Areas" for grizzly bears as being free of motorized traffic and high levels of human use.

Given the particular challenges of addressing low Core Area availability in heavily roaded areas of the national forests and other lands within the North Cascades ecosystem, the subcommittee's technical team has recommended that the highest possible percentage of Core Area be maintained or increased within the BMUs dominated by designated wilderness. The BMUs overlapping the Complex have some of the highest core area values within the North Cascades ecosystem during both early and late seasons. Habitat quality is also high, as summarized above. While the restoration of a sustainable grizzly bear population will require all of the North Cascades ecosystem as a whole, maintaining existing, large, contiguous blocks high quality core areaof Core Area will be essential to grizzly bear recovery in both the short and long-term.

Wildlife

Mammals

Sixty-one mammal species have been documented in Ross Lake NRA. Common mammal species include pika, Townsend's chipmunk, hoary marmot, Douglas squirrel, beaver, black bear, and black-tailed deer. More elusive mammals found in the park complex include snowshoe hare, northern flying squirrel, coyote, martin, spotted skunk, river otter, mountain lion, bobcat, and elk. Nine species of bats are known to occur within park complex boundaries. A small herd of mountain goats, numbering less than 25 individuals, resides on Jack Mountain.

Park staff conducted forest carnivore studies in 2003 and 2004. A total of 78 camera stations were sampled over the 2-year period. More than 1,700 automatic photographs were taken. These photographs documented 13 mammal and 5 bird species. The most common mammal photographed was the American marten (34 stations). Other mammal species detected included black-tailed deer, spotted skunk, Douglas squirrel, forest mouse, coyote, and ermine. Targeted species, fisher and lynx, were not detected.

Special status mammal species are discussed in the Sensitive Species section of this chapter. Special status mammal species associated with Ross Lake NRA include gray wolf, grizzly bear, Canada lynx, Pacific fisher and California wolverine.

Birds

One hundred ninety-two bird species occur within Ross Lake NRA. Just over half of these species live year-round in Ross Lake NRA and/or come to habitats within Ross Lake NRA to breed and raise offspring. Approximately 80 species (42 percent) are neotropical migrants that winter south of the U.S. border. Birds that are prevalent in Ross Lake NRA include common merganser, bald eagle, rufous hummingbird, Steller's jay, American dipper, and an assortment of flycatchers, thrushes, warblers, and sparrows. Up to eight pairs of osprey nest along the Skagit River and three reservoirs. Along the Skagit River, deciduous forests of black cottonwood, red alder, bigleaf maple and several species of willow support small breeding populations of several bird species that are rare elsewhere in western Washington, such as veery, Nashville warbler, American redstart, and lazuli bunting (Wahl 1995; Smith et al. 1997).

Hoary Marmot near Desolation Lookout.

The largest concentration of bald eagles in Washington over-winter along the Skagit River due to its abundance of spawning anadromous fish and mild climate. Eagles arrive in November to gorge on spawning salmon and depart in March to return to their breeding grounds. Park biologists have monitored winter bald eagle populations from 1982 to present. Eagle counts peaked during the winter of 1991-1992; the peak one-day count was 510 birds. Since then most peak counts per year have averaged about 350 birds.

Reptiles

Only four reptile species inhabit Ross Lake NRA. These include the northern alligator lizard and three snakes: the rubber boa, western terrestrial garter snake, and common garter snake.

Amphibians

All 12 species of amphibians known to occur in the park complex have been found in Ross Lake NRA and currently three of these species are listed for special management status by either the Washington Department of Fish and Wildlife or the U.S. Fish and Wildlife Service (See Table 5.9).

Because amphibians occupy both aquatic and terrestrial environments and possess permeable skin, they are potentially at an increased risk from exposure to a wide range of stressors found in both of these environments. Reported declines have been attributed to disease, non-native predator populations, ultra-violet radiation, pollution, changing hydrologic regimes, and habitat alteration.

Fish and Fish Habitat

The Skagit River system is one of the few remaining systems in America which supports significant numbers of five native salmon species, two species of trout, and two species of char. These include six Chinook stocks (spring, summer, and fall), pink salmon, chum salmon, sockeye salmon, summer and winter run steelhead, sea run cutthroat trout, and Dolly Varden and bull trout. Of these stocks, all season-specific Chinook, sockeye, coho, and steelhead species are under review by state and federal agencies for potential listing under the Endangered Species Act. The system's fishery produces an average of 2,210,000 anadromous fish each year. Of this number, about a half-million return to spawn; the balance is harvested by commercial and sport fishermen or by natural predators at sea. These numbers of fish represent a

Table 5.9 Amphibian Species Found in Ross Lake NRA and Their Conservation Status

Common Name	Scientific Name	Documented in NOCA	Federal Status	State Status
Tailed Frog	Ascaphus truei	Yes	None	None
Pacific Chorus Frog	Pseudacris (Hyla) regilla	Yes	None	None
Red-legged Frog	Rana aurora	Yes	Species of Concern	None
Cascades Frog	Rana cascadae	Yes	None	None
Columbia Spotted Frog	Rana luteiventris	Yes	Species of Concern	Candidate
Western Toad	Bufo boreas	Yes	Species of Concern	Candidate
Northwestern Salamander	Ambystoma gracile	Yes	None	None
Long-Toed Salamander	Ambystoma macrodactylum	Yes	None	None
Pacific Giant Salamander	Dicamptodon tenebrosus	Yes	None	None
Ensatina	Ensatina eschscholtzii	Yes	None	None
Roughskin Newt	Taricha granulosa	Yes	None	None
Western Redback Salamander	Plethodon vehiculum	Yes	None	None

significant percentage of the Puget Sound anadromous fish harvest (somewhere between 20 percent and 30 percent).

The upper Skagit River within the Ross Lake NRA provides some of the most important salmon and steelhead spawning habitat in the Skagit River basin. This section of the Skagit system is highly conducive to the migration, spawning and rearing of both anadromous and resident fish. Factors contributing to the high-quality water in the upper Skagit include high dissolved oxygen content, relatively low nutrient level, and low bacterial content and relatively cool temperatures.

In addition, at least 13 other native fish species inhabit the streams and reservoirs of Ross Lake NRA. These include: mountain whitefish; minnows and dace; suckers; sculpins; and lampreys.

The reservoirs in Ross Lake NRA have altered and extended habitat, allowing fish migration above natural stream barriers. Prior to 1900, native anadromous and resident fish occupied primarily the low-gradient mainstream rivers and floodplain portions of tributary streams in Ross Lake NRA. Native salmonid fish became established in naturally isolated tributary streams when reservoirs were constructed and filled.

Non-native fish were introduced into the lakes of the Ross Lake National Recreation Area through stocking. Stocking of trout species in high mountain lakes within the tributaries of Ross Lake is well documented. These included California golden trout, coastal cutthroat trout, west slope cutthroat trout, rainbow trout, and brook trout. These fish have invaded naturally fishless streams through downstream dispersal from planted lakes. Stocked fish populations have developed in Thunder, Fisher, Big Beaver, Newhalem, and Ruby creeks. The expansion of nonnative hatchery strains may be impacting native fish populations through interbreeding or by competition and predation.

Pink salmon in Goodell Creek.

In recent years a substantial population of red sided shiners (native to area but possibly introduced) have been observed in Ross Lake. The red sided shiner is a small minnow (2 to 4 inches) and a prolific breeder. The shiners eat the same food as trout (algae and insect larva) and easily adapt to a variety of water and habitat conditions. At this time the effects of this population explosion on the native rainbow trout and char in Ross Lake are unknown.

Ross Lake Reservoir Tributary Trout Habitat

The tributaries to Ross Lake which had the potential to support trout spawning were surveyed during the spring and summer of 1989 by the Seattle City Light Environmental Affairs Division. These surveys were designed to evaluate the quantity and quality of spawning habitat as well as identify barriers to fish passage from the lowest level of the draw down zone (1500') to the first migration barrier above full pool elevation (1602'). Much of the following stream habitat information was taken from the 1989 Seattle City Light Report. To date, no other comprehensive survey of fish distribution has occurred in the stream reaches located above these barriers identified in the 1989 Seattle City Light surveys.

Arctic Creek

Within the drawdown reach of Arctic Creek, from an elevation of 1500' to 1558', a few small pockets of suitable spawning habitat exist for trout species. Most of the streambed substrate is too large and the stream gradient too steep to provide substantial spawning habitat. A total barrier to fish passage occurs in Arctic Creek at an elevation of 1558'. The barrier is a waterfall that has a vertical drop of approximately one hundred feet and acts as a barrier to trout migration, even at Ross Lake's full pool elevation. Above the barrier to the boundary of Ross Lake NRA there is approximately 1.8 miles of stream habitat. This habitat is overall too steep to allow for significant resident trout populations and would likely have been historically fishless.

Big Beaver Creek

No suitable spawning habitat exists within the drawdown reach of Big Beaver Creek. The streambed within the drawdown reach is primarily boulder and bedrock substrates with multiple falls and high velocity

riffles. At full pool the first migration barrier to trout occurs at an elevation of 1725' near the confluence of Big Beaver Creek and McMillan Creeks. The 1989 Seattle City Light survey indicated a long series of cascades and whitewater at this point with multiple barriers to migration. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 7.6 miles of stream habitat. This stream reach offers excellent fish habitat with low stream gradients and abundant off channel habitat. Historically fish were prevented from accessing Big Beaver Creek by a barrier falls that occurs within the current draw down zone of Ross Lake.

Devils Creek

There is almost no spawning habitat available within the draw down reach of Devils Creek due to numerous barriers and large streambed substrate. Above the full pool elevation of 1602' the streambed gradient of Devils Creek is 4-5 percent and the stream is confined to a narrow bedrock canyon. Several barriers to trout migration occur within the first 500 feet of Devils Creek. The first barrier occurs about 300 feet upstream from the full pool elevation and consists of a 12 foot high chute/ waterfall formed by bedrock. Below the first barrier a limited amount of spawning habitat exists. About one hundred feet above the first barrier there is an 8 foot high bedrock chute, and another 7 foot barrier waterfall occurs an additional one hundred feet upstream. All these waterfalls were determined to be barriers at all flows. Resident rainbow trout were present in Devils Creek above the migration barriers at the time of this survey. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 1.3 miles of stream habitat within Devils Creek. This stream reach offers poor quality fish habitat due to its steep gradient.

Dry Creek

Most of the high quality spawning habitat in Dry Creek is within the draw down reach. Stream gradient with this zone varies between 2 percent and 7 percent and provides many areas of spawning habitat. Above Ross Lake full pool elevation the first potential barrier to fish passage occurs upstream 500 feet. At this point the stream gradient increases to 14 percent and the stream is primarily whitewater and cascades. About 1200 feet upstream from Ross Lake full pool a 6 foot high chute and a 10 foot high boulder cascade form an impassable barrier to upstream trout passage. Resident rainbow trout were documented above this barrier. The only spawning habitat available above the full pool elevation occurs in the first 500 feet of Dry Creek. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 1.2 miles of stream habitat within Dry Creek. This stream reach offers poor quality fish habitat due to its steep gradient and small size.

Hozomeen Creek

The majority of the spawning habitat in Hozomeen Creek occurs within the draw down reach below full pool elevation. From elevation 1573' to 1595' the streambed gradient is 1 – 3 percent and substrate is dominated by gravels suitable for spawning. Below 1570 ft elevation substrate is dominated by sand and silt. Above the full pool elevation of 1602' the gradient of Hozomeen Creek precludes good spawning habitat and at 1625' an impassable barrier exists consisting of steep bedrock chutes. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 2.7 miles of stream habitat within Hozomeen Creek. This stream reach offers good quality fish habitat due to its moderate gradient. This stream reach was historically fishless due to the barrier falls located just upstream from the full pool elevation. Hozomeen Lake was stocked with Brook Trout and this population has dispersed downstream throughout Hozomeen Creek to Ross Lake.

Lightning Creek

The stream gradient within the drawn down of Lightning Creek ranges from 0.5 percent to 3 percent and provides good spawning habitat. Above the full pool elevation there is 1400 feet of habitat accessible to trout in Lightning Creek. A landslide of large boulders creates an impassible 13 foot waterfall above this point. Nine hundred feet above this barrier, large boulders create another 6 foot high cascade which would be a barrier to most fish. Above these barriers Lightning Creek has a gradient of approximately 3 percent and offers excellent trout habitat. The lower quarter mile of Lightning Creek, including its mouth, are important spawning areas for Ross Lake trout. From the full pool elevation at Ross Lake to the boundary of Ross Lake National Recreation Area (Ross Lake NRA) there are 7.2 miles of stream habitat within Lightning Creek. This stream reach offers good quality habitat to resident trout. In the reaches above the barrier falls the populations consist of Dolly Varden/Bull Trout and Rainbow Trout that have existed since before human stocking efforts of this past century.

Little Beaver Creek

Little Beaver Creek has very little spawning habitat in the draw down reach. Most of this reach consists of a long, fast, deep riffle; however, isolated pockets of suitable spawning habitat do occur in some locations. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 2.0 miles of stream habitat within Little Beaver Creek. From the full pool line upstream approximately 1 mile, a number of bedrock chutes and waterfalls create a barrier to fish migration and provide no spawning habitat. Above this reach the gradient decreases and offers good quality fish habitat due to its low gradient and abundant off channel habitat. It is highly likely that Little Beaver Creek was fishless due to the barrier falls near full pool elevation. Fish populations within Little Beaver Creek were likely introduced by humans.

No Name Creek

The only suitable spawning habitat in No Name Creek occurs in the alluvial fan within the draw down reach below an elevation of 1543'. The stream gradient is 1.5 percent here and substrate is dominated by gravels. A barrier falls occur on No Name Creek immediately above full pool. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 1.9 miles of stream habitat within No Name Creek. This area offers poor quality fish habitat due to its steep gradient. At this time, it is unlikely that fish populations exist in this reach. This stream reach was historically fishless due to numerous upstream migration barriers.

Pierce Creek

Within the draw down reach of Pierce Creek there are small isolated patches of suitable spawning habitat but overall the creek velocities are too high. Streambed gradient above full pool elevation in Pierce Creek is 33 percent, and no suitable trout spawning habitat is available, high gradient and a series of bedrock falls precludes trout migration. From the full pool elevation to the boundary of Ross Lake NRA there are 0.9 miles of stream habitat within Pierce Creek. This stream reach offers poor quality fish habitat due to its steep gradient and was historically a fishless stream reach. Current isolated populations of trout species may exist in this reach through dispersal downstream from stocked lakes.

Roland Creek

The majority of suitable spawning habitat on Roland Creek is within the draw down reach though this habitat is of marginal quality. Streambed substrates are somewhat angular and cemented by fine sediments. Above the full pool elevation Roland Creek is a small steep gradient stream with an estimated spawning area of 350 feet[2] accessible to Ross Lake trout. The first barrier to upstream trout migration occurs 1400 feet upstream from the full pool elevation. This barrier consists of a 6 foot high chute cascading over instream logs. Upstream from this point the gradient increases further and a bedrock chute creates another barrier to trout. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 1.1 miles of stream habitat within Roland Creek. This stream reach offers poor quality fish habitat due to its steep gradient and small size.

Ruby Creek

Within the draw down reach of Ruby Creek some small pockets of good spawning habitat exist along the margins of the channel. In general the stream depths were too deep and substrate too large to provide suitable spawning habitat. The reaches of Ruby creek above full pool elevation provide abundant spawning habitat for native fish. Tributaries to Ruby creek including Canyon Creek and Granite creek have particularly good spawning habitat. There are no identified barriers to trout migration within these creeks until reaching the increased gradient of headwater streams. There are about 21 miles of accessible habitat in the Ruby drainage. From the full pool elevation at Ross Lake to the boundary of Ross Lake NRA there are 1.4 miles of stream habitat within Ruby Creek. This stream reach offers good quality fish habitat due to its moderate gradient and large size. This reach contains native populations of Rainbow Trout and Dolly Varden/Bull Trout.

Silver Creek

Within the draw down reach there are areas of suitable spawning habitat near the mouth of Silver Creek and along the margins of the channel. Gradients range from 1 – 3.5 percent and the substrate is composed of gravels and cobbles. Above full pool there is virtually no suitable spawning habitat for trout as the gradient approaches 11 percent. The gradient continues to increase upstream where it forms a nearly continuous series of cascades and waterfalls. Above full pool to the Ross Lake NRA boundary 1.1 miles of stream exists.

Canadian Reach of the Skagit River

According to Johnson (1989) the Canadian Skagit River and its tributaries have more fish spawning

habitat than all the U.S. tributaries to Ross Lake. Stream gradients are generally lower and substrate more appropriate for trout spawning in the Canadian Skagit River System.

Diablo Lake Tributary Trout Habitat

Diablo Lake tributaries believed to support trout spawning were surveyed during spring and summer 1989 by the Seattle City Light Environmental Affairs Division. Surveys were designed to evaluate the quantity and quality of spawning habitat as well as identify barriers to fish passage. Much of the following stream habitat information was taken from this report.

Similar to the Ross Lake tributaries, it is likely that fish are now present in streams which were historically fishless due to widespread stocking efforts within the past century. Stocking of trout species in high mountain lakes within the tributaries of Diablo and Gorge reservoirs is well documented. These introduced fish are capable of dispersing downstream into water bodies below. To date no comprehensive survey of fish distribution has occurred in the stream reaches located above the identified barriers.

Colonial Creek

Small isolated patches of suitable spawning habitat for trout occur in Colonial Creek in the tail-outs of small pools and along the stream margins from the full pool elevation of Diablo Reservoir upstream 1100 feet. From 1100 feet to 1700 feet upstream the gradient increases to 8 percent and stream substrate size increases. A barrier falls occurs 1700 feet upstream from full pool elevation which prevents fish passage. This waterfall has a 7 foot vertical drop which is a barrier to fish at all flows. From the mouth of Colonial Creek to the Ross Lake NRA boundary there are 1.3 miles of stream habitat.

Deer Creek

Within the lower 120 feet of Deer Creek contain numerous small chutes, cascades and waterfall barriers which would prevent upstream fish passage. From the mouth of Deer Creek to the Ross Lake NRA boundary there is 1.2 miles of stream habitat. This habitat is not suitable for trout due to the high gradient and small size of the stream.

Rhode Creek

Rhode Creek has a very small amount of spawning habitat (100 feet^2) in the lower 200 feet of stream. However the spawning habitat is considered poor quality due to the lack of cover, proximity to a road and campground and unstable stream banks. The stream gradient is 4 percent in the lower 200 feet of channel. A concrete culvert forms a total barrier to fish passage about 250 feet from the mouth of Rhode Creek. Above the barrier the streambed gradient increases to 15 percent and there is no habitat available for trout spawning. From the mouth of Rhode Creek to the Ross Lake NRA boundary there is 1.6 miles of stream habitat. This habitat is not suitable for trout due to the high gradient and small size of the stream.

Thunder Creek

Thunder Creek is the largest tributary to Diablo Lake (not counting the Skagit River) and provides the most important trout spawning for Diablo Lake. In the lower 1.5 miles of stream the substrate consists of cobble and boulders and habitat is primarily large deep runs, pools and riffles. Depths range from 3-8 feet and widths range from 70-90 feet. Good spawning habitat is common along the edges of Thunder Creek, especially in the lower ½ mile of stream. There are no barriers to fish passage in Thunder Creek, however, tributaries to Thunder Creek were typically steep and unsuitable for trout spawning or rearing. From the mouth of Thunder Creek to the Ross Lake NRA boundary there is 5.3 miles of stream habitat. The first 3.1 miles of stream habitat is accessible to trout migrating upstream from Diablo Lake. A barrier falls at this point precludes fish passage into the upper 2.2 miles of stream habitat within Ross Lake NRA. Fish presence in the reach from the barrier falls upstream to the Ross Lake NRA boundary is of uncertain origin.

Gorge Lake Tributary Trout Habitat

Gorge Lake tributaries believed to support trout spawning were surveyed during spring and summer 1989 by the Seattle City Light Environmental Affairs Division. Surveys were designed to evaluate the quantity and quality of spawning habitat as well as identify barriers to fish passage. Much of the following stream habitat information was taken from this report.

Similar to the Ross Lake tributaries, it is likely that fish are now present in streams which were historically fishless due to widespread stocking efforts within the past century. Stocking of trout species in high mountain lakes within the tributaries of Diablo and Gorge lakes is well documented. These introduced fish are capable of dispersing downstream into water bodies below. To date no comprehensive survey of

fish distribution has occurred in the stream reaches located above the identified barriers.

Pyramid Creek

The lowermost 400 feet of Pyramid Creek contains about 500 feet^{t2} of spawning habitat. A series of falls shortly above this reach precludes all fish passage. From the mouth of Pyramid Creek to the Ross Lake National Recreation Area (Ross Lake NRA) boundary there is 2.6 miles of stream habitat. This habitat is not suitable for trout due to the high gradient and small size of the stream.

Stetattle Creek

Stetattle Creek is the largest tributary to Gorge Lake, besides the Skagit River, and subsequently contains the most spawning habitat for trout and char. The lower 1.5 miles contain an estimated 1800 feet2 of spawning habitat. Most of this habitat occurs along the stream margin or in pool tail-outs. Stream gradient in this reach is 3-5 percent. A 100 foot falls occur about 1.5 miles upstream from Gorge Lake creating a barrier to fish passage. From the mouth of Stetattle Creek to the Ross Lake NRA boundary there are 1.1 miles of stream habitat. This habitat is suitable for trout due to the low gradient and large size of the stream. This reach is entirely below the barrier falls described above. Fish presence above the barrier and upstream of the Ross Lake NRA boundary has been documented and is likely due to stocking.

Sensitive Species

Special Status Wildlife

Three mammal species are listed under the federal Endangered Species Act. These include the "endangered" gray wolf (*Canus lupus*) and the "threatened" grizzly bear (*Ursus arctos*) and Canada lynx (*Lynx Canadensis*). Two bird species, marbled murrelet (*Brachyramphus marmoratus marmoratus*) and northern spotted owl (*Strix occidentalis caurina*), are both listed as "threatened". There are also two federal "candidate" species, the fisher (*Martes pennanti*) and Columbia spotted frog (*Rana luteiventris*). Additionally, two "monitor" species, both recently delisted, include bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*). There are six state endangered, two state threatened, and eleven state candidate wildlife species found in Ross Lake NRA (Table 5.10).

Gray Wolf (federal – endangered, state – endangered)

Wolves are highly social animals with large home ranges that include a variety of habitat types. Key components of wolf habitat include: (1) sufficient, year-round prey base of ungulates and alternate prey (i.e., beaver and smaller mammals), (2) suitable and somewhat secluded denning and rendezvous sites, and (3) sufficient space with minimal exposure to humans. Wolf distribution is largely influenced by distance from human activity and wolves are highly susceptible to human-caused mortality.

Small numbers of gray wolves persist within the North Cascades, as evidenced by annual observations (NPS files). Recent confirmed sightings include areas just east of Ross Lake NRA and provide evidence that wolves are successfully reproducing. There is currently no U.S. Fish and Wildlife Service recovery plan for wolves in the North Cascades.

Grizzly Bear (federal – threatened, state – endangered)

Grizzly bears are habitat generalists with large spatial requirements in terms of both foraging and security. No data are available to assess grizzly bear habitat use in the North Cascades. Studies in similar habitats show similarities and differences (McLellan and Hovey 2001; Waller and Mace 1997) in resource selection in areas less than 50 miles apart. This variation in habitat use would be expected in the North Cascades as well. These and other grizzly bear habitat use studies suggest it is likely grizzly bears in this ecosystem use an elevational gradient through the year and, based on availability, rely on avalanche chutes, shrub fruits, riparian areas, carrion and small mammals. Ross Lake NRA is within the North Cascades Grizzly Bear Recovery Zone and provides all of the habitat types grizzly bears prefer, including undisturbed riparian areas that are rare in other parts of the recovery zone.

The North Cascades portion of the *Grizzly Bear Recovery Plan* (USFWS 1993) was approved in 1997. The most current population estimate for the North Cascades ecosystem as a whole (including the portion within British Columbia) is less than 35 individuals (Interagency Grizzly Bear Committee, July 2007 unpublished report). In 1991, the Fish and Wildlife Service first issued a warranted but precluded finding to uplist the North Cascades recovery zone population to endangered status. This uplisting action continues to be precluded by higher priority listing actions (USFWS Species assessment and listing priority

assignment form, 2004). All boat-in campsites within Ross Lake NRA have been ~~or soon will be~~ equipped with bear-resistant food storage boxes ("bear boxes"), and several walk-in sites within Colonial Creek and Newhalem Creek campgrounds likewise have been provided with bear boxes. A non-governmental organization has been conducting extensive grizzly bear outreach and education throughout the recovery zone, including Ross Lake NRA. These measures notwithstanding, given the extremely low number of grizzly bears remaining in the ecosystem it is unlikely they will recover to a sustainable population without the aid of population augmentation. An EIS is required to determine if and how this will be undertaken.

Canada Lynx (federal – threatened, state – threatened)

Lynx are associated with subalpine and boreal forests throughout their range (Witmer et al. 1998; Aubry et al. 1999). This species requires a mosaic of forest seral stages connected by stands suitable for travel cover. Lynx use late-seral forests for denning and rearing young and use early-seral forests for foraging (Aubry et al. 1999). Primary prey includes snowshoe hares, although lynx will take other prey, particularly when hare density declines.

Lynx generally use higher elevation (above 3,000-4,000 feet) lodgepole pine, subalpine fir, and/or Engelmann spruce forests. Suitable lynx habitat exists east of Ross Lake, but it is found only in small patch sizes. A remote camera survey completed in 2005, targeting forest carnivore species (including lynx) did not document lynx. The NPS currently has no documented records in Ross Lake NRA. However, there is unconfirmed evidence that lynx may occasionally wander as far west as Mount Baker.

Table 5.10 Wildlife Species Associated with Ross Lake NRA and Their Conservation Status

Species	Federal List	State List
Gray Wolf	Endangered	Endangered
Grizzly Bear	Threatened	Endangered
Canada Lynx	Threatened	Threatened
Marbled Murrelet	Threatened	Threatened
Northern Spotted Owl	Threatened	Endangered
Pacific Fisher	Candidate	Endangered
Columbia Spotted Frog	Candidate	Candidate
Bald Eagle	Monitor	Sensitive
Peregrine Falcon	Monitor	Sensitive
California Wolverine		Candidate
Townsend's Big-eared Bat		Candidate
Northern Goshawk		Candidate
Western Toad		Candidate
American White Pelican		Endangered
Sandhill Crane		Endangered
Western Grebe		Candidate
Golden Eagle		Candidate
Merlin		Candidate
Vaux's Swift		Candidate
Lewis' Woodpecker		Candidate
Pileated Woodpecker		Candidate
Common Loon		Sensitive

Bold represents official current federal and/or state listed status.

Marbled Murrelet (federal – threatened, state – threatened)

Marbled murrelets forage almost exclusively in the near-shore marine environment and fly inland to nest in the canopy of mature and old-growth conifer forests. Current monitoring estimates marbled murrelet populations in Washington, Oregon, and California are declining at a rate of 4 percent to 7 percent annually (USFWS 2008). More recently, major declines (22-73 percent) over a decade or more have been documented in Alaska, British Columbia, and Oregon (Strong 2003, Burger 1995, 2002, Chatwin et al. 2000). McShane et al. (2004) projected a mean annual rate of decline of 2-6 percent per decade over the next 40 years based a more detailed demographic modeling procedure.

Prior to 2008, NPS biologists had never conducted a formal inventory of marbled murrelets because the park complex was considered too far inland. Only two incidental observations document the presence of murrelets in the park complex. Both observations were of single birds found on Ross Lake in late summer, after the breeding season was over. However, U.S. Forest Service surveys conducted immediately adjacent to the park complex in the early 1990s documented murrelets using suitable nesting habitat in many of their low elevation drainages within 5 km (3 miles) of the complex boundary. Nelson (1997) states that the most inland occupied nest site in the Pacific Northwest was located 84 km (52 miles) from marine waters in Washington. In 2008, park biologists initiated a radar survey of five drainages in the park complex. Preliminary results show probable detections in Ross Lake NRA along the lower Skagit River (Hamer et. al. in progress). Ground surveys will be conducted in Ross Lake NRA in 2009-2010 to try to confirm the 2008 radar detections.

Northern Spotted Owl (federal – threatened, state – endangered)

Northern spotted owls occupy mature, old-growth Douglas fir / western hemlock forests that have multi-layered, multi-species canopies with moderate to high canopy closure (USFWS 2008). The final recovery plan (USFWS 2008) designates Managed Owl Conservation Areas (MOCAs) in non-fire dominated habitats west of the Cascades. Two MOCA-2s are designated within Ross Lake NRA. MOCA-2s have enough "habitat-capable" area to support one to 19 pairs of breeding spotted owls (USFWS 2008).

Surveys completed over three years (1994-1996) by NPS staff documented three spotted owl activity sites within Ross Lake NRA (Kuntz and Christophersen 1996). Kuntz and Christophersen (1996) also documented 23 barred owls sites within Ross Lake NRA. In 1995, they found a hybrid spotted/barred owl mated to a female barred owl in the Big Beaver Valley. NPS staff will re-survey spotted owl habitat in 2009-2010 to document changes over the past 15 years.

Fisher (federal – candidate, state – endangered)

Fishers are generally associated with late-successional coniferous and mixed coniferous-deciduous forests, though second growth forest with good cover may also be used. Core habitat zones on the east-slope of the Cascades include subalpine fir and grand fir/Douglas fir forests. Fishers require snags and logs for natal and maternal dens and rest sites.

In Washington, due to lack of recent sightings or trapping reports, the fisher is considered to be extirpated or reduced to scattered individuals (Aubry and Houston 1992). Recent remote camera surveys in the park complex, targeting forest carnivore species failed to document fisher presence (Kuntz and Glesne 1993, Duke Engineering and Services 2000, Christophersen et al. 2005, and Christophersen 2006). Occasional observations are reported to park staff, but all sightings remain unconfirmed. In 2007, the fisher was reintroduced in Olympic National Park (P. Happe, NPS, 2008 pers. com.). If reintroduction efforts are successful on the Olympic Peninsula, similar efforts may be implemented in the Cascades.

Columbia Spotted Frog (federal – candidate, state – candidate)

In Washington, Columbia spotted frogs range in elevation from 1700' to 3100'. Breeding occurs shortly after ice-free water appears, usually in spring and early summer, but can occur in late winter at lower elevations. Jones et al. (2005) states "the species breeds in relatively exposed, shallow waters of sedge fens, riverine overbank pools, beaver ponds and small lakes. Vegetation in the breeding pools generally is dominated by herbaceous plants." This species is known from only one location in Ross Lake NRA (Holmes and Glesne 1997).

Bald Eagle (federal – monitor, state – sensitive)

Bald eagles are associated with riparian and open water habitats (i.e., rivers, lakes, and bays) with large trees and adequate prey (i.e., fish and/or waterfowl)

concentrations. Nests are generally in the tallest tree in a stand, and nest sites are usually located within 0.25 mile of large bodies of water (Montana Bald Eagle Working Group 1991). In most areas, absence of intense human activity is also an important factor in nest site selection (Stinson et al. 2001). Important habitat components for wintering eagles include concentrations of prey in areas with tall trees that provide suitable perch and roost sites (Stalmaster 1987; Stinson et al. 2001). As with the nesting period, the level of human disturbance also influences wintering habitat quality.

The bald eagle was federally delisted in 2007. The species is now being monitored by federal and state agencies to ensure that the post-delisting monitoring plan goals are being met. Ross Lake NRA hosts one of the continent's largest wintering eagle concentrations along the Skagit River. Eagles arrive in November to take advantage of the numerous spawning salmon using the Skagit. Mild winter weather enables these eagles to continue using this area throughout the winter. They depart the Skagit River for their breeding grounds in early March. Servheen (1975) documented the Skagit River as the most important wintering habitat for Bald Eagles in the continental United States. The Nature Conservancy and National Park Service have monitored eagle use of the upper Skagit River since 1978 (Dunwiddie and Kuntz 2001). Eagle use of the river peaked in the early 1990s and has been stable since that time. The upper Skagit River continues to be an important wintering resource for this species.

A bald eagle near Roland Point on Ross Lake.

Since inception of the park complex in 1968, no breeding pairs of bald eagles have been documented within Ross Lake NRA. However, park staff occasionally observe adult bald eagles during the breeding season along Ross Lake.

Peregrine Falcon (federal – monitor, state – sensitive)

The peregrine falcon is a medium to large falcon that nests on ledges on cliff faces. Peregrines were federally delisted in 1999, but remain a federal "monitor" species under the Endangered Species Act. Over the past decade peregrine populations in Washington have dramatically increased and the species appears to be re-colonizing suitable nesting habitat within the park complex.

Bjorklund (1984) surveyed suitable habitat within Ross Lake NRA. While he surveyed many highly suitable areas of breeding habitat, he did not observe any peregrines during the breeding season. Washington Department of Fish and Wildlife biologists, conducting surveys of breeding habitat over the last several years, have documented four active eyries along the upper Skagit River (P. DeBryun, 2008 pers. com.).

California Wolverine (federal – none, state – candidate)

The wolverine is a rare, secretive mammal that occurs at low densities, even in core areas of its range. They are generally found in areas remote from humans and human development. Home ranges of adults in North America are large and vary from less than 40 miles^2 to over 350 miles^2 (Banci 1994). Habitat conditions that influence wolverine distribution and abundance are largely unknown (Banci 1994), but their habitat is probably best defined in terms of "adequate year-round food supplies in large, sparsely inhabited wilderness areas, rather than in terms of particular types of topography or plant associations" (Kelsall 1981). Wolverines are described as opportunistic omnivores in summer and scavengers in winter. In the Yukon and British Columbia, wolverine diets consisted of snowshoe hares, porcupines, sciuridae, birds, small mammals, ungulates, and fish (Banci 1994). Current research being conducted near the east border of the park complex is following the movements of several collared animals and has documented presence in Ross Lake NRA (Keith Aubrey, U.S. Forest Service, pers. com.).

Townsend's Big-eared Bat (federal – none, state – candidate)

This bat is a widespread but declining low- to mid-elevation species found below Pacific silver fir and subalpine fir communities. Christophersen and Kuntz (2003) documented the only known occurrence of this species in the park complex, an individual found along the western bounds of Ross Lake NRA.

Northern Goshawk (federal – none, state – candidate)

The northern goshawk occurs in upland mesic conifer and deciduous riparian forests. This species is an uncommon nester and rare migrant within Ross Lake NRA. Bjorklund and Drummond (1989) documented a dispersed fall south-bound movement of goshawks through the park complex (0.02 birds/hour of survey effort).

Western Toad (federal – none, state – candidate)

Western toads range in elevation from sea level to 7400'. Egg laying sites and aquatic habitat include lakes, springs, ponds, wetlands, stock ponds and slow-moving parts of streams. Terrestrial habitats are forests, grasslands and along streams. Western toads are most common near marshes and small lakes, but they may wander great distances through dry forests or shrubby thickets. Outside of the breeding season, western toads are nocturnal, spending the day buried in the soil, concealed under woody debris, or in the burrows of other animals. While the species can be locally abundant in Ross Lake NRA, reproductive adults are rare and declining.

American White Pelican (federal – none, state – endangered)

The park complex's Wildlife Observation Database documents three observations of this species' occurrence in NRA. The nearest breeding colony is in south-central Washington on the Columbia River. Records for Ross Lake NRA are of birds moving outside their normal range.

Sandhill Crane (federal – none, state – endangered)

This species is a fairly common to locally abundant migrant in Washington, preferring open fields near estuaries and wet farm fields (Wahl et al. 2005). There are only two records for Ross Lake NRA, both along the shores of Ross Lake (NPS files).

Western Grebe (federal – none, state – candidate)

The western grebe is a rare migrant and non-breeding summer visitor to Ross Lake NRA's reservoirs. However, the species is most likely to be seen from mid September through mid November (NPS files).

Golden Eagle (federal – none, state – candidate)

This species is a rare breeder and fall migrant in the Cascades Range, occurring most frequently in subalpine/alpine habitats. Bjorklund and Drummond (1989) documented a fall migration in the park complex of 0.1 birds per hour of survey effort over the period 1984-1988. A Washington state survey in 1985 revealed only 20 territories (11 occupied) in all of western Washington.

Merlin (federal – none, state – candidate)

Merlins are uncommon residents and breeders in Ross Lake NRA. Most breeding pairs are likely the subspecies *Falco columbarius columbarius*, the taiga merlin (Smith et al. 1997). This subspecies prefers high-elevation forests that mimic boreal conditions.

Vaux's Swift (federal – none, state – candidate)

Vaux's swift is a common breeder in forested zones from sea level to 5000'. It nests in tree cavities and eats mostly flying insects. Park studies (R. Kuntz BBS data) have documented this species as regularly occurring in Ross Lake NRA from May through September. This species likely visits high elevation sites (above treeline) strictly as "fly overs".

Lewis' Woodpecker (federal – none, state – candidate)

Lewis' woodpeckers breed in open canopied ponderosa pine forests or in riparian woodlands dominated by cottonwoods, oak woodlands, or cultivated orchards east of the Cascade Crest (Wahl et al. 2005). In Washington, this woodpecker is migratory. There only are three observational records of this species for Ross Lake NRA, all likely representing migrants (Wildlife Observation Database).

Pileated Woodpecker (federal – none, state – candidate)

This species is common in mid-seral and late-seral forests, mostly at low and moderate elevations. It is much less common in subalpine fir and mountain hemlock forest communities. Key habitat needs

include the presence of large snags used for nesting and roosting. Siegel et al. (2004) documented pileated woodpeckers in all conifer or mixed deciduous-coniferous forests for low elevation up to and including the mountain hemlock cover type.

Common Loon (federal – none, state – sensitive)

Common loons are common migrants and winter visitors, and rare breeders in Washington. Breeding pairs prefer lakes and reservoirs with suitable emergent shoreline vegetation and minimal development and disturbance (Wahl et al. 2005). In Ross Lake NRA, common loons are uncommon migrants, visiting reservoirs and a few of the larger lakes. Two of approximately 25 lakes in Washington known to have nesting pairs of this species occur in Ross Lake NRA (Smith et al. 1997).

Special Status Fish

Three species of fish are listed under the federal Endangered Species Act in the Skagit System: Chinook salmon, steelhead trout, and bull trout. Coho salmon and coastal cutthroat are federal species of concern. Chinook and bull trout are also listed as Washington State species of concern (Table 5.11).

Chinook Salmon

The Puget Sound Chinook salmon Evolutionarily Significant Unit was listed as a threatened species on March 24, 1999 by the National Marine Fisheries Service under the federal Endangered Species Act. Chinook salmon stocks originating from the Skagit River have been in a long-term decline. Chinook catches in the Skagit terminal area have declined since at least 1935; ranging from 40,000 to 50,000 in the 1930s, dwindling down to annual catches of a few thousand or even hundreds during the 1990s. Return/spawner rates have been below average since brood year 1983. Since about 1984, Upper Skagit summer Chinook have made up an increasing percentage of the total escapement. Prior to 1984, approximately 60 percent of the summer and fall production unit escapement was comprised of Upper Skagit summer Chinook, yet, since that time, Upper Skagit summer Chinook have averaged about 75 percent of the total summer and fall production unit escapement.

The Ross Lake NRA section of the Skagit River mainly supports all fresh water life history stages (egg, fry, juvenile rearing, and adult spawning) of one of the six separate Skagit Chinook populations (Upper Skagit summer Chinook). Upper Skagit summer Chinook spawn in the Skagit mainstem and its tributaries upstream of the Sauk River, primarily from September through early October. Genetic analyses have shown that upper Skagit summer Chinook are significantly differentiated from other Skagit Basin Chinook populations.

Bull Trout

The Coastal Puget Sound Distinct Population Segment of bull trout was listed as a threatened species under the Endangered Species Act on November 1, 1999 by the U.S. Fish and Wildlife Service. The Puget Sound Management Unit consists of eight core areas, each supporting one or more local populations of bull trout and their habitat. The Coastal-Puget Sound Distinct Population Segment of bull trout occurs in a unique ecological setting because it supports the only known anadromous forms of bull trout in the coterminous United States.

The Ross Lake NRA section of the Skagit River is part of the Lower Skagit core area and supports bull trout that exhibit anadromous, fluvial and resident life history patterns. Three local populations (Bacon Creek, Goodell Creek and Newhalem Creek) spend a portion of their lives in this section of river. The population trend of the Lower Skagit bull trout is stable to increasing.

Steelhead Trout

The Puget Sound Distinct Population Segment of steelhead was listed as a threatened species under the federal Endangered Species Act on May 11, 2007 by the National Marine Fisheries Service. This section of the Skagit River supports all fresh water life history stages (egg, fry, juvenile rearing, and adult spawning) of both summer and winter steelhead. In 2002 the Mainstem Skagit/Tributaries winter steelhead was rated as depressed due to a long-term negative trend in escapements since 1992 and a short-term severe decline in 2000 and 2001.

Special Status Plants

Several Washington State listed vascular plant species have been found within Ross Lake NRA. No federally listed species are known to occur within the North Cascades NPS Complex. Washington State listed species are found in Table 5.12.

Table 5.11 Fish Species Found in Ross Lake NRA and Their Conservation Status

Species		Federal List	State List
Steelhead (Puget Sound)	*Oncorhynchus mykiss*	Threatened	none
Coho salmon (Puget Sound)	*Oncorhynchus kisutch*	Concern	none
Coastal cutthroat	*Oncorhynchus clarki clarki*	Concern	none
Chinook salmon (Puget Sound)	*Oncorhynchus tshawytscha*	Threatened	Concern
Bull trout	*Salvelinus confluentus*	Threatened	Concern

Table 5.12 Plant Species Found in Ross Lake NRA and Their Conservation Status

Species	Common name	Habitat	State Status
Botrychium pedunculosum	Stalked moonwort	Moist or dry meadows, along perennial streams, and in coniferous forests. Elevations range from 1800' to 6300'.	Sensitive
Botrychium pinnatum	St. John's moonwort	Moist coniferous forests, mossy talus slopes under mixed deciduous and coniferous cover, subalpine meadows, and disturbed areas. Elevation ranges from 1900' to 7300'.	Sensitive
Carex buxbaumii	Buxbaum's sedge	Peat bogs, marshes, wet meadows, and other wet places. Elevations ranging from 700' to 6200'.	Watch
Carex magellanica ssp. irrigua	boreal bog sedge	Fens, bogs, shady wet meadows, shrub wetlands, and marshes, often growing in peat soil, at 1640 to 7000'.	Sensitive
Carex macrochaeta	large-awn sedge	The species grows most often in moist or wet, open places, and near a seepage area close to a slide alder (Alnus sinuata) thicket	Threatened
Carex pluriflora	several flowered sedge	Wetlands, boggy lake margins, prairies and stream banks. This species often grows in sphagnum and peaty soils in areas dominated elevation from 160' to 3160'	Sensitive
Carex saxatilis var. major	russet sedge	Wetlands and lake margins	Watch
Eriophorum viridicarinatum	green keeled cotton grass	Cold, sometimes calcareous, swamps and bogs at moderate to high elevations (2000' to 6600')	Sensitive
Lycopodiella inundatum	Bog clubmoss	Sphagnum bogs, wet, sandy places, wetlands adjunct to lakes, and swampy ground, elevations up to 2000'	Sensitive
Lycopodium dendroideum	treelike clubmoss	Rock outcrops, talus or boulder fields, often with a significant moss and organic debris layer. Elevation ranges from 800' to 3600' in Washington.	Sensitive

Natural Resources Program Emphases

Inventory and Monitoring Program

Ross Lake National Recreation Area, as one unit within the North Cascades NPS Complex, is an active participant in the National Park Service Inventory and Monitoring (I&M) program. As part of this servicewide effort to improve park management through the acquisition and application of scientific knowledge, a primary role of the I&M program is to collect, organize, and make available natural resource data. Furthermore, it contributes to the Service's institutional knowledge by transforming data into information through analysis, syntheses, and modeling (http://science.nature.nps.gov/im). This program focuses on completing natural resource inventories and developing a sound scientific monitoring program to track specific resources into the future.

The I&M program is managed largely as a network program, in that park staff contribute to the development and implementation of monitoring projects that can occur in one or more network parks. The park is a member of the North Coast and Cascades Network, which also includes Olympic National Park, Mount Rainier National Park, San Juan Island National Historical Park, Ebey's Landing National Historical Reserve, Lewis and Clark National Historical Park, and Fort Vancouver National Historic Site. The monitoring program focuses on identifying "vital signs," those physical, chemical, and biological elements and processes of park ecosystems that are selected to represent the overall health or condition of park resources, known or hypothesized stressors, or elements that have important human values. Once the vital signs are selected, the expectation is that parks will monitor those resources through a long-term monitoring program.

Development of a parkwide ecological monitoring program initially began in the 1990s, when the park was selected as a servicewide "prototype" park to develop monitoring protocols that focused primarily, but not solely, on aquatic resources. Sufficient funding for this I&M program did not arrive in the park until 2001, and beginning then and in subsequent years, the servicewide I&M program has evolved away from the prototype role for the park to the network approach of developing multiple-discipline protocols for monitoring vital signs.

As of 2009, the network has identified 14 vital signs for development of protocols for long-term monitoring. Fiscal realities, however, will likely limit implementation of monitoring to perhaps 7-10 of those vital signs across the network, depending on future funding. For the park, the selected Vital Signs for long-term monitoring will likely include glaciers, climate, mountain lakes, landbirds, forest and subalpine vegetation, and broad landscape changes. Each of these six vital signs will be implemented following development of a peer-reviewed protocol. Data will be analyzed and reported out to a variety of audiences, and archived through a database management system. The park will also monitor impaired or potentially impaired waterbodies as part of the I&M program, with similar data analysis, reporting, and archiving requirements. The park's two other vital signs, wadeable streams and invasive, non-native vegetation, will likely remain unfunded unless additional funding is secured.

The I&M program is an integral part of the park's broader natural resource management program, in that all I&M projects rely on a mix of park base funds and I&M program dollars to implement the program. The park has adopted the I&M program as a core function to improve park management through a greater reliance on scientific knowledge to guide management decision-making.

Exotic Plant Management Team

A division of the North Coast Cascades Network Exotic Plant Management Team is stationed within the North Cascades National Park Complex. Priorities for the team are assisting the park with the management and control of populations of invasive plant species, especially in "gateway" corridors, including riparian zones, wetlands, roads and trails. This work is focused where invasive plant species adjoin wilderness areas, significantly affect native plant communities and restoration efforts, jeopardize visitor experience or safety, or in areas that may serve to transplant species to non-infested areas. The team has previously conducted control of reed canarygrass (*Phalaris arundinacea*) along the shoreline of Ross Lake, and will continue to be available to assist with the control of non-native, invasive plant species in the park complex.

Fire Management

Natural wildland fire is a frequent and annual visitor to the Ross Lake area and its effects have significantly influenced the vegetative structure that exists there today. Fire size, intensity and impact are strongly correlated to the cyclic nature of drought patterns that

affect the park's many vegetation types. Natural fire typically returns to each forested acre on the average of 100 to 300 years. Some areas show no fire history, suggesting they have never burned, while others, like the unique ponderosa pine-dominated forest near Desolation Peak, experience fire as often as every 50 to 75 years.

The wildfire suppression policy prior to the 1970's has resulted in fewer burned acres during that period than what would occur without human intervention. That policy, which was implemented in the early 1900s, impacted the Ross Lake NRA as we see it today by reducing the vegetative diversity and the ecosystem functionality produced by this vital and necessary disturbance agent. For example, the role of forest pathogens has increased, resulting in dead and moribund forests throughout the Ross Lake NRA. Certainly, the Ross Lake, Diablo Lake, and Gorge Lake reservoirs and the increase in structures in and adjacent to the park and the North Cascades Highway has resulted in fewer opportunities for wildland fire to maintain a dominant role in shaping ecosystem resiliency as compared to historic and pre-settlement times.

The management of wildland fires within the Ross Lake NRA is pursed in the context of being surrounded by federally managed lands, including the Pasayten Wilderness and the North Cascades National Park Complex as a whole. The border with Canada increases the need for suppression of all fires originating within the park that may threaten to burn across the border. Fire management plans for both the park and the Pasayten Wilderness strongly support the use of natural fire to help restore and maintain their fire adapted and maintained ecosystems.

North Cascades managers strongly support the role of lightning-caused fires to burn freely within the Ross Lake NRA, where appropriate. The 2007 *Fire Management Plan* recognizes the necessity of maintaining ecosystem functionality through natural fire, and advocates the necessity to restore fire through prescribed fire techniques in certain vulnerable areas in the Skagit Watershed. The plan also supports the suppression of unwanted fires in certain areas for multiple reasons, including to prevent property damage on federal lands, to private landowners, Seattle City Light, and the Washington Department of Transportation, as well as to prevent undesirable impacts to endangered and threatened species habitats, to prevent fire from burning from the park into Canada, and to protect human life.

Annually, a range of 3-8 fires burn vegetation within the Ross Lake NRA. The North Cascades NPS Complex *Fire Management Plan* provides policy guidance, goals and objectives, mitigation techniques, complexity analyses, staff roles and responsibilities, and strategies and tactics for every ignition occurring within the Ross Lake NRA., whether human- or lightning-caused.

Cultural Resources

The National Historic Preservation Act recognizes five property types: districts, sites, buildings, structures, and objects. To focus attention on management requirements for these property types, *NPS Management Policies 2006* categorizes cultural resources as archeological resources, historic structures, cultural landscapes, ethnographic resources, and museum objects. Cultural resources may be linked to historic events or noteworthy people; they may be embodiments of technical accomplishment, design, or workmanship; they may be sources of information important in historical or archeological research; or they may be important in the cultural system of an ethnic group (NPS Director's Order # 28). Evidence of over 9,500 years of human interaction with the environment is embodied in cultural resources of Ross Lake NRA, preserving a diverse record of the complexity of human life in this extraordinary environment.

Historical Overview

The pre-contact history of Ross Lake NRA spans nearly 10,000 years and represents the longest well-dated cultural sequence of the Cascade Range interior. Due to the historic development of hydropower resources in Ross Lake NRA and federal statutes and regulations requiring consideration of project effects to cultural resources, more archeological research has been conducted here than in any other interior mountain valley in western Washington. As a result, archeological data from Ross Lake NRA have been at the forefront of new ideas regarding the extent of indigenous involvement in vast areas of Washington's densely forested, western Cascade Range slopes.

At historic contact, about A.D. 1830, several Native American groups occupied or traditionally used lands included within Ross Lake NRA. Skagit River bands (including Upper Skagit, Sauk-Suiattle, and Swinomish), who affiliate with other groups speaking Northern Puget Sound (Coast) Salish, utilized resources along the Skagit River and its tributaries

along the length of the Skagit River, including upstream of the gorge above Newhalem to the vicinity of today's Ross Lake reservoir. The reservoir basin was also used by the Nlakápamux (Lower Thompson), an Interior Salish-speaking group centered along the Fraser River but who traditionally hunted in the North Cascades. In addition, the archeological record suggests that a variety of other indigenous bands from both sides of the Cascades regularly utilized lands within Ross Lake NRA, including people from the Chilliwack, Nooksack, Similkameen, Fraser, Methow, Wenatchee, and Chelan watersheds.

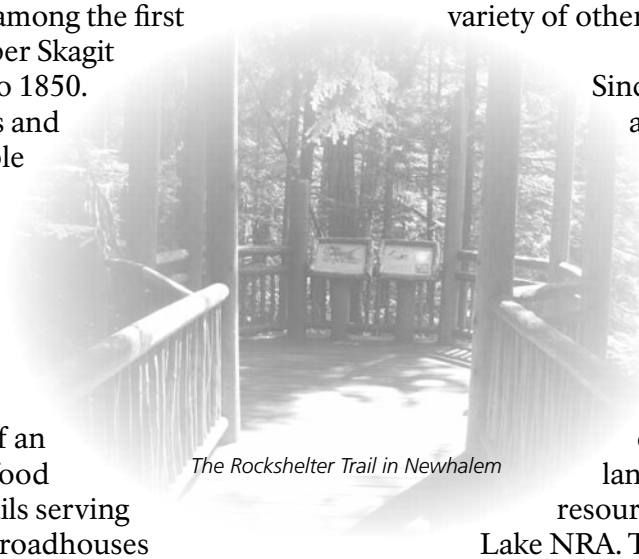
The early contact history of Ross Lake NRA is not well documented and remains poorly understood. Hudson Bay Company brigades were among the first Europeans to explore the upper Skagit River valley, sometime prior to 1850. Following this date, engineers and surveyors explored for possible transportation routes and mapped political boundaries. The discovery of gold at several locations brought an influx of prospectors and miners between 1858 and 1880, which in turn motivated the development of an infrastructure to provide for food and transportation needs. Trails serving pack strings and gardens and roadhouses appeared along the main trail built to follow the Skagit River upstream to mining claims. Upon establishment of the Washington Forest Reserve in 1897, most land in today's Ross Lake NRA came under the administrative authority of the federal government. By 1918 the City of Seattle began development of its Skagit hydroelectric project, spurring the construction of railroads, bridges, power lines, company towns, and related facilities. With the increased demands that followed WWII, the U.S. Forest Service constructed roads for access to logging and recreational sites. In 1968 the U.S. Congress created Ross Lake NRA as part of the North Cascades NPS Complex and in 1988 it designated most of the park complex, including areas of Ross Lake NRA, as the Stephen Mather Wilderness.

An administrative history for the North Cascades NPS Complex was completed in 1998.

Archeological Resources

Archeological resources are the physical remains of past human activity. In many instances they preserve the only evidence that preserves information about the long history of human use of the land. Archeological resources are often buried but they may extend above ground. In this document the term "prehistoric" refers to archeological resources that date prior to Euro-American contact and which are thus associated with Native American populations. Resource types include long and short-term campsites, toolstone quarries, resource gathering and processing areas, rockshelters, storage features, and rock art sites.

"Historic" archeological resources are those that post-date Euro-American contact. Historic archeological resources may be terrestrial or submerged and include homesteads, mines, trails, building remnants, and a variety of other features.



The Rockshelter Trail in Newhalem

Since 1984, a program of park archeological investigations has revealed widespread prehistoric and historic use of Ross Lake NRA by Native American groups. Prior to that time, the very few documented sites offered insufficient evidence to support concluding other than ephemeral use of the mountain landscape. Today, archeological resources are found throughout Ross Lake NRA. The current Ross Lake NRA data base is developed from 190 archeological sites, many of which have been test excavated and assessed for National Register significance by NPS archeologists.

The most thoroughly studied portion of Ross Lake NRA is the Ross Lake area, where inventory and assessment activities have been conducted annually since 1987, when park funded excavations and Seattle City Light funded planning studies began in earnest. Currently and through the year 2025, archeological resources affected by Ross Lake reservoir are managed in compliance with an archeological resources mitigation and management plan for Ross Lake, which was developed by the North Cascades NPS Complex and SCL staff as part of the City of Seattle's license agreements with the Federal Energy Regulatory Commission (FERC No. 553). The portion of Ross Lake NRA below Ross Dam, particularly along the highway 20 corridor, has been almost as well studied, largely due to residential, recreational, and transportation developments of several agencies requiring compliance with Section 106 of the National Historic Preservation Act.

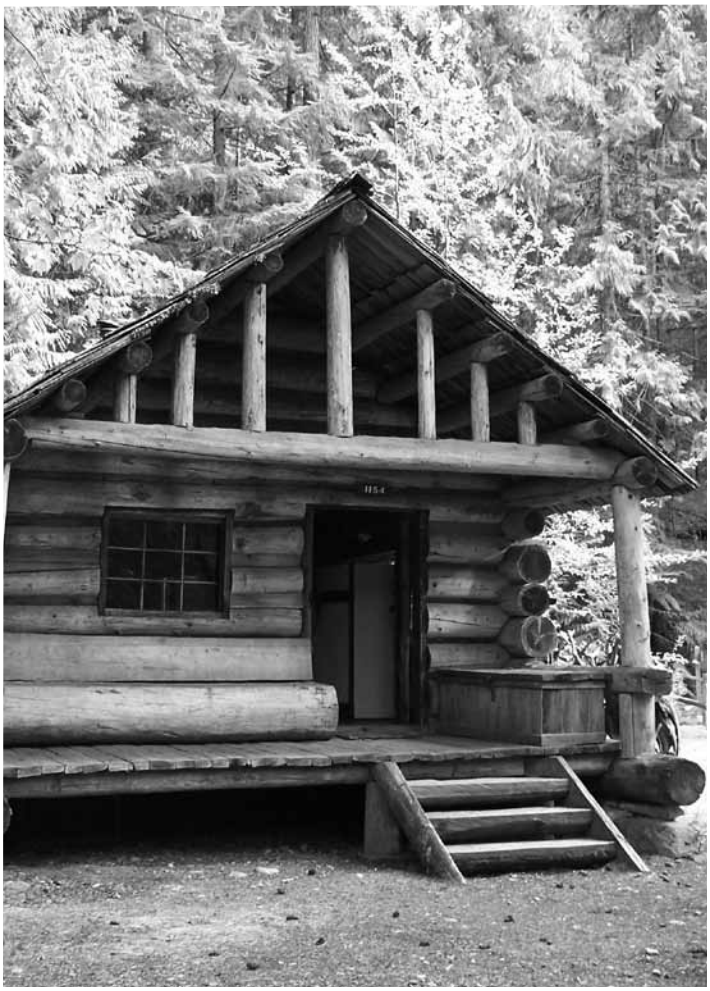
Considered complex-wide, Ross Lake NRA has the largest number of inventoried archeological sites (190) in the North Cascades NPS Complex. One archeological district (Upper Skagit River Valley Archeological District) and two archeological sites have been determined eligible to the National Register of Historic Places. Including sites contributing to the district's eligibility, a total of 18 archeological sites in Ross Lake NRA meet National Register significance criteria. To date, four archeological sites have seen full-scale excavation, two sites have been stabilized by construction of erosion-control structures, and one site serves as a self-guided interpretive exhibit; in each of these cases, the management action was implemented to mitigate an adverse effect. Overall, lands within Ross Lake NRA tend to have high archeological sensitivity, making it necessary for agency planners and managers to strictly adhere to federal guidelines for managing cultural resources.

The accumulated knowledge from the above archeological investigations yields a picture of a long pre-contact indigenous history in Ross Lake NRA, and is summarized here. Based on both radiocarbon dated archeological sites and time-sensitive artifacts, the first people began using the upper Skagit valley at least by 10,000 years ago, about the same time that coniferous forests began to colonize the post-glacial tundra-like vegetation. These early people began a tradition of hunting and quarrying Hozomeen chert tool stone, the latter at a scale previously undocumented west of the Cascades. Base camps on stable landforms, especially those affording good solar exposure, occur in high densities, and represent occupation in all seasons for hunting, fishing, and gathering. Many sites reflect task-specific subsistence activities related to procuring and processing resources, such as salmon and mountain goat, as revealed in faunal remains preserved in intact cooking hearths. Radiocarbon-dated archeological remains (60 dates) suggests increasing indigenous populations until about the time of European contact. Overall, these data reveal an intensity of indigenous use and a level of detailed native knowledge of mountain environments and resources that had not been previously suspected. This new information benefits not only cultural resource program implementation of other agencies managing comparable landscapes, but it serves also to offset a historical lowland bias in pre-contact period studies by offering a vastly more comprehensive geographic view of the Northwest Coast Culture Area.

Ross Lake NRA is also rich in historic archeological sites, most of which are associated with 19th and early 20th century settlement and mining and associated activities, and with federal administration of the land. Many historic archeological sites are incompletely inventoried except for their above-ground structures and architectural features and facilities. Although historic archeological sites are not as numerous as those from the much longer pre-contact period, those that have not been assessed for National Register eligibility must be managed as if they are pending a formal assessment, consistent with NPS management policies.

Historic Structures

A historic structure is "a constructed work . . . consciously created to serve some human activity" (NPS Director's Order 28). Historic structures are usually immovable, although some have been relocated and others are mobile by design. The historic structures of Ross Lake NRA include buildings, fire lookouts, cabins, homesteads, shelters, ranger stations, guard stations, dams, caches, and other structures of historic, aesthetic, or scientific importance.



The Fish and Game-Hozomeen Cabin was constructed in 1935 and listed on the National Register in 1989.

According to federal law and NPS management policies, all historic structures in which the Park Service has a legal interest are to be managed as cultural resources. Regardless of type, level of significance, or current function, every structure is to receive full consideration for its historical values whenever a decision is made that might affect its integrity. Historic structures that are central to the legislated purposes of parks, especially those that are to be interpreted, may be subjects of additional, specialized efforts appropriate to their functions and significance.

The historical research program for the park complex was initiated in 1970 by a Historic Basic Data Study prepared by Erwin Thomson, which provided an overview of some of the historic themes and known resources associated with the area. The first compilation of a List of Classified Structures (LCS) was undertaken in 1976. Currently nine structures listed on the park complex's LCS are located in the Ross Lake NRA.

These studies were expanded by a Historic Structures Inventory (1984) and a Historic Resource Study (1986), both prepared by National Park Service Historian Gretchen Luxenberg and funded by the Cultural Resources Preservation Fund. The Historic Resources Inventory identifies 26 historic structures within the Ross Lake NRA. The historic contexts identified in the historic resource study included exploration, settlement, commercial development, recreation, and administration of the area by the U.S. Forest Service.

Evaluation of the structures listed on National Park Service inventories for the Ross Lake NRA identify four structures and one monument that are listed on the National Register of Historic Places:

- Desolation Peak Lookout (NR listing 88003451)
- Deer Lick Cabin (NR listing 88003452)
- Devil's Corner Cliff Walk (NR listing 74000909)
- Fish and Game – Hozomeen Cabin (NR listing 88003454)
- International Boundary US – Canada (NR listing 88003450)

The historical research and inventory data also provided the background information for the development of a Historic Structures Preservation Guide (1987) and structure and site-specific studies addressing issues at the Devil's Corner Bridge structures.

Additional documentation of historic structures within the park complex is being compiled under the on-going update of the LCS, funded by a servicewide initiative and conducted by support office-based historical architects. The complete List of Classified Structures for the park complex was certified in 2005 and is constantly being updated with structure information and condition assessments.

Within the boundaries of Ross Lake NRA, Seattle City Light owns and/or manages approximately 80 ~~30~~ historic structures, buildings, and features that contribute to the "Skagit River and Newhalem Creek Hydroelectric Projects" ~~Historic District~~ located in Newhalem, Gorge, and Diablo. The district includes buildings and features that contributed to the development and operation of the hydroelectric facilities, such as Diablo Dam and Powerhouse, Gorge Powerhouse, and most of the supporting historic structures.

Cultural Landscapes

The National Park Service defines a cultural landscape as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Four kinds of cultural landscapes, not mutually exclusive, are recognized. A historic site is a landscape significant for its association with a historic event, activity, or person. A historic designed landscape is a landscape significant as a design or work of art, was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner or amateur according to a recognized style or tradition. A historic vernacular landscape is a landscape whose use, construction or physical layout reflects endemic traditions, customs, beliefs, or values in which the expression of cultural values, social behavior, and individual actions over time is manifested in physical features and materials and their interrelationships including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. An ethnographic landscape is an area containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures, each with their own special local names.

The consideration of cultural landscapes in this plan as a distinct group of cultural resources reflects the emergence of the cultural landscape program servicewide. Recently the Secretary of the Interior's *Standards for Historic Landscapes* have been drafted together with a new chapter in the current draft of NPS-28, and a Cultural Landscape Inventory initiative has been implemented in five regions, including the Pacific West Region.

Prior to this recognition, cultural landscape documentation within the complex was completed for several sites. These documents represent early efforts at defining what such documentation should incorporate and, thus, do not meet current standards for cultural landscape reports and related documents. Bringing this information up to current standards is an important recommendation in the following project statements.

The reports do, however, reflect the intrinsic strength of the inherently interdisciplinary approach of cultural landscape research, which requires documenting and understanding both the biotic and cultural resources of a landscape. Evaluation of the significance of a cultural landscape may require drawing on ethnographic, archeological, historical and/or ecological data.

Ethnographic Resources

Ethnographic resources are the cultural and natural features of a park that are of traditional significance to traditionally associated peoples. Ethnographic resources can include sites, structures, objects, resource use areas, or other natural landscape features assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a traditionally associated group.

A display of historical photographs in the visitor center shares the story of the area's history.

Ethnographic resources represent tangible evidence of the past and present behavior or knowledge of identifiable human populations in a geographic area such as the North Cascades. Potential ethnographic resource types include:

- Historic and contemporary human populations (park-associated groups), including relationships/affiliations with prehistoric populations
- Historic and contemporary subsistence uses and residency
- Current uses of ceremonial or religious localities by indigenous peoples
- Traditional sacred localities and/or objects to indigenous peoples
- Ethnogeographic resources
- Traditional Cultural Properties (ethnographic resources defined with reference to the National Register of Historic Places; see National Register Bulletin 38)

These resources are often intimately related to the other categories of both natural and cultural resources. Ethnographic research and studies can provide an added level or depth of understanding of these resources and should thus be coordinated with their inventory, evaluation, and management programs where possible.

Since 1989, several traditional cultural properties studies have been conducted in or near Ross Lake NRA. As with archeological resources, these studies were mandated by non-tribal, land-managing agencies in fulfillment of their obligation to consider the effects of their undertakings on cultural resources. Although several ethnographic resources have been identified by tribal elders in Ross Lake NRA, the location and nature of these resources, and the studies themselves, are protected by adherence to confidentiality agreements outlined in the initial study plans. As a consequence, it is important that agency planning and scoping efforts include consultation with tribal governments during early phases of project development, consistent with federal cultural resource management guidelines (36 CFR Part 800).

Museum Collections

The museum collections contain cultural objects relating to the archeology, ethnography, and the history of the area now within the park complex. The natural collections contain paleontological, geological, and biological specimens. Park archival collections contain resource management records, maps,

photographs and data from research projects, historic photographs, historic objects, and memorabilia. To house the collections within the available space, the museum utilizes compact storage units with moveable carriages. Laboratory space is provided for research and collection maintenance activities. Collection materials are stored in appropriate cabinets. Archives are stored in special archival quality boxes on shelves within the collection.

Since the inception of the park complex in 1968, the idea of collection management at the park level has grown and developed in response to servicewide policies and trends. From 1968 to 1982, the collections grew to contain a park herbarium and small field collections of wet specimens, study skins, geological specimens, and historic artifacts. During this period, collection management consisted of storing the objects in boxes or cabinets residing in a variety of offices and rooms under the auspices of the Research Biologist, or the Interpretive Specialists. During this period, nothing was formally accessioned. In 1976 the park complex headquarters were moved into a new building, and dedicated collections storage space was created.

From 1987 to the present, the collections continued to grow, particularly the archeological and herbarium entries, and collection management at the park complex began taking relatively large leaps of improvement. A draft collection management plan was created in 1984, it provided needed direction for park collection management. A scope of collection statement was written and approved in 1984. The updated scope of collection statement approved in 1998 requires revision. Cataloguing and accessioning began and has seen consistent progress since 1983 with the help of volunteers, the Environmental Internship Program, and seasonal museum technicians hired with backlog cataloguing program funds. A museum curator was hired in 1996 and funded for 13 pay periods on base funds.

In 1988, the resource management division took over responsibility for collection management in the park. That same year, a collection storage room with a single storage cabinet was created in Marblemount to accommodate the quickly growing archeological collection resulting from archeological investigations on Ross Lake. In 1990, funding was provided from the servicewide museum collections security initiative for a new collection storage facility to be built at Marblemount to house all west slope collections.

In 1993, the Marblemount curatorial facility was completed. The museum collections and cultural resource staff were moved to the new building. The museum collections grew in 1994 with the addition of approximately 550,000 historic museum objects excavated by the University of Idaho at San Juan National Historical Park (San Juan NHP). A letter of agreement was signed between the North Cascades NPS Complex and San Juan NHP to formalize the new arrangement. The San Juan NHP historic museum collection is now stored at the Marblemount curatorial facility and the park complex's museum curator is also the curator of record for San Juan NHP. The park complex's *Museum Management Plan* was approved and signed in January of 2005. In the summer of 1998, the NPS adopted a new cataloging system, Automated National Cataloging System (ANCS+, Rediscovery), which facilitated electronic catalog record keeping and submission of reports to the NPS Washington office. A collection condition survey was also completed in 1998 for the entire North Cascades NPS Complex's museum collections.

In 2002 the Marblemount curatorial facility building was expanded with the addition of the islands room, built to house a significant part of the San Juan Island archeology collection as well as the Ebey's Landing National Historical Reserve (Ebey's Landing NHR) museum collections. The Marblemount curatorial facility expansion allowed the addition of 500 cubic feet of prehistoric bulk material excavated by the University of Washington at San Juan NHP and previously stored at the University of Washington's Burke Museum. Approximately 700 cubic feet of San Juan NHP prehistoric material remained at the Burke Museum. A memorandum of understanding between the Burke Museum and San Juan NHP allows the loan of San Juan NHP prehistoric archeology artifacts to be retained by the Burke. The memorandum of understanding is administered by the North Cascades NPS Complex curator. With the addition of the San Juan Island National Historical Park and Ebey's Landing NHR museum collections the curator became the park complex curator and the curator of record for both San Juan Island and Ebey's Landing National Historical Reserve.

Natural History Collection

The purpose of the natural history collections is to provide onsite documentation of park resources. The collections are frequently used by both park staff and outside researchers. Each year field crews use the collections on a regular basis. The following

disciplines are represented in the park complex's natural history collection.

Geology: Geological specimens are represented by the Rowland Tabor and Peter Misch voucher collections, produced during research on the geology of the North Cascade Mountains. Thin sections are mounted on glass slides and are prepared with hand-written laboratory notes. Maps and field notes accompany the collections. There may be continued growth in the geology collections.

Paleontology: A small number of paleontological specimens represent the floras of the Eocene, Triassic and Jurassic Eras, collected by Rowland Tabor. The paleontological collections could be expected to increase with ongoing research.

Biology: Biological specimens comprise most of the natural history collection. Herbarium specimens from vascular and nonvascular research projects are the most numerous and most often examined. There are small reference collections of insect and fish specimens. Park collections have also been deposited in other institutions, mainly the University of Washington's Herbarium and Burke Museum. Vertebrates and invertebrates are poorly represented. Ongoing research will continue to increase the biological collections.

Cultural Collection

The purpose of the cultural collections is to preserve the park complex's cultural heritage and to increase knowledge and appreciation of that heritage. Cultural objects provide opportunities for research, exhibits, and interpretive programs in the park complex. The following disciplines are represented in the park complex's cultural collections.

Archeology: Archeological artifacts and objects represent collections ranging from prehistoric to historic. They are the result of park research activities, compliance, and inadvertent finds. Less than 5 percent of park complex lands have been systematically surveyed. Thus, archeological collections could be expected to increase with ongoing research.

History: Objects with direct relationships to the park complex from the past to the present can be found in the history collections. Historical objects in the collections range from farm implements to building fabric to mining implements, and include a wide range of items. There may be moderate growth in the history collection.

Archives

Archival collections are resource management record materials generated by park complex activities from cultural and natural divisions, as well as archival donations. The park complex archives include many types of records, from photographs and oral histories, to original data from research projects or original manuscript collections. Archival collections relating to the park complex are also found at National Archives and Records Administration facilities in Seattle, as well as the University of Washington Library Special Collections. The archival collections will continue to grow.

Historic Contexts and Current Threats

Traditional Tribal Activities

A pristine natural landscape preserves the opportunity for a range of tribal activities centered around traditional subsistence and ceremonial practices. Procurement of salmon from the Skagit River, the hunting of ungulates and other large mammals, and the collection of plants formed the traditional subsistence base. Pristine natural environments remain important today for practicing traditional ceremonial and spiritual activities. Although development in Ross Lake NRA of the highway corridor and hydropower facilities constitute threats to the pristine natural environment, at the same time, these facilities provide access to natural landscapes that would otherwise be inaccessible by many tribal members, particularly elders.

Implementation of the management plan will be carried out in consultation with the Skagit tribes to prevent loss or degradation of traditional landscapes as these are identified by the affected tribes.

Homesteads

The primary threat to these structures is the lack of professional documentation and boundary delineation. Cultural landscapes for John McMillan and Tommy Rowland's homesteads are important for the functional organization of the landscapes that has occurred in these areas.

Federal Land Management Infrastructure

Historic structures are an important aspect of the historic federal land management infrastructure within Ross Lake NRA. Threats to these structures include lack of regular maintenance leading to decreased structural stability. Cultural landscapes for fire lookouts and other features are important.

Tribes of the Ross Lake National Recreation Area

Three federally recognized tribes maintain an association with park lands based on traditional subsistence use, origin beliefs, mythology, and spiritual beliefs and practices. These are the Upper Skagit, Sauk-Suiattle, and Swinomish tribal governments. In addition, NPS recognizes the traditional association of two Canadian First Nations regarding matters that relate to the northern extremity of Ross Lake, which borders the province of British Columbia. These First Nations include the Nlakápamux (also referred to as the "Lower Thompson") and the Stó:lō, the first of which has been recognized by the U.S. Federal Energy Regulatory Commission as an interested party to the settlement agreements that have led up to Seattle City Light's relicense of the Skagit Hydroelectric Project No. 553.

Stephen Mather Wilderness

Geographic Overview

The Stephen Mather Wilderness was established by Congress in 1988 by the Washington Park Wilderness Act. Over 642,332 acres of North Cascades NPS Complex was designated wilderness, including 69 percent, or 80,043 acres of Ross Lake NRA. Five thousand additional acres within Ross Lake NRA were designated "potential wilderness" contingent on Seattle City Light's plans to implement other hydroelectric projects. Potential wilderness occurs in two areas within Ross Lake NRA: about 1,554 acres in the Big Beaver Valley to accommodate raising Ross Dam, and about 3,559 acres in the Thunder Creek Valley to accommodate flooding and tunneling of Thunder Creek. Where Ross Lake NRA shares a boundary with North Cascades National Park, the Stephen Mather Wilderness continues seamlessly. The Pasayten Wilderness shares a boundary with Ross Lake NRA to the east, while to the north are Skagit Valley and Manning provincial parks in British Columbia. A corridor of non-wilderness within Ross Lake NRA encompasses State Route 20, the Seattle City Light towns of Newhalem and Diablo, and the three reservoirs created by the Skagit Hydroelectric Project: Ross, Diablo, and Gorge lakes (See Figures 1.1 and 1.2).

Potential wilderness in the Big Beaver Valley stretches from just upstream of the mouth of Big Beaver Creek where it feeds into Ross Lake to about six miles up the valley. The entire area, except for 22 acres at its southeast corner, falls within the Big Beaver Research Natural Area, which was established in 1989 to protect an exemplary river valley bottom mosaic of terrestrial, semi-aquatic, and aquatic communities and an old growth western red cedar forest. The largest wetlands in the park complex can be found in this area along with cedar trees more than 6 feet in diameter that are estimated to be more than 1,000 years old. The headwaters of Big Beaver Creek rise along the towering eastern flank of the Picket Range, which holds 44 glaciers. The myriad of swamps and ponds in the wide glacial valley represent a unique collection of wetlands in the North Cascades. All of the Big Beaver drainage, except the lower six miles, is in the Stephen Mather Wilderness.

Potential wilderness in the Thunder Creek Valley stretches from upstream (0.5 miles) of the mouth of Thunder Creek where it feeds into Diablo Lake to about five miles up the valley. The Thunder Creek watershed is the most glaciated watershed in the coterminous states. Extreme climate variability results from the drainage being located along the Pacific Crest of the Cascade Range. Temperature and precipitation gradients are very steep, and result in a great diversity of vegetation that represents a unique mix of west and east-side species. Thunder Creek is located in the crystalline core of the North Cascades, where glaciers and rivers have cut deep canyons, towering peaks, and waterfalls. All of the Thunder Creek drainage, except for the lower five miles, is in Stephen Mather Wilderness.

Potential wilderness areas will become designated wilderness upon the Department of Interior Secretary's determination, published in the Federal Register, that they have finally met the qualifications for designation by the cessation or termination of the nonconforming use.

Wilderness Character

The Stephen Mather Wilderness is at the core of one of the largest protected areas in the lower 48 states.

The portion of this wilderness area found within Ross Lake NRA serves as a gateway to the more remote interior, where jagged mountain peaks flanked by spectacular glaciers and snowfields, colorful subalpine meadows, and countless cascading waterfalls can be seen. Numerous trails provide access from the North Cascades Highway and Diablo and Ross Lake reservoirs. Some of the prominent features within the Ross Lake NRA wilderness include Hozomeen Mountain, Desolation Lookout, and Ruby Peak Mountain.

Agencies responsible for administration of designated wilderness are required by law to preserve the wilderness character of the area. Managers at the park complex use a Minimum Requirement Analysis to determine if, when, and how administrative actions that might impact wilderness character can be implemented. There are four qualities derived from the statutory language of the 1964 Wilderness Act that are used to describe wilderness character:

Untrammeled: wilderness is essentially unhindered and free from modern human control or manipulation

Natural: wilderness ecological systems are substantially free from the effects of modern civilization

Undeveloped: wilderness is essentially without permanent improvements or modern human occupation

Outstanding opportunities for solitude or a primitive and unconfined type of recreation: wilderness provides outstanding opportunities for people to experience natural sights and sounds, solitude, freedom, risk, and the physical and emotional challenges of self-discovery and self-reliance

The current condition of wilderness character within Ross Lake NRA is described below with regard to how well they retain these four qualities.

"Untrammeled"

Ross Lake NRA wilderness is generally unhindered and free from most human manipulation. There are two authorized actions, however, that occur within Ross Lake NRA wilderness that degrade the untrammeled quality of wilderness character: fire suppression and fish stocking or removal. Over the last 38 years (1970-2008), 70 percent (51 of 73) of naturally ignited fires have been suppressed within Ross Lake NRA wilderness. Fire suppression is chosen as a management action when the fire threatens life, improvements, or is determined to be a threat to natural and cultural resources or improvements. The act of suppressing the fire, regardless of how many acres it has burned or will burn, manipulates wilderness.

Six of the eleven mountain lakes (excluding small ponds) within Ross Lake NRA wilderness have a history of being stocked with non-native fish by the Washington Department of Fish and Wildlife as part of its recreational fishery program (See Table 5.13). Fish are not native to these lakes due to downstream barriers such as waterfalls or other high gradients that prevent fish passage. Although three of the lakes are no longer stocked, only one is fishless (Upper Panther Potholes); the remaining two lakes, Lower Bouck and Hozomeen Lake, have populations of reproducing fish. Lower Panther Potholes, Ridley, and Willow lakes are all currently stocked by the Washington Department of Fish and Wildlife. Under the 2008 *Mountain Lakes Fishery Management Plan* removal of reproducing populations of fish and cessation of fish stocking may occur in some lakes. Both stocking and removal of fish is a significant manipulation that degrades the untrammeled quality of wilderness character.

One unauthorized action that has been known to occur within NRA wilderness on at least one occasion is the development of a large-scale marijuana plantation. In 2008 a 4.7 acre plantation was

Table 5.13 Wilderness Lakes with a History of Fish Stocking

Lake	Current Management	Fish Status	Last Stocked
Lower Bouck	No longer stocked	Reproducing fish	1947
Hozomeen	No longer stocked	Reproducing fish	Unknown
Lower Panther Potholes	Stocked	Stocked fish	1994
Upper Panther Potholes	No longer stocked	Fishless	1988
Ridley	Stocked	Stocked fish	2000
Willow	Stocked	Stocked fish	2002

discovered and dismantled near the North Cascades Highway. Over 1,000 pounds of garbage, fertilizers, rodenticides and herbicides, irrigation piping, propane canisters, and equipment were removed from the site. Damage included cutting and limbing of trees to clear the grow sites, terracing of the land, impounding of creeks and installation of irrigation systems, spreading of chemical fertilizers, harassing and trapping wildlife, construction of living quarters and fences, and the spreading of garbage and human waste. This type of action, though it can be small in size, is the most egregious example of trammeling wilderness.

"Natural"

Ecological systems inside Ross Lake NRA wilderness areas are affected by things that happen both inside and outside the wilderness boundary. Affected components can be grouped by plant and animal species and communities, physical resources, and biophysical processes.

Plant species and communities

The condition of plant species and communities in Ross Lake NRA wilderness is generally good; there are no known federally listed species and no known extirpated species in the area. There are 10 known state-listed species; most of which are on this list due to restricted habitats, habitat degradation (outside NPS boundaries), and range limits (those species which are more abundant elsewhere). Out of approximately 200 non-native species in the entire park complex, 40 of them are considered invasive; the number of invasive plants within Ross Lake NRA wilderness areas is an unknown, but assumed to be a lesser amount.

Reed canarygrass *(Phalaris arundinacea*), a non-native invasive plant that is found along the edges of Ross Lake (outside of wilderness), was recently found in the Big Beaver Valley wetland system. This infestation has the potential to change this ecosystem from a highly diverse system, both in habitats and vascular and non-vascular plants, to a monoculture of reed canarygrass. Another non-native invasive plant, cheatgrass (*Bromus tectorum*), has been found along the east-side of Ross Lake in scattered patches that range in size from less than one square yard to more than 20 square yards in size. This annual grass can be stimulated by fire and out-compete native vegetation (Keeley 2006). Its presence has also been linked to increases in fire severity by providing highly flammable fuel in continuous patches during the hottest and driest time of the fire season (Brooks et al. 2004).

White pine blister rust is an invasive, non-native fungus that is threatening the survival of whitebark pines and Western white pines throughout Ross Lake NRA wilderness. White pines, along with other pines (lodgepole, ponderosa, and whitebark), are also threatened by mountain pine beetles, a native species whose population has exploded due to recent warmer winters and an abundance of drought-stressed trees – conditions which are likely the result of climate change and wildland fire suppression. The lodgepole pines are relatively short lived trees, which become decadent in 100-200 years. Wild fire suppression may have exasperated the beetle problem. This major die-off of pine trees will change a large portion of the overstory plant communities within Ross Lake NRA wilderness. As fuel loads continue to build in an area already impacted from past fire suppression, the chance for large, uncontrollable and unnatural wildfires increases.

Ponderosa pine and lodgepole pine occur together on the east-side of Ross Lake, comprising what is considered to be an anomalous vegetation type due to the unlikely assemblage of temperate and continental plant associates (Franklin and Dyrness 1988). It is estimated that these pines and their communities on the east-side of Ross Lake have missed at least one fire return interval due to fire suppression (Agee, personal communication). This estimate is supported by a fire history study performed near Desolation Peak in which the mean fire rotations for stands dominated by ponderosa pine, lodgepole pine and Douglas-fir were 44 , 52, and 76 years, consecutively (Agee et al. 1986). Given that 70 percent of the lightning caused fires were suppressed within the last 38 years, it is probable that these relatively short fire cycles have been altered. Fire suppression enables shade-tolerant species, such as western hemlock, to out-compete fire-dependent species for nutrients and light.

Animal species and communities

The condition of animal species, communities, and habitat in Ross Lake NRA wilderness is generally good. Ross Lake NRA wilderness provides habitat for five federally listed wildlife species, three fish species, and one additional state listed wildlife species. Animals are on these lists due to historic over-taking of mammals associated with European settlement, historic and current overtaking of numerous fish species, habitat loss and degradation both outside and to a lesser extent, inside wilderness boundaries (dams control the flow of water to the extent that natural channel forming processes in upper reaches are limited). There are no known mammals, reptiles or amphibians that are non-native species in the area. The

rock pigeon, European starling, and house sparrow are non-native birds known to be within Ross Lake NRA but have not been documented within wilderness. The barred owl, an eastern species that has expanded its range westward, can be found in Ross Lake NRA wilderness. Its ability to outcompete spotted owls may be contributing to dwindling numbers of spotted owls across the west.

Three non-native fish species exist within Ross Lake NRA wilderness as a result of mountain lake fish stocking. In lakes where non-native fish can successfully reproduce, the largest impacts on native aquatic species occur because a multi-aged fish population can prey on all trophic levels in the system. There are various levels of downstream drift and upstream movement of planted fish in the vicinity of stocked lakes where non-native brook trout could potentially breed with native (and threatened) bull trout. Although the reservoirs are located outside of designated wilderness, they have significant impacts on demography and composition of communities within wilderness. When the reservoirs are full they can provide access above formerly impassable barriers (the falls at Big Beaver Creek, for example). The existence of the reservoirs (especially Ross) has increased the use of some streams for spawning (and rearing) for bull trout and rainbow trout. The population explosion of red-sided shiners in Ross Lake has resulted in reduced populations of mosquitoes and their larva, and increased growth of rainbow and bull trout feeding on shiners. It is currently unknown what will happen as a result of the shiner explosion, but it is suspected that once the food source is consumed there could be a population crash.

Physical resources

Air quality is generally good in Ross Lake NRA wilderness. There is no apparent overall degradation in visibility, no apparent trends in sulphur and nitrogen, and a slight decrease in ozone between 1996 and 2005. However, recent research focusing on atmospheric pollution deposited in snow, from fog, and in surface water systems shows that we are receiving mercury and pesticide pollution from sources adjacent to the park complex as well as from across the Pacific Ocean. A wide range of pollutants have been found in vegetation samples, PCBs and pesticides have been found in lichens, and mercury and organochlorine compounds have been found in fish tissue. Water quality is excellent in Ross Lake NRA wilderness. Human-caused soil disturbance or erosion occurs at a very localized scale, usually around trails that are snow-covered well into summer or in campsites where bare ground disturbance has increased over time. Soil crusts in wilderness are generally in good condition.

Biophysical processes

Most biophysical processes are intact and functioning naturally within Ross Lake NRA wilderness. A few natural processes are disrupted due to human influence, however. It is likely that natural fire regimes have been altered by fire suppression on the east-side of Ross Lake, where the majority of natural fires within Ross Lake NRA occurred (70 percent of which were suppressed). Fire suppression enables dead and downed fuels to accumulate, thus increasing the potential for larger and more severe fires in the future. In turn, these higher severity fires have the potential to exacerbate soil erosion and volatize more nutrients than would be lost in less severe events (Agee 1993).

Creation of the reservoirs, and to a lesser extent, the North Cascades Highway, has resulted in a loss of connectivity with the surrounding landscape for a number of species. Although black bears and moose have been known to swim across the reservoirs, these features serve as significant barriers to movement for smaller mammals, and have likely altered the movements of the larger mammals as well. Loss of the Upper Skagit Valley due to the creation of Ross Dam has resulted in a general lack of suitable low-elevation winter habitat for ungulates and other species. Although there are some large, flat, low-elevation tributaries like Thunder and Big Beaver, they are higher in elevation and somewhat isolated in comparison to the Skagit.

The impact of climate change on natural processes is a growing concern. Impacts include decreased snow cover, glacial retreat, decreased summer stream flow, increased frequency and magnitude of floods, increased stream temperature, rising tree line, changes in phenology, and longer growing seasons. This partial list of changes is resulting in ecological changes that we are not currently monitoring.

"Undeveloped"

For the purpose of this description, and following guidance of "Keeping it Wild: An Interagency Strategy to Monitor Trends in Wilderness Character Across the National Wilderness Preservation System (USDA 2008)," this section only monitors non-recreational developments, such as administrative or instrumentation sites. Recreation-focused developments, such as trails, camps, and toilets, are monitored under the solitude or primitive and

unconfined recreation quality because of the strong connection these features have to recreational experiences.

The "undeveloped" quality of wilderness character in Ross Lake NRA wilderness is generally good. Installations include one mountaintop radio repeater at Ruby Peak consisting of an equipment shelter and a tower measuring 32 feet in height. An additional repeater is scheduled to be installed at Desolation Peak in the near future.

Two historic structures are located within the wilderness: Desolation Lookout and Deerlick Cabin. These protected cultural resources contribute positively to wilderness character because they help us understand our past and present relationship with the land.

Motorized equipment and vehicles, such as chainsaws and helicopters, are used for administrative purposes within the wilderness, consistent with minimum requirement analysis.

~~The undeveloped quality of wilderness character in Ross Lake NRA wilderness is good. There are no non-recreational structures or developments within this portion of the wilderness, nor are there any inholdings. However, one installation, the Ruby Mountain radio repeater, is situated on the peak. There are also numerous recreational developments that detract from the undeveloped quality of wilderness, including over 60 miles of trails, numerous bridges, and 17 designated backcountry camps. Two historic structures can be found within the wilderness: Desolation Lookout and Deer Lick Cabin. These protected cultural resources contribute positively to wilderness character because they help us understand our past and present relationship with the land. Motorized equipment and vehicles, such as chainsaws and helicopters, are used for administrative purposes within the wilderness.~~

"Opportunities for solitude or primitive and unconfined recreation"

Opportunities for solitude within Ross Lake NRA wilderness are abundant. Local topography, dense vegetation, and spacing of campsites and trails within the wilderness provide a sense of remoteness from the sights and sounds of other people that may be nearby. Night sky visibility is excellent at lower elevations but diminishes at higher elevations where light pollution becomes visible from the Seattle and Vancouver metropolitan areas. The natural soundscape is in good condition, though noise intrusions occur from aircraft, motorboats, highway traffic, and NPS administrative activities. Aircraft noise can be heard throughout

A visitor prepares to canoe in the Skagit River from Copper Creek Launch.

the wilderness at any time of day, but motorboat and highway noise significantly drops during nighttime hours. The source of NPS-generated noise typically includes chainsaw use to support trail maintenance activities and helicopter use to support fire management, trails, search and rescue, and resource management activities.

Opportunities for primitive and unconfined recreation are reduced by a number of facilities that decrease self-reliant recreation. A well-developed trail system with over 60 miles of trails and 17~~and~~ designated campsites with Wallowa toilets are the norm in this wilderness area. Trail signs at junctions and hitch rails at designated stock camps are common. Bridges made of both natural and steel materials are common facilities used to aid in stream crossings. Well-defined routes can be found in most cross country zones. ~~One bear box is provided at Desolation Camp for the storage of food and other attractants in order to protect bears and visitors; v~~Visitors are required to store food appropriately by either hanging or using canisters at all ~~other~~ camps in order to protect visitors, bears, and other wildlife. Management restrictions include backcountry camping permit requirements, limited use of campfires, and required use of designated campsites or campsite setbacks for cross country zone camping. These facilities and management restrictions are used to manage impacts from visitor use by spacing people out along trails and confining impacts to specific, localized areas.

Wild and Scenic Rivers

All river segments within Ross Lake are part of the Skagit River Watershed. The headwaters of the Skagit River begin in British Columbia, Canada in the North Cascades Mountains and the Skagit River flows approximately 150 miles and through three dams before it empties into Puget Sound. Abundant glaciers from the surrounding jagged peaks provide stable flows that help make it the only Puget Sound tributary to host all native species of anadromous fish and one of the highest concentrations of wintering bald eagles in the lower 48 states. It is the largest river draining into the Puget Sound and the third largest river on the west coast of the United States. The entire Skagit River watershed basin covers 3100 square miles; it provides 20-percent of the flows into Puget Sound.

There are no designated wild and scenic rivers in Ross Lake NRA, but the Skagit River is designated just downstream of Ross Lake NRA and managed by the Mt. Baker-Snoqualmie National Forest. In 1978, Congress designated 158.5 miles of the Skagit River and its tributaries, the Sauk, Suiattle, and Cascade rivers, as wild and scenic rivers. This river's recognized "outstanding remarkable values" are: fish, wildlife, and scenery. The main-stem Skagit River reach begins at the Ross Lake NRA boundary and extends down to Sedro-Woolley and is designated as a recreational river. This reach is known for its salmon resources, bald eagles, and scenic boating opportunities.

Skagit River

As part of this GMP, eligibility and suitability studies were conducted for the main-stem Skagit below Gorge Dam to Ross Lake NRA boundary and the tributaries flowing into this reach. This study found the main-stem Skagit River, Goodell Creek, and Newhalem Creek to be eligible and suitable WSR segments. For more information on these tributaries and the WSR study, please see Appendix D. In addition to the river segments included in the current study, three other tributaries of the Skagit River above Gorge Dam (Thunder Creek/Fisher Creek, Ruby Creek, and Big Beaver) were also found eligible in previous study efforts. ~~Below is a description of these eligible WSR segments.~~

Thunder Creek/Fisher Creek

***Segment*:** These streams originate from glaciers in the North Cascades NPS Complex and flow into Diablo Lake within Ross Lake NRA over a total of 25 miles.

Potential Outstandingly Remarkable Values:

- *Scenery*. The area provides views of high mountains, rugged peaks, glaciers, waterfalls, old growth forest, and a pristine stream valley.
- *Recreation*. A backcountry trail and several backcountry camps are located along Thunder and Fisher Creeks.
- *Geologic*. These are deep valleys surrounded by high ridges and peaks. There are several active glaciers at the headwaters.

Classification: Wild – These creeks are only accessible by trail.

Ruby Creek

***Segment*:** Ruby Creek from the Ross Lake National Recreation Area Boundary to slack water of Ross Lake over 2 miles.

***Potential Outstandingly Remarkable Values*:**

- *Scenery*. Rapid flowing mountain streams with views of spectacular high mountain ridges and peaks.
- *Recreation*. Driving for pleasure and hiking.
- *Fish*. Important habitat for Dolly Varden rainbow and cutthroat trout.

***Classification*:** Scenic

Big Beaver Creek

***Segment*:** Big Beaver Creek originating on the east side of the Pickett Range in the North Cascades National Park until it flows into the slack water of Ross Lake over a course of 13 miles.

***Potential Outstandingly Remarkable Values*:**

- *Scenery*. A maintained backcountry trail follows much of the lower portion of the creek. The trail offers spectacular views of the adjacent high country including mountain peaks, forested slopes, and the natural stream course with numerous beaver ponds, and old growth forests including spectacular stands of virgin western red cedar.
- *Recreation*. A maintained trail follows much of the lower portion of the creek. There is significant visitor use here and in the surrounding areas.
- *Geologic*. This is an active stream that varies from very steep gradient with falls and cascades to gentle meanders in the valley bottom.
- *Wildlife*. The valley provides diverse wildlife habitat including extensive growth Douglas-fir, western hemlock, and western red cedar; potentially extensive Spotted Owl habitat. This valley has excellent potential for Peregrine Falcon habitat due to the large cliffs and outstanding prey availability. Important mammals are mink, marten, river otter, beaver, cougar, mule, deer, black bear, and possibly gray wolf and grizzly bear.

***Classification*:** Wild – This creek is only accessible by trail.

Below is a summary of the all eligible wild and scenic river segments within Ross Lake NRA (See Table 5.14).

Table 5.14 Summary of All Eligible Waterways within Ross Lake NRA

River Segments	Classification	Outstandingly Remarkable Values						
		Fish	Wildlife	Geology	Pre-history	History	Recreation	Scenery
Big Beaver Creek	Wild		X	X			X	X
Ruby Creek	Scenic	X					X	X
Thunder Creek	Wild			X			X	X
Skagit River	Recreational	X	X	X	X	X	X	X
Newhalem Creek	RM 0 – RM 0.5 –Recreational RM 0.5 – headwaters-Wild		X	X	X	X	X	
Goodell Creek	Mouth to RM 0.5-Recreational RM 0.5 to headwaters - Wild	X	X	X				X

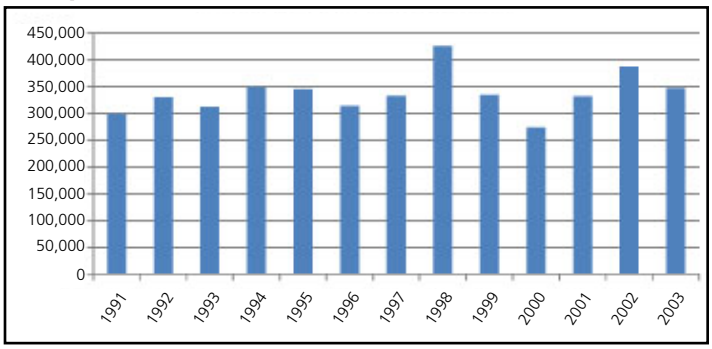
Visitor Use and Experience

Visitation Overview

Since the park complex has no entrance stations, visitation is difficult to calculate. For this GMP, visitor use numbers were estimated using numerous traffic counters placed at key locations, campground and visitor center counts collected by park staff, backcountry camping counts collected from the backcountry permit database, and reporting by partners and concessioners. Due to inconsistent reporting and dilapidated recording equipment in recent years, visitation numbers collected by the NPS since 2003 are unreliable. For this analysis visitation numbers from 1991 to 2003 have been used. Improvements to the visitor use data collection and reporting system is recognized as an immediate need in this planning effort.

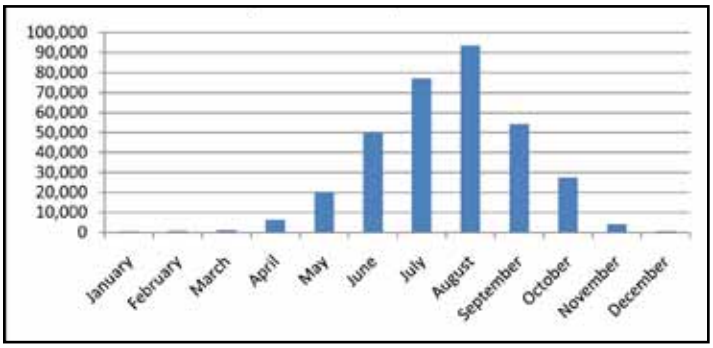
Visitation to Ross Lake NRA from 1991 to 2003 averaged about 337,000 people per year. During this same time period, visitation has fluctuated between a high of 425,000 people in 1998 and a low of 273,000 people in 2000. We are unable to report any current trends in visitation due to a lack of reliable data. Figure 5.7 shows the total annual recreation visits from 1991 to 2003.

Figure 5.7 Total Annual Recreation Visits (1991 – 2003)



Visitation to Ross Lake NRA is seasonal in nature, with 82 percent of all visits occurring in June through September. Twenty-eight percent of visits occur during the peak month of August. There is some late shoulder season use (April and November), but winter use is very limited due to access issues, the very low level of the reservoir, and the weather. There are currently detailed monthly use reports available. Figure 5.8 shows the average amount of visitation to Ross Lake NRA by month. Note: winter visitation is underestimated because recording equipment has been removed during that season in the past.

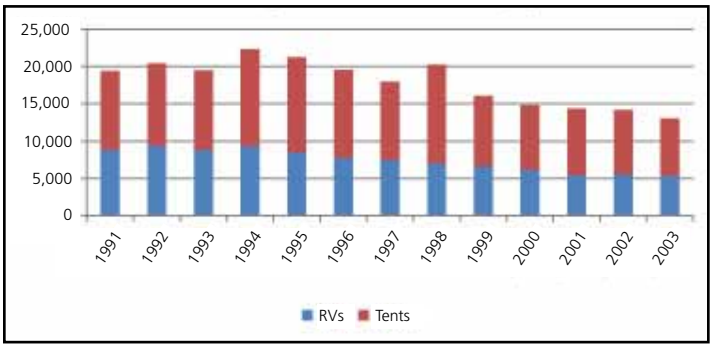
Figure 5.8 Average Monthly Recreation Visits (1991 – 2003)



Overnight Use

Overnight stays within Ross Lake NRA are recorded at NPS auto campgrounds, backcountry camps, the Ross Lake Resort concession, and the Environmental Learning Center. Auto campground use has declined since the 1990s, when 19,600 visitor use nights (number of visitors multiplied by number of overnight stays) on average were recorded each year. From 2000 to 2003, about 14,000 visitor use nights on average were recorded each year. The proportion of tent and RV users also slightly changed since the 1990s to include more tent users (59 percent in 2003 vs. 54 percent in 1991). Figure 5.9 shows visitor use nights at auto campgrounds each year and the proportions of tent and RV users.

Figure 5.9 Visitor Use Nights at Auto Campgrounds



In 1974, the first year for which backcountry visitor use night data is available, the park complex recorded 28,800 visitor use nights. After dipping to an all-time low of 17,800 in 1977, use climbed to its highest level of 39,500 in 1981. Another severe dip occurred in the mid-1980s, and then use climbed again to a secondary peak in 1995 of 38,900 visitor use nights. Since then, backcountry use has fluctuated, dropping again in 2004 to 29,870 visitor use nights, but currently on an upward trajectory through 2009 (35,956 visitor use nights). The average visitor use nights for the park

complex between 2000 and 2009 are 33,785. Separate data for Ross Lake NRA is more limited, and begins in 1991 with 13,500 visitor use nights recorded. This number reached a high of 17,300 in 1994, and has fluctuated since then. For the last ten years (2000 – 2009) visitor use nights for Ross Lake NRA averaged 14,325 with a low of 12,707 in 2003, and a high of 16,405 in 2008. Although visitor use nights dropped a minor amount in 2009, the general trajectory is upward.

On average from 2000 to 2009, backcountry use in Ross Lake NRA represents about 42 percent of total visitor use nights for the park complex. This percentage has been on an upward trajectory over the years. For example, in 1985 Ross Lake NRA backcountry use represented about 38 percent of total complex use. In 2009, the amount is at 45 percent. In the last two years, visitor use nights for Ross Lake NRA have surpassed the park for the first time. Much of this use is centered on Ross and Diablo Lakes, which represent about 78 percent of all backcountry use nights for Ross Lake NRA, and 33 percent of for the park complex. The remaining 22 percent of backcountry use for Ross Lake NRA is in wilderness.

Overnight lodging is provided by the Ross Lake Resort concession and the Environmental Learning Center operated by North Cascades Institute. The resort operates from mid-June through October. Visitation averages about 6,500 visitor use nights per year (1998-2008). Reservation rates at the resort have been in the 90 percent range for the last few years and this trend is expected to continue in the future. Many guests will book their reservation for the next year at the time of their stay at the resort.

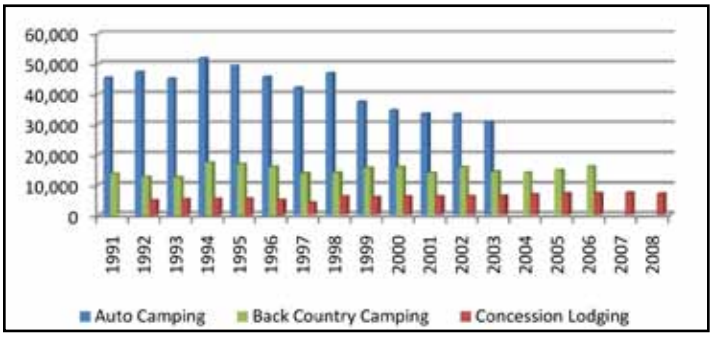
Since the 2005 opening of the Environmental Learning Center, participation in overnight programs lasting two to four days has increased from almost 1,000 participants in 2005 to 2,800 in 2008. Mountain School enrollment has increased from 800 participants in 2000 to over 1,800 in 2008. Figure 5.10 summarizes overnight use within Ross Lake NRA for auto

Table 5.15 North Cascades Highway Corridor Users and Ross Lake NRA Users

Profile of Corridor Users	**Profile of Ross Lake Users**
Most parties were families (68%)	Most parties were families (46 – 57% depending on survey location)
51% of visitors traveled in groups of two, 12% traveled in groups of three, and 15% traveled in groups of four	46% and 44% of visitors traveled in groups of two at Ross Dam Trail and Hozomeen, respectively, 15% and 13% traveled in groups of three, and 17% and 11% traveled in groups of four. In contrast, only 25% of visitors traveled in groups of two at Diablo Portage, 9% traveled in groups of six, and 11% traveled in groups of nine or more
29% of parties included children under age 18; however if Ross Lake NRA was a primary destination 45.2% of the parties included children	35% of parties included children under 18
Visitors were most commonly residents of Washington (62%), followed by other US states (30%)	At Ross Dam Trail and Diablo Portage, visitors were most commonly residents of Washington (71% and 93%, respectively); while at Hozomeen, visitors were most commonly from Canada (66%)
For 63% of visitors, this was their first trip to Ross Lake NRA	For 65% of visitors along Ross Dam Trail, this was their first trip to Ross Lake NRA, compared to 39% at Hozomeen and 31% at Diablo Portage
Trip Motivation for Corridor Users	**Trip Motivation for Ross Lake Users**
"Viewing scenery" was the trip motivation that received the highest importance rating, followed by "being close to nature," "getting away from the usual demands of life," and "experience tranquility"	"Viewing scenery" was the trip motivation that received the highest importance rating for Ross Dam Trail and Diablo Portage visitors, followed by "experience tranquility," "being close to nature," and "getting away from the usual demands of life." For Hozomeen visitors the highest importance rating was "getting away from the usual demands of life," followed by "experience tranquility," "viewing scenery," and "being close to nature"

campgrounds, backcountry camps, and concession lodging.

Figure 5.10 Overnight Stays (Visitor Use Nights) by Type*



**Data on overnight stays for auto campers is unreliable beyond 2003. Back Country Camping visitor use nights for 2007 were 15,991; 2008 were 16,405; and 2009 were 16,259.*

Visitor Survey

During the summer of 2005 the Protected Areas Social Research Unit at the University of Washington conducted surveys of North Cascades Highway corridor users and Ross Lake users. The primary objectives of the Corridor User Survey were to obtain general visitor and trip information and to gather information such as awareness, use, and satisfaction related to facilities and programs introduced since the 1988 GMP. The primary objectives of the Ross Lake User Survey were to describe current lake users, the types of experiences they expect and have, and their attitudes toward potential management policies. Survey results are summarized below:

Trip Characteristics of Corridor Users

- Visiting Ross Lake NRA was the primary reason for the trip for 26% percent of visitors, was one of several reasons for 33% percent of visitors; and 41% percent of visitors were incidental visitors (visiting Ross Lake NRA was not a reason for their trip although they did stop at Ross Lake NRA)
- Most visitors came by auto (65% percent); motorcyclists made up 8% percent of incidental visitors and 6% percent of visitors for whom Ross Lake NRA was one of several destinations; no visitors for whom Ross Lake NRA was a primary destination came by motorcycle
- Visitors were more likely day users (61% percent) than overnight (39% percent)
- 63% percent of overnight visitors spent one or two nights and 92% percent spent between one and four nights
- Day users stayed four hours when Ross Lake NRA was a primary destination and 2.4 hours when it was an incidental visit
- Intentional visitors most frequently engaged in taking walks/hikes (80.6% percent), viewing lakes (79.0% percent), and viewing wildflowers/vegetation (75.8% percent)
- The three most important activities for intentional visitors include camping overnight in an auto campground, taking walks/day-hiking, and driving around viewing scenery

Trip Characteristics of Ross Lake Users

- Most lake users stayed overnight in Ross Lake NRA (98% percent at Diablo Portage, 86% percent at Hozomeen, and 56% percent at Ross Dam Trail)
- 70% percent of visitors at Ross Dam Trail spent one or two nights, 60% percent of visitors at Hozomeen and Diablo Portage spent two to three nights, and 26% percent of visitors at Diablo Portage spent five or more nights
- 48% percent of Hozomeen visitors described their trip as "camping overnight along lakeshore," followed by 18% percent that described it as car camping
- 33% percent of Ross Dam Trail visitors described their trip as "drove from home or other lodging to spend the day," followed by 19% percent that described it as car-camping, and 17% percent that described it as "camping overnight along lakeshore"
- 53% percent of Diablo Portage visitors described their trip as "staying overnight at Ross Lake Resort," followed by 35% percent that described it as "camping overnight along lakeshore"
- Hozomeen visitors were the most likely to car camp (52% percent), Ross Dam Trail visitors were the most likely to day-hike (79% percent) and to backpack (29% percent), and Diablo Portage visitors were the most likely to stay at Ross Lake Resort (55% percent), to go motor-boating (64% percent), to kayak/canoe (38% percent), and to camp overnight at a boat-in campsite (46% percent)

Facilities and Programs (Corridor Users)

- The top three sources of trip information were 1) NPS website, 2) travel guide/tour book, and 3) NPS map/brochure
- The facilities or programs with the highest visitation rates were 1) North Cascades Visitor

Center (62% percent), 2) Diablo Overlook restrooms (37% percent), 3) Gorge Overlook Trail (24% percent), and 4) Newhalem area trails (23% percent)

Impacts of Other Visitors (Ross Lake Users)

- The number of people seen on Ross Lake by those who were surveyed was as expected for 38% percent of visitors, fewer than expected for 23% percent of visitors, and a lot fewer than expected for 14% percent of visitors
- 62% percent of respondents indicated that the number of people seen on the lake was as preferred, 17% percent indicated there were more people than they preferred, and 3% percent indicated there were a lot more people than they preferred. Three percent of visitors indicated they saw fewer people on the lake than they preferred
- The number of people seen on inland trails by people hiking on inland trails was as expected for 39% percent of visitors, fewer than expected for 30% percent of visitors, and a lot fewer than expected for 11% percent of visitors
- Two-thirds of visitors said the number of people seen on inland trails was as preferred and 10% percent said the number of people were more than they preferred. Six percent of visitors indicated that the number of people seen on inland trails was fewer than they preferred
- 19% percent of visitors indicated that another party's behavior detracted from their enjoyment. These incidents were most likely to occur when respondents were on the shore of Ross Lake. Visitors contacted at Hozomeen were most likely to describe the party that affected their experience as having 8 or more party members whereas visitors contacted at Ross Dam Trail or Diablo Portage were more likely to describe the party that affected their experience as being in motorized boats
- Visitors contacted at Hozomeen reported a greater degree of detraction than visitors contacted at the other two sites. Over half (52% percent) of visitors contacted at Hozomeen indicated that this behavior detracted greatly whereas 63% percent of visitors contacted at Diablo Portage and 56% percent at Ross Dam Trail reported that this behavior detracted slightly. Review of the descriptions of these behaviors indicated that loud behavior that often goes on late into the night and sometimes accompanied by alcohol

View from Thunder Knob Trail.

was more prevalent at Hozomeen than the other locations and may be the behavior that results in the higher detraction ratings

- About one fourth of visitors contacted at Diablo Portage and Ross Dam Trail and 40% percent of visitors contacted at Hozomeen reported feeling crowded to some extent. The two factors rated highest as contributing to feelings of crowding were number of boating parties seen and number of parties camped within sight or sound
- 47% percent of people who saw evidence of human impacts indicated that the impacts did not detract from their experience and 39% percent indicated the impacted detracted slightly
- The most common impacts seen were litter (48% percent) and hiker-made trails (36% percent). Nine percent of visitors who saw evidence of human impacts specified in the other impact option the dam and dam-related items (i.e., power lines, maintenance equipment, road) as a human impact seen.

Recreation Opportunities

Recreation opportunities in Ross Lake NRA can be found within the highway corridor, on lakes, the Skagit River, smaller streams, and in the backcountry. Table 5.16 shows the primary recreational activities reported by overnight visitors to Ross Lake NRA.

Table 5.16 Ross Lake NRA Activities by Average Use Nights (2001-2009)

Activity	Percent
Boating (paddle)	39.3
Hiking	29.4
Fishing	12.4
Boating (power)	11.4
Other (other, admin., unknown)	3.6
Climbing	0.5
Stock Packing	0.4
Hunting	0.1

North Cascades Highway Corridor

The majority of visitors who come to Ross Lake NRA pass through on the North Cascades Scenic Highway, also known as State Route (SR) 20. This highway is the northern-most crossing of the North Cascades in Washington State. In addition to connecting the east and west sides of the state, it provides access to a number of trails, auto campgrounds, the Skagit River, the North Cascades Visitor Center, and the Seattle City Light towns of Newhalem and Diablo.

Numerous recreational opportunities exist within the highway corridor. According to the 2005 Corridor User Survey, some of the most popular activities include taking walks or hiking, taking photographs, viewing lakes, auto-touring and viewing scenery, and viewing wildflowers or vegetation. Other activities that occur within the corridor include camping, bicycling, bird-watching, going to the North Cascades Visitor Center, going to the Seattle City Light Visitor Center and tour, rock climbing, reading interpretive displays, attending NPS programs, attending North Cascades Institute programs, and staying at Ross Lake Resort. Winter recreation within the corridor includes cross country skiing, snowshoeing, snowmobiling, and ice climbing. Snowmobiling occurs on the closed portion of the highway beyond Ross Dam Trailhead, which closes each winter due to high avalanche danger.

Lake and River Recreation

Numerous water-based recreational activities also exist within Ross Lake NRA. On the Skagit River, activities include rafting, kayaking, canoeing, motorboating, fishing, and sightseeing. Although Ross Lake has limited access, it is popular among both motorized and non-motorized boat operators. Although early data activity is unavailable, anecdotal evidence suggests that use on Ross Lake has changed from a primary fishing destination to a primary paddling and hiking destination, with the proportion of non-powered craft such as kayaks and canoes

The North Cascades Visitor Center in Newhalem provides exhibits and information for visitors.

gaining in popularity relative to fishing and power boating. From 2001 to 2009, the latest timeframe for which detailed activity use reports are available, backcountry permit data reveals that 39.3 percent of visitor use is paddling (canoe/kayak) and 29.4 involves hiking. Fishing is still listed as a primary activity for 12.4 percent of use, with power boating at 11.4 percent. Climbing, stock packing, and hunting are all minimal (less than 1 percent).

Ross Lake Resort provides boat rentals and a water taxi service on Ross Lake as well as the portage of small vessels around Ross Dam. Diablo and Gorge lakes also attract a smaller number of motorized and non-motorized boat operators. There are currently no restrictions on motorboats on any of the reservoirs or the Skagit River, although personal watercraft are prohibited. Seaplane landing is currently allowed on Diablo and Ross Lake; a small but unknown number of seaplanes (estimated at 5-15) land each year on the reservoirs.

Backcountry and Wilderness Recreation

World-class primitive recreational opportunities exist in the backcountry and designated wilderness of Ross Lake NRA. There are over 100 miles of trails in the recreation area, over half of which are open to stock use. Several of the trails within Ross Lake NRA are long-distance segments that continue on into North Cascades National Park or the Pasayten Wilderness. Hiking and backpacking are the most popular activities, while stock use, mountaineering, fishing, swimming, skiing, and hunting also occur.

Hunting and fishing in Ross Lake NRA are both authorized in accordance with the enabling legislation for Ross Lake NRA. Both activities require a valid license from the Washington Department of Fish and Wildlife; however, no permit is needed from the NPS. Hunting within Ross Lake NRA is managed in accordance with 36 Code of Federal Regulations, Sec. 2.22. In general, the NPS defers to the WDFW regulations for specific fishing and hunting seasons, gear restrictions, and bag limits. Trapping is illegal. Two game management units encompass Ross Lake NRA: the Diablo unit (GMU 426) comprises approximately 203,546 acres, of which about 114,689 acres lie within Ross Lake NRA. The Sauk GMU lies mostly to the west of Ross Lake NRA; a very small area of this GMU is within Ross Lake NRA. The fishery is broken down according to water body and reach, and restrictions vary.

Big game hunting within Ross Lake NRA includes deer, bear, and cougar. Hunting mountain goats is not legal within the Diablo GMU. Small mammals that can be hunted include bobcat, coyote, snowshoe hare, raccoon and red fox. Various species of waterfowl and upland game including forest grouse and dove are also legal to hunt.

Hunting is not allowed within ¼ mile of: nature trails, Thunder Knob Tail, the first few miles of Thunder Creek Trail as far as the Thunder Creek Bridge, Happy Creek Boardwalk, North Cascades Environmental Learning Center, Hozomeen Road, Ross Lake Resort, Colonial Creek and Goodell Creek Campgrounds, the towns of Newhalem and Diablo , the dams and their powerhouses, and the Ross Dam Trail and haul road. Hunting use is generally considered a minor use. amounting to 0.1 percent of total activity use on average between 2001 and 2009.

Climbing, which represents almost 12 percent of the activity use in the park complex as a whole, is limited to 0.5 percent of activity use in Ross Lake NRA because very few mountaineering objectives lie wholly within Ross Lake NRA (Ruby and Hozomeen Peaks are the exception, and climbing use is light on these routes).

Use of the Ross Lake area by organized groups appears to have increased in the last 10 years, with more commercial use permitees (camps, outdoor schools, guided services) as well as more church groups, educational organizations, Boy Scout troops, etc. This use tends to focus heavily on Ross Lake, Diablo Lake, and to a lesser extent the East Bank Trail. Ross Lake is also becoming increasingly popular as an area for projects with park partners. The number of projects has increased over the last few years as well, with regular programs run by the Student Conservation Association, North Cascades Institute, and other park partners. These programs all generally work with youth and provide an opportunity for combining service work, learning, and recreation in the backcountry. There is also a small amount of stock packing use, representing about 0.4 percent of total activity use in Ross Lake NRA.

Popular day-use destinations are Thunder Creek, Fourth of July Pass, Pyramid Lake, Ross Dam, Hozomeen Lake, and (for backpackers or boaters already on the lake), Desolation Peak.

Opportunities for People with Disabilities

Ross Lake NRA is the most accessible unit of North Cascades NPS Complex. Accessible restrooms are available at all visitor information stations and most campgrounds. The North Cascades Visitor Center, the Park and Forest Information Center in Sedro-Woolley, and the Wilderness Information Center are fully accessible. The Sterling Munro Trail at the North Cascades Visitor Center and the Happy Creek Forest Walk along the North Cascades Highway are fully accessible boardwalk paths. The River Loop Trail, Linking Trail and Newhalem Creek Rockshelter Trail, all in the vicinity of the North Cascades Visitor Center, are accessible trails with good surfaces and less than 10 percent grade throughout. The Rockshelter Trail ends in a boardwalk providing a view and interpretation of an archeological site. East of Newhalem along the North Cascades Highway the Gorge Overlook Trail is partially paved. There are accessible campsites and restrooms in Ross Lake NRA campgrounds along the North Cascades Highway and accessible picnic shelters at Newhalem and Goodell Creek campgrounds. There is also an accessible fishing pier at Colonial Creek Campground.

Visitor Facilities and Services

Visitor facilities within Ross Lake NRA include visitor information centers, campgrounds, overnight lodging facilities, and a small store.

Visitor Information Centers

North Cascades Visitor Center at Newhalem

The North Cascades Visitor Center is designed for visitors to explore the park complex's primary interpretive themes. Exhibits, a large relief map, two large-format audio-visual programs, and a staffed information desk give visitors an overall introduction to the park complex that will help them plan their visit. The various media, park rangers, network of short trails, and the cooperating association sales area also help visitors learn about the variety of park resources and introduce the key interpretive themes. Volunteers are a vital component in the operation of the visitor center. The facility is open May through October, serves approximately 40,000 annual visitors, and was designed to accommodate double the current visitation.

Wilderness Information Center at Marblemount

The Wilderness Information Center is designed for visitors to obtain information about backcountry travel and obtain necessary permits. Exhibits, a large relief map, and a staffed information desk help visitors understand the park complex's backcountry, and how to explore it safely and ethically. The various media, park rangers, and the cooperating association sales area also help visitors learn about the variety of park resources and introduce the key interpretive themes. Volunteers are a vital component in the operation of the information center. The facility is open May through October and serves approximately 10,000 annual visitors.

Park and Forest Information Center at Sedro-Woolley

The Park and Forest Information Center is a jointly operated facility with the Mount Baker Ranger District of the Mount Baker-Snoqualmie National Forest that is designed for visitors to obtain orientation and trip planning for the park complex and surrounding national forests. A large relief map and a staffed information desk help visitors understand the park complex and forests, and how to explore them safely. The facility is open year-round and serves approximately 20,000 annual visitors.

Hozomeen Ranger Station

The Hozomeen Ranger Station is designed as a contact station for visitors entering Ross Lake NRA from Canada. It is situated along a gravel road and is often mistaken for a Border Patrol station. Its primary function is to provide backcountry campsite availability information and to facilitate backcountry campsite self-registration. The ranger station does not have electricity or running water and is rarely staffed.

Skagit Tours Information Center at Newhalem

The Skagit Tours Information Center is operated by Seattle City Light and serves as a contact point for visitors who participate in the *Diablo Lake Adventure* or *Diablo Dam Good Dinner Tour*, and contains exhibits that cover the history of the Skagit Hydroelectric Project. The facility is open April through October and serves approximately 10,000 visitors.

Campers at Colonial Creek Campground.

Boaters at Ross Lake Resort.

Campgrounds

Auto Camping

There are five auto-accessible campgrounds within Ross Lake NRA. None of the campgrounds provide utility hook-ups. Fees vary based on level of amenities available at each location. Information on when auto campgrounds are filled to capacity is not currently collected.

Goodell Creek Campground and Group Camps

The Goodell Creek Campground is the western-most facility along the North Cascades Highway. It has 21 sites appropriate for tents and small RVs. Drinking water and vault toilets are provided (no flush toilets). Campsites are filled on a first-come, first-served basis. The facility is open year-round and no fees are charged during the wintertime when potable water is not available. Group camping is available with eight sites at Lower Goodell Creek Campground and three sites at Upper Goodell Creek Campground. Group camp reservations can be made via an on-line reservation system. There is no potable water at the group camps.

Newhalem Creek Campground

The Newhalem Creek Campground is located on the south side of the Skagit River just west of the town of Newhalem. It has 111 regular sites, two group sites, and can accommodate larger RVs. A fully accessible site is available. Drinking water and flush toilets are provided. A portion of the sites in the campground can be reserved; other sites are filled on a first-come, first-served basis. The facility closes during winter months.

Gorge Lake Campground

The Gorge Lake Campground is the smallest of the five auto-accessible campgrounds. It is located just off of the North Cascades Highway on the access road to Diablo. It has six campsites and no water or services. Camping is free of charge at this location. The facility is open year-round.

Colonial Creek Campground

The Colonial Creek Campground is the largest and most popular of the auto campgrounds. It has 142 campsites and can accommodate larger RVs. Fully accessible sites are available. Drinking water and flush toilets are available. All sites are filled on a first-come, first-served basis. A small number of sites remain open year-round with no water, services or fees. Remaining sites are closed during winter months.

Hozomeen Campground

The Hozomeen Campground is accessible via a 42-mile gravel road from Hope, British Columbia or via boat, foot, or floatplane in the US; it is not accessible by road from the US. It has 79 designated campsites plus other camping areas at Winnebago Flats. Drinking water and vault toilets are provided. All sites are filled on a first-come, first-served basis; the facility closes during winter months.

Boat Camps

There are 19 boat-accessible camps on Ross Lake (including Hozomeen Campground) and three on Diablo Lake. On average there are three sites per camp, but numbers range from one to seven sites per camp. Nine of the sites are also accessible by trail. Over half of the sites have boat docks and group site availability. All sites are furnished with picnic tables, bear boxes for storage, well-defined tent pads, and outhouses. Boat-in camps are regularly filled to capacity during peak season, especially on the southern half of Ross Lake.

Hiker and Stock Camps

Fourteen hiker camps and nine stock camps are accessed via trails within Ross Lake NRA (an additional nine boat-access camps can also be accessed by trail). Camps have designated tent pads and Wallowa-style toilets. Visitors are required to either hang food and other attractants or use bear canisters for storage. Some hiker camps are regularly filled to capacity on weekends during peak season.

Lodging

Ross Lake Resort provides the only concession-operated overnight lodging within Ross Lake NRA. The resort is located on the north/west side of Ross Lake near Ross Dam. It is accessible by foot, boat, or floatplane. Accommodations sleep 86 and include twelve individual cabins and three bunkhouses built on log floats. All cabins have their own fully equipped kitchens; since there is no food service at the resort, guests are required to bring their own food supplies. There are no phones or televisions in the cabins and there is no reception for cell phones or wireless Internet. Equipment rentals include motorboats, canoes, kayaks, and fishing gear.

Ross Lake Resort operates an on-demand water taxi to and from trailheads along Ross Lake for a fee. This is a popular service which serves the general public and supports other commercial hiking/backcountry guide services operating within Ross Lake NRA. The resort also provides a truck portage between Diablo Lake and Ross Lake. This service, while mostly serving their clients in accessing the resort with gear and food supplies, is also used by visitors wishing to transport kayaks, canoes or other small vessels from Diablo Lake to Ross Lake. The resort is extremely popular with anglers as well as those who just want to "get away from it all."

Overnight lodging is also available at North Cascades Institute's Environmental Learning Center for program participants. The ELC is a residential field campus that provides lodging for up to 69 guests. Program participants enjoy meals at the dining hall, featuring local, organic foods, while learning about the local "foodshed." As allows, the facility is available for private groups hosting educational retreats and conferences.

Supplies and Stores

The Skagit General Store, owned and operated by Seattle City Light, is the only store within Ross Lake NRA. Established in 1922 in Newhalem, the store was originally a commissary that served Skagit River Hydroelectric Project employees and their families. In the 1940s the store was opened to the general public. Today visitors can purchase convenience foods, locally made fudge, souvenirs and other supplies. The building is listed in the National Register of Historic Places.

Interpretation and Education

Educational programs are presented within Ross Lake NRA through numerous methods and at various locations. The majority of education programs are developed and presented in partnership with the North Cascades Institute and take place at the North Cascades Environmental Learning Center. The keystone partnership education program is Mountain School, which brings 3rd through 12th graders to the Center for a three-day residential education experience exploring the natural and cultural history of the North Cascades. Other education programs include classroom visits and field trips to the park complex for area schools. There is a need to expand the number and variety of education programs for neighbors, area residents, and other diverse audiences.

Interpretive programs are presented within Ross Lake NRA through numerous methods and at various locations. Interpretive talks, guided walks, Junior Ranger programs, and evening programs are offered July through August at Hozomeen. Interpretive talks, guided walks, Junior Ranger programs, evening programs, exploration tables, and interpretive roves are offered June through September at campgrounds and other facilities throughout the North Cascades Highway corridor.

An interpretive ranger provides an interactive educational program at the visitor center.

Information and Orientation

Information about Ross Lake NRA, as well as the other units of the park complex, can be obtained over the Internet; through wayside exhibits, signs, and brochures; and at visitor information centers. A variety of interpretation and education opportunities are available.

Internet Site

The park complex's official website provides a wealth of information for prospective visitors. The website also serves national and international audiences, including people who may never have the opportunity to visit Ross Lake NRA.

Wayside exhibits, Signs, and Brochures

There are 72 wayside exhibits in Ross Lake NRA that provide information on a variety of subjects, representing all of the park complex's natural and cultural themes. Interpretive signs at the trailheads provide the public with information specific to the area, park natural and cultural resources, and information on park rules and regulations. There is a large kiosk on the Canadian side of the border at Hozomeen that explores the natural resources and cultural history of the region. There are self-guided interpretive trails at The Trail of the Obelisk, To Know a Tree Trail, Thunder Woods Nature Trail, and Happy Creek Forest Walk.

Outreach

Outreach programs are designed to connect the park with members of the surrounding communities by making them aware of the park and its opportunities for recreation and stewardship. These programs foster relevancy between the park and the individuals who live near it. In recent years, the NPS has embraced two initiatives to accomplish this goal: diversity outreach and developing pathways for youth from education and stewardship programs to employment opportunities.

The target audience for diversity outreach is Latinos and Hispanics who comprise the fastest growing ethnic group in the communities surrounding the park. The North Cascades NPS Complex staff collaborate with partners to provide education programs to Latino and Hispanic groups and field trips to the park. The NPS also attempts to hire Spanish-speaking employees throughout its organization.

The park and its partners collaborate to develop pathways for youth from diverse backgrounds so that those who participate in education and stewardship programs comprise a recruitment pool for additional education and stewardship programs over time, with a select few progressing to internships and seasonal jobs in the park.

Partnerships

To accomplish its mission, the park complex collaborates with a wide-variety of partners.

North Cascades Institute

The North Cascades Institute (NCI) was founded in 1986 and seeks to inspire people through direct experiences in the natural world. Its mission is to conserve and restore Northwest environments through education. It accomplishes this through science, art, literature and hands-on study of natural

Visitors can purchase supplies at the Skagit General Store.

A family views an informational exhibit at the visitor center.

and cultural history. In 2005, a partnership between the NPS, North Cascades Institute and Seattle City Light opened the North Cascades Environmental Learning Center (ELC) on the shore of Diablo Lake. The NPS views the ELC as a cornerstone of the educational program to connect people to the North Cascades ecosystem. The Institute also serves as the park complex's cooperating association, operating five retail sales outlets within the North Cascades NPS Complex. A variety of youth, family, and adult programs are offered by NCI, and detailed below.

Natural and cultural history seminars, field excursions and retreats for adults

These programs are tuition based and are open to the public. Classes are taught by trained NCI staff, and contracted experts in the field. They take place at inspiring locations throughout the Pacific Northwest including the North Cascades NPS Complex.

Family getaways

Family programs are based out of the ELC where kids and adults learn about nature through adventures on the lake and trails, games, arts and crafts, storytelling and scientific explorations.

School programs and summer youth adventures

"Mountain School" is a residential education program for elementary, middle and high school students. Students come to the ELC with their school class, teacher and chaperones to learn about the ecosystems, geology and natural and cultural history of the mountains. "North Cascades Wild" is a canoe camping and conservation service program for underserved high school students. At the heart of the program is a 12-day canoe camping and backpacking program exploring Ross Lake. Underserved high school youth will complete valuable conservation service projects for the NPS while learning leadership skills, community building and the natural and cultural history of the region. "Cascades Climate Challenge" is a program that brings together students from cities across the U.S. for a one-month residency at the ELC to study glaciers and climate change in a hands-on way, and work closely with park scientists and naturalists. The experience is followed by a trip to Washington, D.C. to meet with national experts on climate change and share their experiences with elected officials and policy makers. When the students return home, they'll participate in service and leadership projects in their own communities facilitated by the NPS.

Visitors participate in an educational North Cascades Institute canoe trip.

Volunteer stewardship programs

These include Eagle Watchers and Mountain Stewards, which help to educate visitors and help restore and protect local ecosystems.

Graduate Master of Education program in environmental education

NCI, in partnership with Western Washington University, offers a Master Degree in Environmental Education and a Certificate in Leadership and Non-Profit Administration. The two year program focuses on leadership and nonprofit administration, curriculum development and instructional strategies, natural and cultural history, and residential program operations. Students spend one year in residency at the ELC and finish their second year of course work at Western Washington University.

Seattle City Light

Seattle City Light is a key partner of the NPS on numerous visitor information, maintenance, and resource management projects. Seattle City Light is a publicly-owned utility that manages ~~the Skagit Hydroelectric Project –~~ a complex of four hydroelectric dams within Ross Lake NRA. Seattle City Light constructed and owns the North Cascades Environmental Learning Center and operates two "company towns" within Ross Lake NRA for its employees. Additional explanation about Seattle City Light and its projects are located in the chapter under "Skagit River Hydroelectric Project" and "Newhalem Creek Hydroelectric Project."

Mount Baker-Snoqualmie National Forest

The Mount Baker-Snoqualmie National Forest surrounds the west boundary of the park complex and serves as a gateway for hikers to access to the park. The forest and park complex jointly operate the Park and Forest Information Center in Sedro-Woolley and park staff augment the forest staff at the Glacier Public Service Center in Glacier. The forest and park complex collaborate on numerous visitor information projects.

British Columbia Parks

Three British Columbia Provincial Parks are located to the north of the park complex and collaborate with the park to provide an interpreter for summer programming in Hozomeen (a region that comprises the northern portion of the Ross Lake National Recreation Area and the southern portion of Skagit Valley Provincial Park). The park also provides an interpreter for summer programming in this area and the two uniformed representatives from each country jointly develop and present programs for the public that support the theme "nature has no borders."

Skagit Environmental Endowment Commission

The Skagit Environmental Endowment Commission was established by a 1984 treaty between Canada and the U.S. based on an agreement between the City of Seattle and the Province of British Columbia to not build a higher dam on Ross Lake, and which also resulted in the creation of the Commission to manage an endowment fund to preserve the area, pristine wilderness and fish and wildlife habitat in the Upper Skagit Watershed until 2065. The Commission works together with the park to plan visitor information, interpretation, restoration, and inventory and monitoring projects to fund – many of which the park carries out.

Access and Transportation

Visitors access Ross Lake NRA via the North Cascades Highway, the Silver/Skagit Road to Hozomeen, or on foot from numerous trails.

Roads and Vehicular Access

Ross Lake NRA is bisected by the North Cascades Highway, also known as the North Cascades Scenic Highway. Completed in 1972, it is the northernmost route across the Cascades in Washington, hence its original name: the North Cross State Highway. The highway connects the Skagit and the Methow river valleys by crossing two mountain passes east of the Ross Lake NRA boundary: Rainy Pass at 4,855' and Washington Pass at 5,477'. In 1984 the highway was designated a National Forest Byway and a Washington State Scenic Byway. The Cascade Loop, a 440-mile scenic byway, travels through Puget Sound, the North Cascades, and the Columbia River Valley.

The North Cascades Highway is a state highway operated and maintained by the WSDOT under a right-of-way easement. Right-of-way conditions require WSDOT to be responsible for the following areas and/or activities: road surface; rock slope stabilization; road drainage; snow removal, sanding, and opening; signs (regulatory, warning, destination, and delineators); guardrails; bridges, tunnels, cribbing, and retaining walls; storm damage repair and slide removal; vegetation control within the road prism; paved pullouts; and rock patrol. The NPS is responsible for signs (entrance signs, information signs, and rock sign bases); hazard trees outside the road prism; vista clearing; and litter pickup.

The highway maintenance shed at Newhalem is WSDOT's base for the North Cascades Highway operations. Four staff members report to the building and are responsible for a section of the highway extending from milepost 89 to milepost 148. WSDOT closes thirty-six miles of the highway east of the Ross Dam parking lot during the winter to protect motorists and maintenance workers from snow and avalanche danger. The highway is also occasionally closed due to rock fall, mudslides, and other natural events. WSDOT initiated avalanche control with explosives for the first time in the Gorge area in 2008. The NPS is working with WSDOT to address potential concerns regarding wildlife and wilderness impacts in response to any avalanche control they may need to undertake in the future.

The North Cascades Highway provides the only vehicle access to Ross Lake NRA in the US (the Silver/Skagit Road in Canada provides access to Hozomeen). Recreationists, truck drivers, and other users alike travel the highway to cross the Cascades, driving cars, RVs, motorcycles, and tractor-trailers. The NPS also uses the highway to access all of its facilities, trailheads, and other access points for administrative use within Ross Lake NRA. Large traffic volumes occur along this crossing during peak season weekends (July and August). Traffic counters placed at east and west entrances along the highway help to estimate use

Old signage at Diabloe Dam access road.

New replacement signage at Diablo Dam access road.

(due to unreliable equipment, the North Cascades Highway traffic counts have been unavailable since 2000). According to the counters, a greater proportion of drivers travel from west to east (over 170,000 per year on average during the summer from 1993-2000) than from east to west (over 140,000 during the same period). Summertime traffic counts show no noticeable trend during this time, possibly because of poor or inadequate recording.

From the North Cascades Highway the Thornton Lakes Road is a five-mile, rough gravel road that provides access to the Thornton Lakes Trailhead. The Newhalem Creek Road is a 1.5-mile gravel road that provides access to the Newhalem Creek Trail, a USGS gauging station, and the diversion structure for Seattle City Light's Newhalem Creek Hydroelectric Project. Other access points along the North Cascades Highway include the North Cascades Visitor Center, auto campgrounds, Newhalem and Diablo, the Environmental Learning Center, and various trailheads and overlooks.

The only other vehicle access to Ross Lake NRA is achieved via the Silver/Skagit Road in Canada. The Silver/Skagit Road joins Highway 1 just west of Hope, British Columbia. It is a 40-mile long gravel road that provides access to Hozomeen. The road parallels Ross Lake for about two miles before it dead-ends at the water's full pool edge.

Improvements Needed

Several issues related to access, congestion and potential safety concerns have been identified along the North Cascades Highway. At the Ross Dam Trailhead parking lot, traffic congestion at points of egress and ingress, as well as a lack of clearly defined parking spaces, are safety issues. During the summers of 2005 through 2008, NPS employees recorded informal daily tallies at the parking lot that included the total number of vehicles at the parking lot, the number of oversized vehicles, and the number of government-owned vehicles (See Table 5.17). Results show that on average, 27 vehicles are parked in the parking lot in the daytime during the summer. The average number of vehicles parked in the parking lot on weekends increases to 34. The maximum number of vehicles recorded at the parking lot during the four-year period is 72. It is estimated that the parking lot is filled to capacity when anywhere from 60 to 72 vehicles are present. This number varies based on the size of vehicles and how they are parked in the lot. The maximum number of oversized vehicles parked in the parking lot at one time is four, and the average number turns out to be less than one at a time over the four year recording period. The maximum number of government-owned vehicles parked in the parking lot at one time is 10, and averages out to be two vehicles at one time over the four years.

Table 5.17 Number of Vehicles at Ross Dam Trailhead Parking Lot *
*excluding oversized and government vehicles

	All days			Weekends only	
	Average # vehicles	**Median # vehicles**	**Maximum # vehicles**	**Average # vehicles**	**Median # vehicles**
2005	24	22	62	32	29
2006	28	26	61	36	37
2007	27	27	56	32	34
2008	28	28	72	38	40
4-year Summary	27	26	72	34	36

The Panther Creek Trailhead location poses another safety issue. Because the trailhead has no formal parking area, most hikers park at the East Bank Trailhead. To reach the trailhead, hikers must cross the North Cascades Highway, walk about 75 yards along the shoulder of the highway, cross the Panther Creek highway bridge (60 yards), then walk another 50 more yards along the highway shoulder. Because hikers are exposed to high-speed traffic, especially along the bridge (which lacks a pedestrian walkway), this situation is a safety concern. The safety risk is greatest in the spring and fall when the highway and the bridge may be icy and slick

Another safety concern along the highway involves the lack of a pedestrian route and parking in the gorge to reach designated climbing areas. Climbers currently park along the road shoulder or in Newhalem and walk along the highway to reach climbing destinations. In many areas climbers end up walking between Jersey barriers, placed along the shoulder, and fast moving traffic.

Water access

Boat launches are available at Gorge Lake, Diablo Lake, and at the north end of Ross Lake at Hozomeen. Two graded-concrete boat launches at Hozomeen are normally usable from mid-June through September. Canoes, kayaks and small craft can be launched at Colonial Creek Campground and boated five miles to the end of Diablo Lake. To get from Diablo Lake to Ross Lake, boats and gear must be portaged around Ross Dam over a mile-long gravel road with switchbacks. Ross Lake Resort also provides portage service for motorboats under 14 feet as well as canoes and kayaks.

Bicycle Access

Bicycles are allowed on roads within Ross Lake NRA and are prohibited on all trails and in wilderness. The North Cascades Highway is a popular bicycling route and is part of the Northern Tier TransAmerica bike route. Between the towns of Newhalem and Diablo there are two tunnels. The longer tunnel, closer to Newhalem, is fitted with a "Bikes in Tunnel" flashing safety light that can be turned on at either end.

Socioeconomic Environment

Regional Socioeconomics

The area of influence for economic and social consideration associated with the Ross Lake National Recreation Area encompasses Whatcom, Skagit, and Okanogan counties in northwestern Washington; the community of Stehekin, within Lake Chelan National Recreation Area at the northern end of Lake Chelan; and the district municipality of Hope, located within Fraser Valley Regional District in British Columbia. Socioeconomic data is most readily available at the county and regional district level, therefore this analysis uses that data. The reader should note however, that Ross Lake National Recreation Area is located in and near the eastern, rural portions of Skagit and Whatcom counties, while the more populated, western portions of these counties strongly influence the data presented. Fraser Valley Regional District also has a population concentration in its western portion, including the communities of Abbotsford, Chilliwack, and Mission. The population of Hope, nearest the recreation area is much lower than in those western communities.

Ross Lake National Recreation Area is located between the north and south units of North Cascades National Park. The recreation area is located just over 100 miles from both Seattle, Washington and Vancouver, British Columbia. The recreation area contains most of the developed areas of the North Cascades NPS Complex and the only road through the complex. The North Cascades Highway is one of a few roads that traverse the North Cascades mountain range. Communities along the route to the recreation area include Sedro-Woolley, Concrete, Rockport, and Marblemount to the west; Newhalem and Diablo within the boundaries; and Mazama, Winthrop, and Twisp to the east. The other access road to the recreation area, Silver Skagit Road, is a 40-mile unpaved road that takes visitors from Hope, British Columbia, to Hozomeen, a campground within the recreation area boundaries on the northern shores of Ross Lake.

Demographics

Population

The influence area has seen steady growth in population from 1990 to 2000, with growth slowing slightly from 2000 to 2006. Whatcom and Skagit counties and Fraser Valley Regional District grew

faster than Washington and British Columbia from 1990 to 2000. Okanogan grew at a rate slightly slower than the state's average rate during that time and had almost no change from 2000 to 2006.

The three counties and Fraser Valley Regional District had an average annual growth rate of 3.0 percent in the 1990s and 1.6 percent from 2000 to 2006. The state population grew at an average annual rate of 2.1 percent in the 1990s, and slowed to 1.4 percent annually from 2000 to 2006. (U.S. Census Bureau 2006; Washington State Office of Financial Management 2008; British Columbia Stats 2008). British Columbia grew at an average annual rate of 2.3 percent in the 1990s and 1.4 percent from 2000 to 2006 (British Columbia Stats 2008). The community of Stehekin had a loss in population from 2001 to 2006 (Washington State Office of Financial Management 2007). Hope had no growth in that same period (Statistics Canada 2006). Table 5.18 shows historic and projected population growth for this area.

Population trends in the counties are driven by different influences. In Skagit and Whatcom counties, growth has been driven largely by migration into the areas. In Okanogan County, new births are offset by out-migration (U.S. Census 2006). The Fraser Valley Regional District has experienced growth because the number of births has been greater than the number of deaths, and the district is experienced in-migration (British Columbia Stats 2008). Migration patterns are closely related to employment—people follow the jobs. The recent population changes reflect growing job sectors in Skagit and Whatcom counties and Fraser Valley, and a slightly retracting job sector in Okanogan County.

Population Projections

Population projections to the year 2030 indicate rates of growth very similar to those from 2000 to 2006 for each of the regions. The influence area is projected to grow at a greater rate than either the state of Washington or the province of British Columbia during the period from 2000 to 2030, with a projected 1.9 percent average annual growth vs. 1.5 percent and 1.4 percent respectively (Washington State Office of Financial Management 2008 and British Columbia Stats, 2008).

Age

Okanogan and Skagit counties have older populations than does Whatcom County and the state of

Table 5.18 Historic and Projected Population Growth

Area	Historic		Projected			Projected Growth, 2000 to 2030	Average Annual Growth Rate, 2000 to 2030
	1990	2000	2010	2020	2030		
Okanogan County, WA	33,350	39,564	42,739	46,526	49,239	24%	0.8%
Skagit County, WA	79,545	102,979	123,888	150,305	178,036	73%	2.4%
Whatcom County, WA	127,780	166,826	195,633	230,008	261,416	57%	1.9%
Fraser Valley, British Columbia	183,847	243,728	289,072	336,579	379,144	56%	1.9%
Three County and Fraser Valley Total	424,522	553,097	651,332	763,418	867,835	57%	1.9%
Washington	4,866,663	5,894,143	6,792,318	7,698,939	8,509,161	44%	1.5%
British Columbia	3,290,814	4,039,198	4,563,927	5,172,715	5,706,179	41%	1.4%

Source: U.S. Census Bureau; British Columbia Stats; Washington State Office of Financial Management 2007.

Washington. The median ages are 38 and 37 for Okanogan and Skagit counties and 34 and 35 for Whatcom County and Washington, respectively. Hope has an older population than does British Columbia as a whole. The median age is 42 in Hope, while it is 38 in British Columbia.

Race

The racial composition among the three U.S. counties and Fraser Valley Regional District is predominately white (between 75 percent and 88 percent). Washington and British Columbia are more diverse, with 82 percent and 74 percent of the population white, respectively. American Indians account for 12 percent of the population in Okanogan County. Fraser Valley has a South Asian population of 8 percent and an aboriginal population of 5 percent. The Hispanic or Latino populations of Okanogan and Skagit counties are greater than for the state overall (See Tables 5.19 and 5.20).

Economic Overview

Employment

The influence area had over 325,000 jobs in 2006 and employment has grown at an average annual rate of 1.9 percent since 2000. This was slightly higher than the state's average annual growth of 1.7 percent during the same period. Total full- and part-time employment in Okanogan County grew by 1.2 percent annually, or by 1,600 jobs. In Skagit County, employment increased in that same period by 1.7 percent annually or by 7,000 jobs and in Whatcom County, by 2.7 percent or by 16,600 jobs.

However, employment is cyclical, often responding to swings in the national or regional economy. Okanogan County experienced a decline in employment that was not mirrored in statewide data from 1997 to 2001. The losses were likely due to retirement and an aging population, loss of timber and wood-related work, and declining employment opportunities in the fruit packing industry due to structural and technological changes. A challenge for Okanogan County is the large share of seasonal employment: 41.3 percent of county employment was concentrated in seasonal industries, compared to 14 percent statewide. Industries with seasonal employment patterns are characterized by large employment increases and decreases in particular months of the year (Washington State Employment Security 2002).

Skagit County has experienced general employment growth over the past decade, with some periods of decline. High employment growth occurred through 2000, and then employment decreased during the recessionary period of 2001 and 2002. Growth rebounded following 2002 (Washington State Employment Security, 2006).

Whatcom County's employment rate also increased from 1990 to 2000 and into 2006 at a rate greater than the state's rate overall.

In 2001, the labor force numbered 115,655 people in Fraser Valley, and increased 1.5 percent annually to 125,725 by 2006. This was a lower rate than the 1.8 percent annual growth British Columbia's labor force experienced (See Table 5.21).

Unemployment

Unemployment in the three U.S. counties has increased slightly in the period from 2000 to 2006, as it did in the state. Skagit and Whatcom counties and Washington have rates from 4 percent to 6.4 percent; these rates are relatively low in historic terms. Okanogan County has had a high rate of unemployment over the years, averaging 5 percentage points higher than the state from the period 1970 to 2001 (Washington State Employment Security, 2002). The seasonal nature of agricultural industries is a cause of high unemployment in the county, with the highest unemployment occurring during the winter and early spring months. In Hope, the unemployment rate of 9.2 percent in 2006 was fairly high. It is a higher rate than in the province, but it does reflect a decrease since 2000. Unemployment in British Columbia also decreased during that time period (See Table 5.22).

Industries

Trade and services dominate the influence area economies, with retail trade and health services driving much of the jobs in this sector. Government also has a strong presence in the U.S. counties, and agriculture—especially apple production—is important in Okanogan County (Washington State Employment Security 2002).

In Fraser Valley, the primary economic activities include agriculture, forestry, and manufacturing. Industrial and warehousing operations have been attracted to this area due to the lower land prices (British Columbia Stats Quarterly Regional Statistics, 2008).

Table 5.19 Demographics, Area of Influence, United States

Area	Median Age	Race/Ethnicity						
		White	Black	American Indian & Alaskan Native	Asian and Pacific Islander	Other	Two or more	Hispanic or Latino
Okanogan County	38.2	75%	0%	12%	1%	9%	3%	14%
Skagit County	37.2	87%	0%	2%	2%	7%	2%	11%
Whatcom County	34	88%	1%	3%	3%	3%	3%	5%
Washington	35.3	82%	3%	2%	6%	4%	4%	8%

Source: U.S. Census Bureau 2000.

Table 5.20 Demographics, Area of Influence, Canada

Area	Median Age	Race							
		Chinese	South Asian	Filipino	Japanese	Other Visible Minority	Multiple Origins	Total Aboriginal People	Rest of Pop-ulation
Hope	42.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fraser Valley	36	1%	8%	0%	0%	2%	0%	5%	83%
British Columbia	38.4	9%	5%	2%	1%	4%	0%	4%	74%

Source: British Columbia Stats 2001.

Table 5.21 Employment Growth by Area, 2000-2006

Area	1990	2000	2006	Growth, 2000-2006	Average Annual Growth Rate, 2000-2006
Okanogan County	13,632	22,502	24,130	7%	1.2%
Skagit County	34,121	59,483	65,660	10%	1.7%
Whatcom County	61,657	94,837	110,180	16%	2.7%
Fraser Valley Regional District					
(2001, 2006)	N/A	115,655	125,725	9%	1.5%
Total	N/A	292,477	325,695	11%	1.9%
Washington	2,487,073	2,793,722	3,084,652	10%	1.7%
British Columbia (1991, 2001, 2006)	1,721,685	1,883,975	2,092,770	11%	1.8%

Source: U.S. Census Bureau 1990, 2000, 2006; British Columbia Stats 2001, 2006; Statistics Canada 2001, 1991, 2006.

Table 5.22 Unemployment Rates		
Area	**2000**	**2006**
Okanogan County	7.0%	N/A
Skagit County	4.3%	4.7%
Whatcom County	4.9%	5.7%
Washington	4.1%	6.4%
United States	5.8%	6.4%
Hope	12.0%	9.2%
Fraser Valley	8.6%	5.8%
British Columbia	8.0%	6.0%
Canada	7.4%	6.6%
Source: U.S. Census Bureau 2000, 2006; Statistics Canada 2007.		

Electrical power generation is an important economic component of Ross Lake National Recreation Area; it is the reason for the creation of the lakes. The Skagit River is dammed within the recreation area at three points, creating Ross, Diablo, and Gorge lakes. In addition, Newhalem Creek is dammed within the boundaries. These four dams (owned by Seattle City Light) provide 17 percent of the electricity for the city of Seattle and surrounding municipalities (Seattle City Light, 2008). Seattle City Light has proposed to gain an additional 30 megawatts of power from the Skagit River system by constructing a bigger tunnel through the Gorge Reservoir.

Tourism

Recreation and tourism also have a role in the economy of the influence area. Ross Lake is one of several visitor attractions in the area, which also includes North Cascades National Park, Lake Chelan National Recreation Area, and Mount Baker (located within the Mt. Baker Snoqualmie National Forest). Forests, rivers, and towns in the influence area attract visitors with opportunities for skiing, whitewater rafting, camping, hiking, fishing, boating, and art and cultural experiences. Visitors and travelers support numerous jobs in the influence area's retail trade, accommodations, dining, entertainment, and other affiliated industries. In the three U.S. counties, 6 percent of jobs are in the tourism industry, making up 3 percent of the counties' earnings (Washington State, 2006). The percentage of jobs and earnings from tourism are greater in the three-county region than in the state of Washington overall. In Fraser Valley, 8 percent of jobs are in the industries of accommodation, food services, arts, entertainment, and culture (Statistics Canada, 2006).

Tourism is important to Stehekin, which has several businesses providing accommodations, recreation, transportation, food services, arts, and culture to visitors.

Commercial Services Provided at Ross Lake National Recreation Area

As of 2008, one concessioner, Ross Lake Resort, operated within Ross Lake NRA, providing lodging, boat rentals, fishing equipment, and transportation across the lake. The concessioner is interested in expanding services. Several companies operate under commercial use authorizations to offer services, such as fishing and rafting tours, to the recreation area visitors.

Table 5.23 provides a breakdown of employment in the area by major category.

Income

Median household income has increased in all the counties and the regional district from 2000 to 2006. Skagit and Whatcom counties are 9th and 12th out of 40 in a state ranking of highest median household incomes by county, while Okanogan is ranked 39th. Median household income in Hope is only 86 percent of the median income for British Columbia (See Tables 5.24-5.27).

Housing

Occupancy Rates

At the time of the 2000 census, Okanogan, Skagit, and Whatcom counties all reported vacancy rates above the statewide average of 7.3 percent, although other

Table 5.23 Employment by Major Category, 2006

Area	Farming	Industrial**	Trade & Services***	Government****	Total
Okanogan County*	4,531	3,999	9,802	5,330	24,162
Skagit County	2,568	15,175	37,943	10,810	66,496
Whatcom County	3,108	24,624	68,399	15,337	111,468
Fraser Valley	9,530	34,915	74,395	6,875	125,715

Sources: Bureau of Economic Analysis, 2006; British Columbia Stats 2001; Statistics Canada, Census of Population 2001

*** Some industry numbers not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.**

****Industrial includes forestry, mining, utilities, construction, manufacturing, and transportation and warehousing.**

*****Trade and services includes wholesale and retail trade, information, finance and insurance, real estate, professional and technical services, management of companies, administrative and waste services, education and health care, arts and recreation, accommodation and food services, and other services.**

******Government includes federal, state, and local government in the US counties.**

Table 5.24 Total Personal Income, 2006 (in $US)

County	2006
Okanogan County	$699,000,000
Skagit County	$2,665,000,000
Whatcom County	$4,189,000,000
3 County Total	$7,553,000,000

Source: Washington State 2006.

Table 5.25 Total Personal Income, 2006 (in $Can)

Municipality	2006
Hope, British Columbia	$157,110,000

Source: British Columbia Stats 2006.

Table 5.26 Median Household Income: Counties, State, and U.S. (in $US)

Area	2000	2006	% of 2006 State Median Income	Statewide Rank (of 40 counties)
Okanogan County	$29,726	N/A	N/A	39
Skagit County	$42,381	$48,222	92%	9
Whatcom County	$40,005	$43,798	83%	12
Washington	$45,776	$52,583	100%	-
United States	$41,994	$48,451	92%	-

Source: U.S. Census Bureau 2000, 2006.

Table 5.27 Median Total Income: District Municipality, Province, and Canada (in $Can)

Area	2000	2006	% of 2006 Province Median Income
Hope	$16,932	$23,988	86%
British Columbia	$22,189	$27,862	100%
Canada	$22,356	$27,500	99%

Source: British Columbia Stats 2000, 2006.

than in Okanogan County, the rates are still fairly low in a historical context. Okanogan had a high vacancy rate of 21.3 percent, much of which is attributable to vacation homes and winter vacancies of farm worker homes (2008 *Okanogan County Comprehensive Plan*). Hope and Fraser Valley had low vacancy rates of 6.8 percent and 5.5 percent respectively (See Table 5.28).

New Construction

Skagit County and Whatcom County experienced residential construction increases of 17 percent and 15 percent respectively from 2000 to 2006, reflecting population growth (U.S. Census Bureau 2006). Fraser Valley had a 15 percent increase in residential units during that time. Hope had a 5 percent increase in housing units during the same period (British Columbia Stats, 2006). Note that data on growth or decrease in housing units for Okanogan County cannot be quantified due to the 2006 data not being available. However, in Okanogan County, 723 building permits were issued in the years 2003-2006 for new residential construction, indicating increases in housing stock (Okanogan County Building Department, 2008).

Employee Housing

In the summer, the recreation area employs many seasonal workers. Efforts to find housing for the influx of people have proven difficult, and employees often must make long commutes due to the lack of suitable rental housing. Table 5.29 shows median area rents. At recreation area sites, such as Hozomeen, Ross Guard, and Newhalem, the National Park Service owns and rents housing for more than 22 people, in a mix of housing types, from homes for permanent employees to shared apartments and rooms for seasonal employees.

At Marblemount, the National Park Service owns housing for 38 employees, including housing for seasonal employees. At Diablo, the National Park Service typically rents 2 houses for up to 12 employees.

Land Use and Ownership

Ross Lake NRA is surrounded by public lands, with North Cascades National Park to the north and south of the recreation area, Skagit Valley Provincial Park and Manning Provincial Park also to the north, Mount Baker Snoqualmie National Forest to the west, and Okanogan National Forest to the east.

In the three U.S. counties, an average of 56 percent of the land is public, including state and national parks and forests. Rangeland, agricultural lands, and forested lands are dominant land uses in the counties (Okanogan County 2008; Skagit County 2007; Whatcom County 2008), These uses make up 23 percent of the land In Okanogan County, 43 percent of Skagit County, and 25 percent of Whatcom County. Urban areas occupy 2-3 percent of the three counties. Tribal lands make up 11 percent of Okanogan County. Similar data was not available for Fraser Valley. Table 5.30 shows median area house values.

Newhalem Townsite and Diablo Townsite are located within the boundaries of Ross Lake NRA. Seattle City Light employees live and work in these areas which are managed by Seattle City Light. Much of the dam maintenance has been automated and currently the townsite is not fully occupied. The house and facilities are owned by Seattle City Light.

Although federal lands are not subject to property taxes by local governments, the Bureau of Land Management administers a program called payment in lieu of taxes, which helps offset lost property taxes. In Skagit County, 539,838 federal acres netted a payment of $410,870. Whatcom County's 847,031 acres received payment of $663,834, and Okanogan County received $1,076,930 for its 1,568,288 federal acres (Bureau of Land Management, 2006).

Economic contributions of Ross Lake National Recreation Area

Visitor Spending

Total visits to Ross Lake National Recreation Area were recorded as 290,701 in 2007. Of that total, 46,472 visits involved overnight stays in the recreation area. Visitor spending in the influence area was estimated at $9.3 million in 2007, with $8.3 million coming from non-local visitors. Discover Your Northwest, formerly the Northwest Interpretive Association, sold books, posters, and other items at the gift shops in the North Cascades NPS Complex through 2009. Annual gross sales are about $80,000. Non-local visitor spending is new money coming to the influence area, which results in more local income being generated and supports local jobs. Visitors supported an estimated 165 jobs and $2.9 million in personal income (Stynes et al. 2008). This is in addition to jobs and income associated with national recreation area operations and staff, which are discussed in the next section.

Table 5.28 Vacancy

Housing and Vacancy 2000	Total Units	Vacant for seasonal, recreational or occasional use	Vacancy rate for seasonal, recreational or occasional use	Total Vacant Units	Total Vacancy Rate
Okanogan County	19,085	2,355	12.30%	4,058	21.3%
Skagit County	42,681	1,971	4.60%	3,829	9.0%
Whatcom County	73,893	5,946	8%	9,447	12.8%
Washington	2,451,075	60,355	2.50%	179,677	7.3%
Hope (2006)	2,855	N/A	N/A	195	6.8%
Fraser Valley (2006)	100,157	N/A	N/A	5,532	5.5%
British Columbia (2006)	1,788,474	N/A	N/A	145,324	8.1%

Sources: U.S. Census 2000, British Columbia Stats 2000.

Table 5.29 Area Monthly Rents

Area	Median Rent (in $US)		
	2000	**2006**	**Growth**
Okanogan County	$423	N/A	N/A
Skagit County	$668	$828	24%
Whatcom County	$622	$753	21%
Washington	$663	$779	17%

Area	Average Rent (in $Can)		
	2001	**2006**	**Growth 2001 to 2006**
Hope	$656	$683	4%
Fraser Valley	$688	$700	2%
British Columbia	$751	$752	0%

Sources: U.S. Census 2000, 2006; British Columbia Stats 2000, 2006.

Table 5.30 Area House Values

Area	Median House Value - Owner Occupied (in $US)		
	2000	**2006**	**Growth 2000 to 2006**
Okanogan County	$91,400	N/A	N/A
Skagit County	$158,100	$240,600	52%
Whatcom County	$155,700	$281,800	81%
Washington	$168,300	$267,600	59%

Area	Average House Value - Owner Occupied (in $Can)		
	2001	**2006**	**Growth 2001 to 2006**
Hope	$145,154	$228,001	57%
Fraser Valley	$184,143	$336,853	83%
British Columbia	$230,645	$418,703	82%

Sources: U.S. Census 2000, 2006; British Columbia Stats 2000, 2006.

Operations Spending

The national recreation area provides salaries to employees who go on to contribute to the local and regional economy. The recreation budget also includes spending for utilities, leasing, supplies, and local services, which supports regional sales, jobs, and income. The effects of these amounts are in addition to effects of spending by visitors.

The staff at Ross Lake National Recreation Area are employed by North Cascades NPS Complex. Many among the staff divide their time between Ross Lake and the other three units of the complex: the north and south units of the North Cascades National Park, and the Lake Chelan National Recreation Area. Therefore, an analysis of the payroll impacts of Ross Lake has not been split out specifically for the recreation area. NPS payroll for the complex in 2007 was $6.6 million, plus benefits for 155 NPS full time employees. This spending generates an estimated additional $1.8 million in local income and 62 jobs (Stynes et al, 2008).

Combined Effects of Visitor and Operations Spending

Ross Lake National Recreation Area contributes an estimated $11.3 million annually to local income ($2.9 million from visitor spending, $6.6 million for NPS employee income, and $1.8 million in generated income from operations spending). Total personal income was $699 million in Okanogan County in 2006, $2.67 billion in Skagit County, and $4.19 billion in Whatcom County (US$). In Hope, total income was $157 million (Can$). Of the influence area's total income of approximately $7.7 billion ($US), the contribution of the recreation area is a small but important 0.15 percent.

An estimated 382 additional jobs are created by the recreation area (including NPS jobs, jobs created by visitor spending, and jobs created by spending associated with NPS operations). These jobs make up 0.12 percent of the 325,695 jobs in the influence area. Table 5.31 shows the economic impacts from visitor spending and recreation area operations spending.

Management and Operations

Administrative Facilities

Park headquarters is located approximately 45 miles west of Ross Lake NRA boundary in Sedro-Woolley. The station is operated jointly with the Mt. Baker District of the Mt. Baker-Snoqualmie National Forest. North Cascades Institute, U.S. Geological Survey, and the North Cascades branch of the Discover Your Northwest also share this office. The Marblemount Ranger Station serves as the base of operations for many park functions, including trails, wilderness, fire management, cultural resource management, and portions of natural resource management. In addition to administrative facilities, staff housing is also located at the station.

Operations and Staffing

The North Cascades NPS Complex is managed by a team composed of the superintendent, science advisor, chief of administration and business practices, chief of natural and cultural resources, chief of maintenance, chief of visitor and resource protection, and chief of interpretation and education. Employees for all divisions are generally based out of offices in the headquarters complex in Sedro-Woolley, the Stehekin and Marblemount district offices, the U.S. Forest Service Ranger District Office in Chelan, and field offices in other smaller developed areas within the park complex. Most park employees within the complex have work responsibilities that encompass activities and functions for all three units of North Cascades NPS Complex.

Table 5.31 Impacts from Visitor Spending and Recreation Area Operations Spending, 2007

	Estimated Additional Influence Area Personal Income Created	Estimated Additional Influence Area Jobs Created
Visitor Spending	$2,900,000	165
Operations Spending*	$8,400,000	217

***Includes payroll and jobs of NPS employees and additional jobs created in the region**

Source: MGM2 2007.

The science advisor is responsible for encouraging and facilitating scientific research in the park complex. This employee works with the Natural and Cultural Resource Management Division and research scientists to identify research needs and opportunities, collaborates with other agencies and partners regarding research, and facilitates a dialogue between managers, scientists, and educators. The science advisor is based in park headquarters.

The Administration and Business Practices Division is responsible for the park budget, fiscal and real property management activities, revenue and fee management, contracting, information technology services, concessions management, and human resources. These employees are based in the headquarters complex, the Stehekin and Marblemount district offices, and the U.S. Forest Service Ranger District Office in Chelan.

The Natural and Cultural Resources Division is responsible for preserving and managing the natural and cultural resources of the park complex. Natural resource staff is primarily responsible for resource inventory, monitoring, and evaluation; impacts restoration and mitigation; aquatic and terrestrial resources management; physical sciences; wilderness preservation and monitoring; fire management; invasive, non-native plant control; geographic information systems; and environmental compliance and planning. The cultural resource staff is primarily responsible for cultural resources inventory and identification, monitoring, mitigation, preservation, research, maintaining the museum collections, and coordination with the Washington State historic preservation officer and area tribes. The staff is responsible for compliance with requirements of the National Historic Preservation Act (as amended). Division staff is based at headquarters and in the Marblemount and Stehekin districts.

The Maintenance Division performs maintenance and rehabilitation on the park complex's physical assets, infrastructure and equipment. The primary maintenance facilities are located in Marblemount and in Stehekin, with some additional maintenance facilities located in other developed areas of the park complex. Although approximately 94 percent of the park complex is designated wilderness, the rest consists of road accessible frontcountry developed areas with developed infrastructure including water treatment facilities, wastewater treatment facilities, electrical utilities, phone, trails, roads, parking areas, campgrounds, housing, and other administrative and public use facilities. In addition, some infrastructure exists within designated wilderness. Maintenance division staff is based throughout the park complex.

The Resource and Visitor Protection Division manages for resource protection and visitor safety and experience. Responsibilities include various visitor management and resource protection duties, including enforcing laws, providing emergency medical services, fighting wildland fires, managing visitor use in the park, performing search and rescue activities, managing wilderness activities, and issuing camping permits. Division staff is based throughout the park complex.

The Interpretation and Education Division facilitates the connections between park resources and the public by operating park visitor centers; maintaining the park website, wayside exhibits, and bulletin boards; offering interpretive and curriculum-based educational programs; developing publications; and fostering media and community relations. Division staff is based throughout the park complex. Table 5.32 lists the staffing levels by division.

Table 5.32 Staffing Levels by Division

Management	3 Permanent
Administration	15 Permanent
Maintenance	44 Permanent
Interpretation/Education	13 Permanent
Resource Management	43 Permanent
Visitor Protection	15 Permanent
Total Staff	133

Volunteer Program

North Cascades NPS Complex has an active Volunteers-In-Parks program with over 500 volunteers participating in a variety of projects in the course of a year. Most service work occurs between May and October although volunteers are active year round.

Volunteers contribute to almost all park operations. Service work varies greatly and may include clerical work; skilled and unskilled maintenance; trail maintenance; highway clean-up; biology and hydrology data collection; invasive, non-native plant removal and native plant restoration; visitor contact in campgrounds, on trails or at visitor centers; or backcountry patrols. The few campground host positions are quickly filled. Long-term volunteers

may be provided with uniforms and sometimes a reimbursement for meals or transportation.

Many volunteers are individuals who work with Park Service staff on a part time basis for multiple years. Other volunteers may contribute a few hours as part of a visiting school or tour group. Park staff frequently train and work with volunteers through partner groups including The North Cascades Institute, the Washington Trails Association, The Wilderness Society, Boy Scouts of America, Outward Bound etc. The Student Conservation Association (SCA) has been an important partner for the park complex. SCA offers a subsistence stipend as well as the possibility to earn tuition assistance through the AmeriCorps program for intern volunteers.

Volunteer work is most successful when it includes education, recreation, restoration and inspiration. North Cascades NPS Complex staff are particularly committed to engaging young and/or first time visitors to national parks in meaningful service work. Involvement in stewardship activity provides an excellent opportunity to work with NPS staff and gain a unique perspective on the park complex.

Volunteers provide very important contributions to almost all facets of park complex operations. Volunteer work contributions help extend the services and benefits the park can provide to visitors and assists in the protection of natural areas.

Hidden Cove on Diablo Lake.

Welcome

You are now in the Environmental Consequences Chapter. Here are the topics you can read about:

Terms and Definitions

Cumulative Impacts

Impairment of Resources

Methods and Assumptions for Analyzing Impacts

Impacts from Alternative A (No Action)

Impacts from Alternative B (Preferred Alternative)

Impacts from Alternative C

Impacts from Alternative D

Chapter 6: Environmental Consequences

The National Environmental Policy Act (NEPA) requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if a proposed action is implemented. In addition, the effects on historic properties are considered in accordance with the National Historic Preservation Act (NHPA). In this case, the proposed federal action would be the adoption of a general management plan for Ross Lake National Recreation Area.

The alternatives in this general management plan provide broad management direction. Thus, this environmental impact statement should be considered a programmatic document. If and when specific developments or actions are proposed subsequent to this general management plan for implementation, appropriate detailed environmental and cultural compliance documentation would be prepared in accord with NEPA and NHPA requirements. Those actions that implement guidance provided in the GMP may tier from this EIS.

This chapter begins with a discussion on terms and definitions used for determining environmental consequences, followed by a discussion on policy related to cumulative impacts, a description of the projects that make up the cumulative impact scenario, and finally a discussion on impairment. The second part of this chapter describes the methods and assumptions used for analyzing each impact topic. The impacts of the alternatives are then analyzed by alternative in the order they appeared in the "Alternatives" Chapter 4. Each impact topic includes a description of the impact of the alternative, a discussion of cumulative effects, and a conclusion. Where data are limited, professional judgment has been used to project environmental impacts. Professional judgment was based, in part, on observation, analysis of conditions, and responses in similar areas.

At the end of the impacts of each alternative, there is a brief discussion of unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and the relationship of short-term uses of the environment and the maintenance and enhancement of long-term productivity.
The impacts of each alternative are also briefly summarized in the "Summary of Impacts" chart at the end of the "Alternatives" Chapter 4.

Terms and Definitions

The following section defines the terms used for determining the environmental consequences of the actions in the alternatives. The environmental consequences to each impact topic are defined based on impact type, intensity, and duration, and whether the impact would be direct or indirect. Cumulative effects are also identified.

Impact Type

The effects that an alternative would have on an impact topic could be either adverse or beneficial. Adverse impacts involve a change that moves the resource away from a desired condition or detracts from its appearance or condition. Beneficial effects are those that involve a positive change in the condition or appearance of a resource or a change that moves the resource toward a desired condition. In some cases, the action could result in both adverse and beneficial effects for the same impact topic.

Intensity

Defining the intensity or magnitude on an impact is taken directly from Director's Order 12: Conservation Planning, Environmental Impact Analysis and Decision-making (National Park Service 2001). Impact intensity is the magnitude or degree to which a resource would be beneficially or adversely affected. Each impact was identified as negligible, minor, moderate, or major. Because definitions of intensity vary by topic, separate intensity definitions are provided for each impact topic in the methodology section. Due to the broad nature of actions called for in this GMP, most intensity findings were expressed qualitatively.

Duration

Duration refers to how long an impact would last. The planning horizon for the GMP is approximately 15 to 20 years. Unless otherwise stated, in this document the

following terms are used to describe the duration of the impacts:

Short term: The impact would be temporary in nature, lasting one year or less, such as the impacts associated with construction.

Long-term: The impact would last more than one year and could be permanent in nature, such as the loss of soil due to construction of a new facility. Although an impact may only occur for a short duration at one time, if it occurs regularly over a longer period of time the impact may be considered to be a long-term impact. For example, the noise from a vehicle driving on a road would be heard for a short time and intermittently, but because vehicles would be driving the same road throughout the 20-year life of the plan, the impact on natural soundscape would be considered to be long-term.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Cumulative Impacts

Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonable foreseeable future action, regardless of what agency or person undertakes such other action. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Cumulative impacts are considered for all impact topics and alternatives. The National Park Service assumes the types of use that are occurring now would continue, but there may be new or different future uses. These actions are evaluated in conjunction with the impacts of each alternative to determine if they have any cumulative effects on a particular resource. For most of the impact topics, the geographic area defined for the analysis was Ross Lake NRA. In some cases, the area of consideration was the Pacific Northwest.

To determine potential cumulative impacts, projects in the area surrounding the park were identified. Projects included in this analysis were identified by examining other existing plans and by calls to local governments and to state and federal land managers. Projects identified for the purposes of cumulative impact analyses are past actions, plans or actions that are currently being implemented, and reasonable foreseeable future plans or actions. These projects were considered regardless of what agency, organization, or person undertakes them. Projects included in the cumulative impact analysis do not affect all resources equally.

The following land uses, operations and management actions make up the cumulative impact scenario:

- Continued operation of Skagit Hydroelectric Project
- Continued maintenance of North Cascades Highway
- Seattle City Light Proposed Gorge Second Tunnel
- History of Land Use – Mining (some continued)
- Development patterns and trends throughout the Greater North Cascades ecosystem, including population growth predictions
- Human-forced climate change scenarios

Impairment of Resources

In addition to determining the environmental consequences of the alternatives, NPS policies (Interpreting the National Park Service Organic Act, Management Policies 2006) require that potential effects be analyzed to determine whether or not proposed actions would impair the resources or values of Ross Lake NRA. An evaluation of impairment is not required for topics related to visitor use and experience, operations, or the socioeconomic environment.

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act (as amended) begins with a mandate to conserve resources and values. NPS managers must seek ways to avoid or minimize adverse impacts on the resources and values to the greatest degree practicable. However, laws do give the NPS management discretion to allow impacts on the resources and values when necessary and appropriate to fulfill the purposes of a unit, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS this management discretion, it is limited by the statutory requirement that the NPS must leave the

resources and values unimpaired unless a particular law directly and specifically provides otherwise. Impairment is an impact that in the professional judgment of the NPS manager would harm the integrity of the resources and values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact on any resource or value may constitute impairment. An impact would be most likely to constitute impairment if it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the unit or to opportunities for enjoyment of the unit; or
- identified as a goal in the general management plan or other relevant NPS planning documents.

Impairment might result from NPS activities in managing a unit, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in Ross Lake NRA. Actions that occur outside NRA boundaries could cause impairment, but these actions would not be a violation of the Organic Act unless the National Park Service was in some way responsible for the action. In this chapter, a determination about impairment is presented in the conclusion section for each required impact topic related to the unit's resources and values. When it is determined that action(s) would have a moderate to major adverse effect, a justification for non-impairment is made. Impacts of only negligible or minor intensity would by definition not result in impairment.

Methods and Assumptions for Analyzing Impacts

The planning team based the impact analysis and the conclusions in this chapter largely on the review of existing literature and studies, information provided by experts in the National Park Service and other agencies, and park staff insights and professional judgment. The team's method of analyzing impacts is further explained below. Impacts have been assessed assuming that mitigation measures, as described in Chapter 2, would be implemented. If mitigation measures were not applied, the potential for resource impacts and the magnitude of those impacts would increase.

The impact analyses for the No Action Alternative compare resource conditions throughout the life of the plan to existing conditions, based on the continuation of current management. The impact analysis for the action alternatives (alternatives B, C and D) compare the action alternative to the no-action. In other words, the impacts of the action alternatives describe the difference between no-action and implementing the action alternatives. To understand a complete "picture" of the impacts of implementation any of the action alternatives, the reader must also take into consideration that impacts would occur under the No Action Alternative.

Natural Resources

Analysis of natural resources was based on research, knowledge of park resources, and the best professional judgment of planners, biologists, geologists, hydrologists, and botanists who have experience with similar types of projects. Information on Ross Lake NRA's natural resources was gathered from several sources, including maps, satellite imagery of vegetation, and assorted resource inventories. As appropriate, additional sources of data are identified under each topic heading.

This impact analysis evaluated impacts to various natural resources including Air, Water, Geology, Vegetation, Fish and Wildlife (including special status species). This analysis is based upon the following assumptions:

- Except for sensitive species, the distinction between beneficial and adverse impacts in this document is a value judgment based upon the causal agent or source of effect. Beneficial impacts would be associated with management actions that benefit or otherwise promote native ecosystem functions, values and processes. In contrast, adverse impacts would be associated with impacts from management actions that manipulate or influence natural ecosystem functions and processes.
- Impacts to sensitive or listed species would be considered beneficial to those species if they reduce the potential for harm to those species or their habitats. In some instances, adverse impacts to native ecosystem functions, values and processes could result in beneficial impacts to sensitive species, or vice versa.
- This analysis assumes a 15-20 year lifespan for the general management plan.

- The human population of the Greater Puget Sound metropolitan area has doubled from 2 million to 4 million since 1960, and population in the greater Puget Sound metropolitan area is anticipated to increase by approximately 1 million people in the next 15 to 20 years (Puget Sound Partnership, 2008). Accurate visitation trends for Ross Lake NRA have been difficult to assess due to unreliable data; however, available information suggest park visitation has remained relatively stable between 1991 and 2003. Given this information it is assumed that visitation trends could fluctuate and while visitation could remain relatively flat, it is reasonable to assume that visitation could increase relatively proportionate to population growth for the purpose of this analysis.
- North Cascades is a very dynamic environment, routinely affected by various natural events including, but not limited to severe weather, flooding, avalanches, rockfall, wildfire and landslides. These events routinely damage park roads, campgrounds and facilities, and disrupt visitor use. They are also fundamental components of natural ecosystem functions and values. It is assumed that these events would increase slightly in frequency and intensity for the next 15-20 years in response to human-forced climate change.
- Direct and indirect impacts to the natural resources of Ross Lake NRA would generally result from human activities related to (1) general visitor use and enjoyment of the area; (2) park management and operations intended to provide for visitor use and conserve the resources and values of the unit; and (3) activities associated with other administrative uses of the area including Seattle City Light's operation of the hydroelectric facilities and the Washington Department of Transportation in their maintenance of the North Cascades Highway (State Route 20).
- Seattle City Light will continue to operate and manage the Skagit River and Newhalem Creek hydroelectric projects in accordance with the FERC license terms and conditions, however, the project boundary for the Skagit River hydroelectric project may expand to accommodate the proposed Gorge Tunnel II project, and the project may be constructed within the timeframe of the plan.
- The North Cascades Highway will continue to remain closed during the peak winter months due to heavy snow and avalanche dangers.
- Climate change may result in higher peak flows, less snow pack, earlier spring runoff and lower summer flows; however, some of these projected effects may not materialize within the 15-20 year timeframe of this plan.
- Extreme natural phenomena such as periodic flooding, landslides, and wildfire will continue at current frequency and intensity.

Where possible, map locations of sensitive resources were compared with the locations of existing developments and proposed modifications, including management zoning. Predictions about short-term and long-term site impacts were based on previous studies of visitor and facilities development impacts on natural resources.

Impacts were predominately assessed qualitatively, given the programmatic nature of this document and consistent with the level of detail provided in the alternatives. However, when possible, impacts were assessed with quantitative data and analysis.

Air Resources

The area of consideration for this impact topic is the North Cascades NPS Complex. Impacts on the park's air quality would be based on anticipated changes from baseline conditions and national ambient air quality standards. The thresholds of change for the intensity of an impact are as follows.

Negligible: There would be no perceptible visibility impacts caused by anthropogenic air pollutants. The first highest three-year maximum for each criteria pollutant would be less than the national ambient air quality standards for criteria air pollutants.

Minor: There would be slightly perceptible visibility impacts on less than 180 days per year caused by anthropogenic air pollutants. The first highest three-year maximum for each pollutant would be less than the national standards.

Moderate: There would be moderately perceptible visibility impacts on less than 180 days per year or slightly perceptible visibility impacts on 180 days or more per year caused by anthropogenic air pollutants. The first highest three-year maximum for each criteria pollutant could be greater than national standards.

Major: There would be highly perceptible visibility impacts on 180 or more days per year caused

by anthropogenic air pollutants. The first highest three-year maximum for each criteria pollutant would be greater than national standards.

Natural Soundscapes

The area of consideration for this topic is Ross Lake NRA. Context, time, and intensity together determine the level of impact for an action or activity. Noise for a certain period and intensity would be a greater impact in a highly sensitive context, and a given intensity would be a greater impact if it occurred more often, or for longer duration. For example, in very low level ambient soundscapes, like the wilderness, noises can be much more audible, thereby having greater impact intensities. It is usually necessary to evaluate all three factors together to determine the level of noise impact.

Negligible: Noise would rarely be greater than natural ambient sound levels, and/or there would usually be lengthy periods of time each day between noise events. Noise in a specific area would rarely result in a value for any noise metric that is more than a very small increment above the value for natural ambient sounds in the same area. Natural sounds would predominate.

Minor: Noise would be greater than natural ambient sound levels for a small portion of the day, and/or there would often be substantial periods of time each day between noise events. Noise in a specific area would rarely result in a value for any noise metric that is more than a small increment above the value for natural ambient sounds in the same area.

Moderate: Noise would be greater than natural ambient sound levels for an intermediate portion of the day, and/or there would rarely be more than intermediate periods of time each day between noise events. Noise in a specific area would rarely result in a value for any noise metric that is more than an intermediate increment above the value for natural ambient sounds in the same area

Major: Noise would be greater than natural ambient sound levels for a large portion of the day, and/or there would rarely be more than short periods of time each day between noise events. Noise in a specific area would often result in a value for a noise metric that is more than an intermediate increment above the value for natural ambient sounds in the same area.

Water Quality

The area of consideration for this topic is the surface waters of Ross Lake NRA Potential impacts from management actions are based on professional judgment and experience with similar actions. The thresholds of change for the intensity of an impact are as follows.

Negligible: Impacts (chemical, physical, or biological effects) would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.

Minor: Impacts (chemical, physical, or biological effects) would be detectable, but would be well below water quality standards or criteria and within historical or desired water quality conditions.

Moderate: Impacts (chemical, physical, or biological effects) would be detectable, but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be altered on a short-term basis.

Major: Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would be slightly and singularly exceeded on a short-term basis.

Hydrologic Systems and Processes (Surface Hydrology, Wetlands, Floodplains)

The area of consideration for this topic is surface waters within Ross Lake NRA. Available information on surface hydrologic systems including surface hydrology, wetlands, and floodplains in Ross Lake NRA was compiled. While an additional Wetland Statement of Findings will be considered if management actions require the dredging of lacustrine wetlands, pPotential impacts from other management actions are included in this EIS and are based on professional judgment and experience with similar actions. The thresholds of change for the intensity of an impact are as follows.

Negligible: Effects on hydrologic systems would be at or below the level of detection, would occur in a small area, and the changes would be so small that they would not be of any measurable or perceptible consequence.

Minor: Effects on hydrologic systems would be detectable, but localized, small, and of little consequence.

Moderate: Effects on hydrologic systems would be readily detectable and have localized consequences or a measurable change to a hydrologic system

Major: Effects would be obvious and would have widespread, substantial consequences on hydrologic systems that would result in either a severely adverse or major beneficial impact with regional consequences.

Geologic Resources and Processes, including Soils

The area of consideration for this topic is Ross Lake NRA. Available information on surface geologic resources and processes, including soils, in Ross Lake NRA was compiled. Potential impacts from management actions are based on professional judgment and experience with similar actions. The thresholds of change for the intensity of an impact are as follows.

Negligible: An action that could result in a change to a geologic feature or process, but the change would be so small that it would not be of any measurable or perceptible consequence.

Minor: An impact that could result in a change to a geologic feature or process, but the change would be small and localized and of little consequence.

Moderate: An action that would result in a change to a geologic feature or process; the change would be measurable and of consequence.

Major: An action that would result in a noticeable change to a geologic feature or process; the change would be measurable and the level of disturbance would be severe.

Vegetation

The area of consideration for this topic is Ross Lake NRA. Available information on vegetation in Ross Lake NRA was compiled. Potential impacts from management actions are based on professional judgment and experience with similar actions. The thresholds of change for the intensity of an impact are as follows.

Negligible: The impact of vegetation (individuals or communities) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.

Minor: An action would not necessarily decrease or increase an area's overall biological productivity. An action would affect the abundance or distribution of individuals in a localized area but would not affect the viability of local or regional populations or communities.

Moderate: An action would result in a change in overall biological productivity in a small area. An action would affect a local population sufficiently to cause a change in abundance or distribution, but it would not affect the viability of the regional population or communities. Changes to ecological processes would be of limited extent.

Major: An action would result in a change in overall biological productivity in a relatively large area. An action would affect a regional or local population of a species sufficiently to cause a change in abundance or in distribution to the extent that the population or communities would not be likely to return to its/their formal level (adverse), or would return to a sustainable level (beneficial). Key ecological processes would be altered.

Wildlife and Wildlife Habitat

The area of consideration for this topic is Ross Lake NRA. Impacts on wildlife are closely related to the impacts on habitat. The evaluation considered whether actions would be likely to displace some or all individuals of a species in the park or would result in loss or creation of habitat conditions needed for the viability of local or regional populations. Available information on wildlife and wildlife populations was compiled. Predictions about short- and long-term impacts were based on previous studies of impacts to natural resources and recent monitoring data from the park. The thresholds of change for the intensity of an impact are as follows.

Negligible: Effects on wildlife would be at or below the level of detection, would be short term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the species' population.

Minor: Effects on wildlife would be detectable, but localized, small, and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on wildlife would be readily detectable but localized, with consequences at the population level. Mitigating measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects on wildlife would be obvious and would result in substantial consequences to the wildlife populations at the regional level. The change would result in a severely adverse or major beneficial impact, and possible permanent consequence on the species. Extensive mitigating measures would be needed to offset any adverse effects and their success would not be guaranteed.

Aquatic Organisms

The area of consideration for this topic is Ross Lake NRA. Available information on aquatic organisms in Ross Lake NRA was compiled. Potential impacts from management actions are based on professional judgment and experience with similar actions. Predictions about short- and long-term impacts were based on previous studies of impacts to natural resources and recent monitoring data from the park. The thresholds of change for the intensity of an impact are as follows.

Negligible: Effects on aquatic organisms would be at or below the level of detection, would be short term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the species' population

Minor: Effects on aquatic organisms would be detectable, but localized, small, and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on aquatic organisms would be readily detectable but localized, with consequences at the population level. Mitigating measures, if needed to offset adverse effects, would be extensive and likely successful

Major: Effects on aquatic organisms would be obvious and would result in substantial consequences to the wildlife populations at the regional level. The change would result in a severely adverse or major beneficial impact, and possible permanent consequence on the species. Extensive mitigating measures would be needed to offset any adverse effects and their success would not be guaranteed.

Special Status Species

The area of consideration for this topic is suitable and known occupied habitat in the North Cascades NPS Complex. Information on threatened, endangered, candidate species, and species of general concern was gathered from responsible agencies, research, and specialists. Known locations of habitat associated with threatened, endangered, candidate species, and species of special concern were compared with locations of development and facilities, and modifications of existing facilities.

In accordance with standard terminology used to describe effects on threatened and endangered species under the federal Endangered Species Act (USFWS 1998), potential effects on special status species are categorized as follows:

No effect – The proposed actions would not affect special status species or critical habitat.

May affect / not likely to adversely affect – The effects on special status species would be extremely unlikely to occur and could not be meaningfully measured, detected, or evaluated or they would be completely beneficial.

May affect / likely to adversely affect – Any adverse effect to listed species that might occur as a direct or indirect result of proposed actions, and the effect would not be discountable or would be beneficial.

Is likely to jeopardize proposed species / adversely modify proposed critical habitat – The appropriate conclusion when the National Park Service or the U.S. Fish and Wildlife Service identifies situations in which an action could jeopardize the continued existence of a proposed species or adversely modify critical habitat to a species within or outside park boundaries.

The thresholds of change for the intensity of an impact are defined as follows.

Negligible: The action would have no measurable effect to a listed species, suitable, potential, or critical habitat, resulting in a no effect determination.

Minor: The effects of the alternative would be discountable (extremely unlikely to occur), insignificant (not able to be meaningfully measured, detected, or evaluated), or completely beneficial. Any change would be small and localized and of little consequence, and result in a "not likely to adversely affect" determination and require informal consultation with the U.S. Fish and Wildlife Service.

Moderate: An action that would result in some change to a population or individuals of a species or designated critical habitat. The change would be measurable and of consequence but would most likely result in a "not likely to adversely affect" determination and require informal consultation with the U.S. Fish and Wildlife Service.

Major: An action that would result in a noticeable change to a population or individuals of a species or designated critical habitat. Any adverse effect to the species that may occur as a direct or indirect result of the alternative and the effect is not discountable, insignificant, or completely beneficial. Incidental take is anticipated to occur as a result of the action. The change would result in a "likely to adversely affect" determination and require formal consultation with the U.S. Fish and Wildlife Service.

Cultural Resources

National Register Eligible Properties

Potential impacts to those resources listed or eligible for listing in the National Register of Historic Places were identified and evaluated. The categories considered include archeological resources, cultural landscapes, museum collections, and historic structures. The cultural resources section also includes discussion on tribal issues and ethnohistory, even though these resources are not eligible for listing in the National Register. Evaluation was done in accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800, Protection of Historic Properties). This evaluation was done by (1) determining the area of potential effects; (2) identifying cultural resources in the area of potential effects that are listed in or eligible for listing in the National Register; (3) applying the criteria of adverse effect to affected resources; and (4) considering ways to avoid, minimize or mitigate adverse effects. Information used in this assessment was obtained from relevant literature and documentation, maps, and consultation with cultural resource professionals, as well as from interdisciplinary team meetings, field trips, and site visits.

Under the regulations of the Advisory Council on Historic Preservation, a determination of *adverse effect* or *no adverse effect* must be made for affected National Register-listed or National Register-eligible cultural resources. An adverse effect occurs whenever an action alters, directly or indirectly, any of the characteristics of a cultural resource that quality it for inclusion in the National Register; that is, the action diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CRF 800.5(a)(1)). A determination of no adverse effect means there is an effect, but the effect would not meet the criteria of adverse effect (36 CFR 800.5(b)).

The thresholds of change for the intensity of an impact are defined as follows.

Negligible: The effects on cultural resources would be at the lowest levels of detection, barely measurable without any perceptible consequences, either beneficial or adverse to cultural landscape resources, historic structures, or archeological resources. For the purposes of Section 106 and the National Historic Preservation Act, the determination of effect would be no adverse effect.

Minor: The effects on cultural resources would be perceptible or measurable, but would be slight and localized within a relatively small area. The action would not affect the character or diminish the features of a NRHP eligible or listed cultural landscape, historic structure, or archeological site, and it would not have a

permanent effect on the integrity of any such resources. For the purposes of Section 106 and the National Historic Preservation Act, the determination of effect would be no adverse effect.

Moderate: The effects would be perceptible and measurable. The action would change one or more character-defining features of a cultural resource, but would not diminish the integrity of the resource to the extent that its NRHP eligibility would be entirely lost. For the purposes of Section 106 and the National Historic Preservation Act, the cultural resources' NRHP eligibility would be threatened and the determination of effect would be adverse effect.

Major: The effects on cultural resources would be substantial, discernible, measurable, and permanent. For NRHP eligible or listed cultural landscapes, historic structures, or archeological sites, the action would change one or more character-defining features, diminishing the integrity of the resource to the extent that it would no longer be eligible for listing in the National Register. For purposes of Section 106, National Register eligibility would be lost and the determination of effect would be adverse effect.

The relationships between definitions of effects, including beneficial effects, and treatments of cultural resources, are analyzed in the impact analysis for each of the alternatives. Levels of beneficial effect are not directly linked to specific types of treatments; rather they depend on the particular treatment of given cultural resources. All treatments proposed under all of the alternatives would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. All treatments proposed under all of the alternatives would have no adverse effect on known cultural resources.

Ethnographic Resources

The intensity of potential impacts on ethnographic resources that are not traditional cultural properties is described below:

Negligible: Impact(s) would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs.

Minor: Adverse impact — impact(s) would be slight but noticeable but would neither appreciably alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs.

Moderate: Adverse impact — impact(s) would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the affiliated group's practices and beliefs, even though the group's practices and beliefs would survive.

Major: Adverse impact — impact(s) would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the resource and the affiliated group's body of practices and beliefs, to the extent that the survival of a group's practices and/or beliefs would be jeopardized.

Beneficial impact — would allow access to and/or accommodate a group's traditional practices or beliefs.

Museum Collections

Museum collections (prehistoric and historic objects, artifacts, works of art, archival documents, and natural history specimens) are generally ineligible for listing in the National Register, and are not subject to Section 106 of the National Historic Preservation Act. The intensity of impacts on museum collections is defined as follows:

Negligible: Impact is at the lowest levels of detection, barely measurable with no perceptible consequences, either adverse or beneficial, to museum collections.

Minor: Adverse impact — would affect the integrity of few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation.

Beneficial impact — would stabilize the current condition of the collection or its constituent components to minimize degradation.

Moderate: Adverse impact — would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

Beneficial impact — would improve the condition of the collection or protect its constituent parts from the threat of degradation.

Major: Adverse impact — would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

Beneficial impact — would secure the condition of the collection as a whole or its constituent components from the threat of further degradation.

Wilderness Character

Working from definitions included in the Wilderness Act, and included in NPS Management Policies 2006, and the tradition of wilderness preservation and management at Ross Lake NRA and the North Cascades NPS Complex, the following wilderness characteristics have been identified for consideration in this analysis.

- The earth and its community of life are untrammeled by humans, where humans area visitors and do not remain.
- The area is undeveloped and retains its primeval character and influence without permanent improvements or human habitation.
- The area generally appears to have been affected primarily by the forces of nature, with the imprint of humans' work substantially unnoticeable.
- The area is protected and managed so as to preserve its natural conditions.
- The area offers outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Impacts on natural and cultural resources, visitor access, soundscape, night sky, and other resources are evaluated elsewhere in the environmental consequences section. The analysis for this topic focuses on wilderness character and wilderness experience, which are integrally related because much of wilderness character can only be subjectively determined by the visitor's experience (for example, solitude or freedom of movement).

The thresholds of change for the intensity of an impact are as follows:

Negligible: Impacts would not be detectable to most visitors and would have no discernible effect on wilderness character or experience.

Minor: Impacts would be slightly detectable to some visitors but would not be expected to have an overall effect on wilderness character or experience.

Moderate: Impacts would be clearly detectable by many visitors and could have an appreciable effect on wilderness character or experience.

Major: Impacts would have a substantial and noticeable effect for most visitors on wilderness character or experience and could permanently alter various aspects of the visitor experience.

Wild and Scenic River

The impact analysis evaluates how well each alternative would protect and enhance outstandingly remarkable values for designated and eligible wild and scenic rivers. Outstandingly remarkable values include scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values or features.

Impacts are evaluated on a segment-wide basis in terms of whether they would be beneficial or adverse to outstandingly remarkable values that have been defined for a river segment. Beneficial impacts would result from actions that protect and enhance these values, while adverse impacts would result from actions that reduce those values. The duration of the impact considers whether the impact would be temporary and/or associated with transitional types of activities or if the impact would occur over a long period and affect the protection and enhancement of outstandingly remarkable values.

The thresholds of change for the intensity of an impact are as follows:

Negligible: Impacts would not be detectable to most visitors and would have no discernible effect on a river's outstandingly remarkable values.

Minor: Impacts would be slightly detectable to some visitors but would not be expected to have

an overall effect on a river's outstandingly remarkable values.

Moderate: Impacts would be clearly detectable by many visitors and could have an appreciable effect on a river's outstandingly remarkable values.

Major: Impacts would have a substantial and noticeable effect on most visitors or on a river's outstandingly remarkable values.

Visitation

The impact analysis evaluates how visitation might vary between alternatives as a result of applying proposed actions and different management zones in the alternatives. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact. Impacts could be temporary or short-term (for example, delays and inconvenience caused by the construction of facilities) or long-term.

The thresholds of change for the intensity of an impact are as follows:

Negligible: The impact would be barely detectable, would not occur in primary visitor destination areas, or would affect few visitors.

Minor: The impact would be slight but detectable, would not occur in primary visitor destination areas, or would affect few visitors.

Moderate: The impact would be readily detectable, would occur in primary visitor destination areas, or would affect many visitors.

Major: The impact would be severely adverse or exceptionally beneficial, would occur in primary visitor destination areas, or would affect the majority of visitors.

Visitor Opportunities

The impact analysis evaluates how visitor opportunities might vary between alternatives as a result of applying proposed actions and different management zones in the alternatives. The analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives. Professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact. Impacts could be temporary or short-term (for example, delays and inconvenience caused by the construction of facilities) or long-term.

The following areas have been analyzed in this section:

- Recreation Opportunities: this section analyzes the recreational opportunities for visitors in each alternative and includes opportunities along the North Cascades Highway, land- and trail-based recreation opportunities, and water-based recreation opportunities.
- Visitor Recreation Facilities and Services: this section analyzes the different recreational facilities and services available to visitors in each alternative, including visitor and information centers; campground facilities; trails and boat launches; picnic areas; and services including permits, reservations and fees.
- Commercial Services and Facilities: this section analyzes commercial services and facilities available to visitors in each alternative such as guide services and commercial lodging.

The thresholds of change for the intensity of an impact are as follows:

Negligible: Impacts would be barely detectable to the visitor and expected to have no discernable effect related to recreation opportunities, visitor facilities and services.

Minor: Impacts would be slightly detectable to the visitor, though not expected to have an overall effect on the visitor experience related to recreation opportunities, visitor facilities and services.

Moderate: Impacts would be clearly detectable to the visitor and could have an appreciable effect on the visitor experience related to recreation opportunities, visitor facilities and services.

Major: Impacts would be have substantial, highly noticeable influence on the visitor experience and could permanently alter access to and availability of various aspects of the visitor experience related to recreation opportunities, visitor facilities and services.

Interpretation and Education

This section analyzes two aspects of the visitor experience: interpretation (which includes the elements of visitor information and orientation) and education. These two visitor experience components evaluate opportunities for and quality of visitor information, orientation, as well as interpretive and educational experiences. Impact analysis was based on whether there would be a change in the access to quality and diversity of media and programs throughout Ross Lake NRA in order to achieve the desired conditions called for by the alternatives.

This assessment focused on the intensity and duration of impacts that would result from the proposed actions in the plan relative to the aspects of the visitor experience related to interpretation and education, and whether those impacts were considered beneficial or adverse. The assessment specifically evaluated whether there were changes in the characteristics or quality of the experience.

The thresholds of change for the intensity of an impact are as follows:

Negligible: Impacts would be barely detectable to the visitor and expected to have no discernable effect related to interpretation and education opportunities.

Minor: Impacts would be slightly detectable to the visitor, though not expected to have an overall effect on the visitor experience related to interpretation and education opportunities.

Moderate: Impacts would be clearly detectable to the visitor and could have an appreciable effect on the visitor experience related to interpretation and education opportunities.

Major: Impacts would be have substantial, highly noticeable influence on the visitor experience and could permanently alter access to and availability of various aspects of the visitor experience related to interpretation and education opportunities.

Access and Transportation

The impact analysis evaluates how each alternative would change access and visitation and the capacity of roads and facilities in Ross Lake NRA to accommodate that change. Access addresses the distribution of visitors in Ross Lake NRA as well as access points and access options (motorized and non-motorized) to areas in Ross Lake NRA. Beneficial impacts would be associated with a decrease in the level of visitor congestion. Adverse impacts would be associated with the actions that reduce access to an area or increase the level of congestion.

The thresholds of change for the intensity of an impact are as follows:

Negligible: The effects would not be detectable and would have no discernable effect on the condition of roads and trails and/or traffic flow.

Minor: The effect would be slightly detectable, but there would not be an overall effect on the condition of roads and trails and/or traffic flow.

Moderate: Impacts would be clearly detectible, and the action could have an appreciable effect on the condition of roads and trails and/or traffic flow.

Major: Impacts would be substantial, with a highly noticeable influence, and the condition of roads and trails and/or traffic flow could be permanently altered.

Socioeconomics

Economic effects are commonly expressed in terms of the number and types of jobs supported, changes in income, the number of visitors to the recreation area, and the resulting changes in local tourism spending. Less well-defined economic effects include the indirect effects from ongoing NPS operations and the effects on local government fiscal conditions. Examples of social impacts include effects on regional population growth and land use.

Socioeconomic impacts were determined based on applied logic, professional expertise, and professional judgment. The approach to these issues was based on the following factors directly related to implementation of the general management plan:

- estimated costs of building new facilities and infrastructure
- changes in the number of NPS staff and federal spending to operate the recreation area
- changes in the number of visitors to the recreation area
- changes in recreation area boundaries

Indirect consequences of these four factors, such as impacts on traffic, were also considered.

Costs were estimated using the best available tools for this level of detail, including estimates based on comparable projects and cost estimating calculators using RS Means data. Future staffing levels and operating costs were estimated by the project team. Actual future costs could be different than the estimates in this analysis because they would be based on future NPS policies, operations and maintenance policies adopted at the recreation area, and budgets approved by Congress for the NPS in general, or Ross Lake NRA specifically.

Projected visitor use was generally estimated as increasing or decreasing based on proposed visitor opportunities for each alternative.

Economic impacts associated with the GMP alternatives are assessed in terms of type/character of impact, duration, and scale/intensity. These three parameters are defined below.

This analysis relies on qualitative analysis of the impacts of each alternative, as actual visitor numbers are not estimated, spending values are for comparison only, and influence area data was mainly available at the broad county and regional district level. The three U.S. counties and one Canadian regional district were defined as the influence area for this analysis. Impacts of the alternatives are generally negligible to minor on the influence area. However, since Skagit and Whatcom Counties are much more densely populated in their western portions, the data is somewhat skewed. The area where the recreation area is located is less densely populated, and therefore changes in the number of jobs, personal incomes, business revenues, vacancy, and traffic all have greater impacts on the local area than they do on the influence area. Since consistent data was not obtainable in the immediately local area, the analysis was mostly done in the influence area, with some analysis done in the local area where noted. The local area is generally the closest towns to the recreation area, including Marblemount, Rockport, Concrete, Hope, Mazama, and Winthrop.

Beneficial impacts result in generally recognized improvements to established social and economic environment, or can be recognized as improvements to specific sectors and stated as such. Adverse impacts are those effects that are generally recognized to diminish the established social and economic environment, or diminish the environment for particular sectors and stated as such.

Indeterminate effects are those for which the size, timing, location, or individuals or groups that would be impacted cannot be determined, or those that include both beneficial and negative effects—in some instances affecting different communities—such that the net effect is indeterminate.

Short-term effects are those that occur during and in response to the planning, design, construction, and major maintenance of buildings, trails, parking lots, and other improvements associated with federal spending. These effects diminish or disappear after the project is completed. "Short-term" may also describe the first or early response in social or economic conditions to more fundamental changes in recreation area management and operations and to changes in visitor use, but which give way to broader changes over time. Generally, "short-term" describes those effects that may last up to 5 years.

Long-term effects are those that last longer than 5 years, including some that may not begin until after completion of direct activities associated with the initial federal government spending or changes in management.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Negligible effects would be below detectable levels or detectable only through indirect means and would have no discernible effect on the character of the social and economic environment.

Minor: Minor effects would be detectable, but localized in geographic extent or size of population affected and would not be expected to alter the character of the established social and economic environment.

Moderate: Moderate effects would be readily detectable across a broad geographic area or segment of the community and could have an appreciable effect on the social and economic environment.

Major: Major effects would be readily apparent, affect a large segment of the population, extend across an entire community or influence area and likely would have a substantial effect on the social and economic environment.

Park Operations

Park management and operations refers to the current management structure of the park to provide policy direction for the protection, public use, and appreciation of the park, and the ability of the current staff to adequately protect and preserve vital resources and provide for an effective visitor experience. The discussion of impacts on park management, operations, and staffing focuses on the type of management structure, the amount of staff available to ensure public safety, and the ability of the staff to protect and preserve resources given current funding and staffing levels.

Staff knowledgeable about the management of the park were consulted to evaluate the impacts of implementing each alternative.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: The effect would be at or below the lower levels of detection, and would not have an appreciable effect on park management and operations.

Minor: The effects would be detectable, but would be of a magnitude that would not have an appreciable adverse or beneficial effect on park management and operations.

Moderate: The effects would be readily apparent and would result in substantial adverse or beneficial change in park management and operations in a manner noticeable to staff and the public.

Major: The effects would be readily apparent and would result in substantial adverse or beneficial change in park management and operations in a manner noticeable to staff and the public, and would be markedly different from existing operation.

Impacts from Alternative A (No Action)

Natural Resources

Air Resources

Air Quality

Under the No Action Alternative, there would be no major changes in management or use of Ross Lake NRA, so no major changes to air quality conditions or trends would be anticipated as a result of the plan. Existing impacts to air quality from park operations would include localized, negligible to minor adverse impacts from sources such as vehicle emissions and fugitive dust. Periodic natural or human-caused wildfires would continue to temporarily and adversely affect air quality in Ross Lake NRA by releasing large quantities of smoke and particulate matter, causing negligible to major, short term adverse impacts to air quality. Recreational activities such as campfires would continue to have localized, minor adverse effects on air quality in the immediate vicinity of campgrounds and backcountry campsites. Vehicle emissions along the North Cascades Highway would also continue to release various air pollutants including volatile organic compounds and criteria air pollutants such as nitrogen oxides and carbon monoxides. Motorboat use on the reservoirs would also contribute negligible to minor, locally adverse impacts to air quality, especially use of two-stroke engines.

Visibility (Regional Haze)

North Cascades is one of 30 western National Parks with stable or improving visibility on both clear and hazy days. Management actions proposed for Alternative A would have no affect on this broad trend because except for periodic wildfires, the underlying causes of regional haze are beyond the scope of management actions that would take place as a result of the plan. Instead, adverse impacts to visibility would continue to result from regional and global air quality influences.

Cumulative Impacts
The North Cascades Complex, including Ross Lake NRA is estimated to have emitted approximately 6,800 metric tons of greenhouse gases in 2007 (NPS, 2009). The vast majority of these emissions occurred within Ross Lake NRA, as that unit has the most infrastructure, mobile sources, and operations-

related emissions. Emissions similar to these levels would be expected to occur within the timeframe of this plan under Alternative A. These emissions would contribute to negligible, adverse increases in human-forced global warming, because they would continue to be insubstantial compared to the global scale of greenhouse gas emissions that are collectively contributing to human-forced climate change.

One reasonably foreseeable management action that could have short term adverse impacts to air quality, but long-term negligible to minor benefits to air quality, is the proposed construction of a second tunnel from Gorge Dam to Gorge powerhouse. If constructed, this tunnel would reduce frictional losses from turbulence (presently occurring in the single power tunnel) and convert those losses into enough additional energy to power 5,420 homes in Seattle. This additional energy would theoretically help to offset fossil fuel emissions.

By far the most of the measurable impacts to air quality within Ross Lake NRA would result from various human activities outside of Ross Lake NRA, including the greater Puget Sound metropolitan area and from sources as far away as Asia. Population growth, more cars, and economic expansions may continue to push air pollutant emissions higher. Long-range transport of pollutants from Asia are projected to increase as those economies continue to develop and expand.

Predicted increases in population throughout the Puget Trough suggest the potential for cumulative increases in regional haze (NPS, 2005). Increasing trends in atmospheric ozone concentration at North Cascades underscore the possibility of future cumulative impacts to haze, as ozone and visibility impairment are often related.

The magnitude of potential adverse impacts to air quality from regional, and global emissions could range from negligible to moderate or even major, but is difficult to predict because fossil fuel consumption, and the technologies that enable such continued consumption, may be substantially affected by technological advances and consumer demand for alternative energy sources with reduced emissions. These uncertain future scenarios regarding trends in air quality make it difficult to predict the magnitude of potential cumulative impacts.

Conclusion
Direct and indirect impacts to air quality under Alternative A would remain negligible to minor and adverse. These impacts would result from emissions associated with park operations and visitor use. Wildland fire would occasionally result in minor to moderate adverse impacts to air quality, primarily via impacts associated with smoke, particulate matter and visibility reductions. Cumulative impacts to air quality would remain negligible to minor, because the air quality within Ross Lake NRA is predominately influenced by human activities outside of Ross Lake NRA, including regional and global sources of pollution. The management actions proposed under Alternative A would have short-term negligible to minor adverse impacts on air resources. There would be no derogation or impairment of air resources within Ross Lake NRA.

Natural Soundscapes

Under the current management alternative, soundscape monitoring would occur as funding and equipment availability would allow, and human-caused sounds associated with park operations would be sporadically mitigated on a case by case basis. No additional restrictions or enforcement of noise associated with visitor use would be anticipated. The natural soundscape would be most impacted along the North Cascades Highway, where vehicle noise would predominate during daytime hours in the summer. Slight anticipated increases in visitation to Ross Lake NRA could create more traffic that would further impact the natural soundscape along and adjacent to the highway. Wintertime use such as snowmobiling along the highway, and WSDOT management actions such as avalanche control on an emergency basis would continue to adversely impact the natural soundscape. Along the highway, impacts would range from minor during the winter to major in the most developed areas during the peak summer season. In some areas, such as Colonial Creek Campground, there would rarely be more than short periods of time between daytime noise events. At Hozomeen Campground, the natural soundscape would be impacted by large groups of campers that congregate at night and create a "party atmosphere."

On the reservoirs and the Skagit River, unlimited motorboat use with no restrictions will continue to impact the natural soundscape. Noise from seaplane landings would continue on Ross and Diablo lakes. Impacts to the natural soundscape on the reservoirs would be minor to moderate but fleeting, depending on the time of day and season. Because motorboat use on the Skagit River probably happens very infrequently, impacts would be short-term and minor.

In wilderness, natural sounds would continue to predominate in most areas. The backcountry permit system would help to manage and disperse use in the backcountry, thus protecting the natural soundscape. The closure of Thornton Lakes Road and parking lot in wilderness would reduce the effects of noise from motorized vehicle traffic in wilderness, providing additional protection of the natural soundscape. Impacts from airplane overflights and NPS administrative helicopter use would continue to impact the natural soundscape. The recommended 2,000 foot distance for airplane overflights may help to protect the natural soundscape in some areas. Vehicle noise from the North Cascades Highway would be audible in some areas in wilderness, especially on peaks closest to the highway. Overall, impacts to the natural soundscape in wilderness would be minor, since noise would be greater than natural ambient sound levels for only a small portion of the day.

Cumulative Impacts
Other past, present, or future actions that could impact the natural soundscape primarily include ongoing highway traffic, motorboat use, and aircraft use. Potential increases in visitation and corresponding increases in these uses could further impact the natural soundscape. Motorboat use by NPS, Seattle City Light, and the Ross Lake Resort concession would also contribute to adverse impacts on the natural soundscape. Administrative helicopter uses, such as those which would be needed to conduct prescribed burning on the slopes south of Hozomeen, described in the 2008 Fire Management Plan, other potential fire management activities within Ross Lake NRA, and installation of the Desolation radio repeater, would likely involve considerable helicopter use that would cause short-term adverse impacts. Seattle City Light day to day operations such as boat use, maintenance, and the phone on Ross Dam would continue to cause adverse impacts. Special Seattle City Light projects, such as the proposed Gorge Second Tunnel, would cause considerable impacts to the natural soundscape during construction. Depending on the action, the duration of each activity, and time of year, these actions could result in minor to moderate adverse impacts. In combination with the No Action Alternative, these cumulative impacts would result in minor to major impacts on natural soundscapes.

Conclusion
Impacts to the natural soundscape would vary based on the time of year, duration of the impact, and location. Major adverse impacts would occur in the daytime during peak use in heavily developed areas such as Colonial Creek Campground, where noise events are closely spaced together. Minor impacts would occur in the wintertime along closed portions of the highway, and year-round along the Skagit River and in wilderness. Minor to moderate impacts would occur on the reservoirs due to boat and seaplane use. Cumulative impacts would range from minor to major. Implementation of this alternative would not result in impairment to this resource or value.

Water Resources

Water Quality

The water quality in Ross Lake NRA is generally considered to be excellent; however, there are various point and non-point sources of pollution that would continue to adversely affect water quality.

The NPS has no facilities with point source releases of effluent that could cause adverse effects to water quality. However, Seattle City Light operates waste water treatment facilities in Diablo and Newhalem. These facilities would remain unaffected by this alternative, so they would continue to release treated effluent with elevated levels of nutrients and fecal coliform bacteria. During periods of heavy rain, excess stormwater infiltration could overwhelm these systems and cause release of untreated effluent into Gorge Lake and the Skagit River. Water quality impacts from these facilities would be adverse, negligible to moderate (during high runoff) and long-term.

Nonpoint or diffuse sources of pollutants would continue to be released in varying degrees from approximately 1,115 acres of impermeable surfaces, including paved and unpaved roads, parking lots and various structures. Diffuse pollution from these impermeable sources would continue to include petroleum byproducts; metals such as lead, copper and zinc; various organic toxins and sediment (Novotny and Olem, 1994). The NPS has no water quality monitoring data regarding non-point source pollution from impermeable surfaces, but the impacts are believed to be negligible to minor and dispersed across the landscape. Adverse impacts would generally be higher after the first rainfall following long periods of dry weather. In addition, adverse impacts would be expected to be higher in areas with large contiguous tracts of impermeable surfaces, such as parking lots.

Septic fields associated with various facilities would also continue to contribute negligible to minor amounts of nutrients to ground water and surface water when the soils are saturated, or possibly via subsurface flow. Past monitoring of fecal coliform

counts indicate occasionally elevated concentrations in the vicinity of Colonial Creek Campground and Ross Lake Resort (Kuntz, 2000). Recent upgrades to the septic system at Ross Lake Resort are believed to have substantially reduced the fecal coliform concentrations, but there are no monitoring data available.

Given the relatively small area occupied by facilities and the transportation infrastructure, impacts to water quality from primarily non-point source pollution would be minor to moderate, long-term and adverse.

Hydrologic Systems (surface hydrology, wetlands, floodplains)

This section evaluates the potential impacts to hydrologic systems including streams, creeks and the Skagit River. It also evaluates potential impacts to Ross, Diablo and Gorge reservoirs, wetlands, floodplains, and riparian zones that are substantially influenced by hydrologic processes.

Hydrologic Processes

Hydrologic processes is a category that includes a wide variety of atmospheric, surface and subsurface physical and biogeochemical processes involving the transport, cycling and storage of water in the environment. The hydrologic processes of the Skagit River watershed within Ross Lake NRA would not be directly or indirectly affected by continued current management activities. Except for certain instances, the scale of potential management actions would simply be too small to have any measurable effect on the broad patterns and processes of weather, climate and precipitation that ultimately govern the hydrology and hydrologic processes of the Skagit River Watershed in Ross Lake NRA. One notable exception would involve the continued operation of the Skagit River and Newhalem Creek Hydroelectric Projects. The hydroelectric projects would continue to substantially modify the natural hydrology of the Skagit River and its tributaries. Management and operation of those facilities is governed by the terms and conditions of the licenses provided by the Federal Energy Regulatory Commission. Those licenses are beyond the scope of the management actions proposed in this plan, so the impacts of the hydroelectric facilities are discussed in the Cumulative Impacts section.

Hydraulic Processes

Hydraulic processes are an impact topic that includes various dynamic physical processes and conditions that affect the surface and subsurface flow of water in the environment. In contrast to hydrologic processes, the hydraulic processes of surface streams, creeks and the Skagit River could be affected to varying degrees by the management actions proposed to continue for Alternative A. Broadly speaking, management actions intended to reduce erosion would continue to adversely impact the hydraulic processes of running waters to varying degrees as described in the following sections.

The NPS would continue to maintain and repair the transportation infrastructure, including roads, bridges, culverts, trails and transportation facilities. Areas most routinely affected include creek crossings under roads in the vicinity of Goodell Creek, Colonial Creek, Rhode Creek, Sourdough Creek, Damnation Creek, Thornton Creek and Pyramid Creek. These creeks routinely flood and damage roads and/or facilities via erosion, channel avulsion or both processes. Channel avulsion in particular often prompts emergency action to reopen roads and reroute the stream back under a bridge or through a culvert. Management actions such as installation of bank barbs, culvert replacement, or armoring of bridge abutments would be considered in consultation with various state and federal agencies with jurisdiction over running waters. When possible, the NPS would seek to address the underlying causes of damage (such as undersized culverts) and seek improved engineering solutions to reduce the risk of further damage, such as installation of vented ford crossings as an alternative to culvert replacement. This spectrum of potential management actions would generally cause long-term, negligible to moderate adverse impacts. Impacts would be greater in creeks such as Goodell Creek, where the scale of management intervention would be larger, and/or where other instream resources such as fish rely upon hydraulic processes to provide instream and off-channel spawning and rearing habitat.

The NPS would continue to maintain the Goodell Creek and Colonial Creek Campgrounds. Goodell Creek campground is situated on an alluvial fan at the confluence of the Skagit River. The alluvial fan is aggrading (i.e. the channel is filling) due to naturally high volumes of bedload transport in the creek. The bridge crossing along the North Cascades Highway at Goodell Creek is presently too narrow. It is constricting flows, reducing bedload transport and

causing alluvial material to build up upstream of the footings.

Colonial Creek Campground is constructed on the debris cones of Colonial and Rhode Creeks. Periodic debris flows from these creeks, especially Rhode Creek, block entrance roads and damage campground roads and facilities. These events also require periodic dredging of the boat ramp at Colonial Creek Campground to maintain a navigable channel. The NPS would continue to react to these events on a case-by-case basis by removing debris, maintaining the single constructed channel at Rhode Creek, and replacing/repairing damaged facilities as necessary, as long as dredging is feasible. These actions would continue to cause minor to moderate adverse impacts to the natural hydraulic processes on both of these systems. Should these activities, such as dredging, threaten lacustrine wetlands, a Wetland Statement of Findings would be considered at that time. Should dredging no longer be feasible and the NPS did not attempt to maintain the boat launch, these impacts would not continue, resulting in long term benefits to natural hydraulic processes.

Cumulative Impacts
The Skagit and Newhalem Creek Hydroelectric Projects would continue to cause cumulative adverse impacts to the quantity and quality of water resources within Ross Lake NRA. Water quality impacts would continue to be associated with point and non-point source pollutants from the hydroelectric facilities. Point source pollutants would include contributions from the wastewater treatment plants in Newhalem and Diablo and from effluents discharged from the hydroelectric facilities. These point sources would continue to release increased levels of nutrients, oils and greases, and trace low levels of various toxins including metals. The reservoirs would continue to release water that has been thermally modified (warmer in winter, cooler in summer) by reservoir storage, and chemically modified by loss of suspended sediment and other biogeochemical processes that take place when captured and stored in the reservoirs. When added to the past releases of various pollutants, including highly toxic materials such as PCB's, the cumulative impacts to water quality and quantity and timing of flows would be long-term, moderate to major and adverse.

Certain tributaries to the Skagit, including Ruby Creek and Thunder Creek, have experienced fairly extensive mining activity since the late 1800's. Some mining still occurs in Ruby Creek. The lingering past impacts of mining, coupled with the present impacts of continued mining on Ruby Creek, could cumulatively contribute various heavy metals to the Skagit River watershed, however, there are no data to quantify the magnitude of adverse impact to surface waters.

Snowpack sustains most of the rivers, reservoirs, and aquifers in the North Cascades. The volume of the April 1st snowpack in the low- and mid-elevations of the Cascades has a high sensitivity to surface temperatures. Projected warming in the future will substantially diminish springtime snowpack in these watersheds and cause large changes in the timing of stream flows, with peak flows shifting from spring dominated flows caused by snowmelt, to fall and winter flows associated with increases in extreme precipitation during those times, including less snow at lower elevations.

Floodplains and wetlands have been impacted by past construction of roads and other facilities. Past, present, and future activities may include further bank armoring, replacement of culverts and bridges, and various channel modifications (such as dredging) to protect facilities and bridges. These actions will continue to cause long-term, minor to moderate adverse impacts on hydrologic systems by affecting streambed composition, sediment transport, natural stream dynamics, flow regimes, lateral water infiltration, and other hydrologic components and processes.

Conclusion
Direct and indirect adverse impacts to water quality would range from negligible to minor and adverse. Impacts would primarily be associated with operations and maintenance related activities. There would be negligible impacts to hydrology. Impacts to hydraulics would be localized, long-term, adverse and of negligible to moderate intensity. These impacts would be primarily associated with local manipulation of hydraulics to protect roads, campgrounds and facilities from erosion. Cumulative impacts to water resources would be negligible to major (depending upon location), long-term and adverse because there would be no substantive changes to existing park operations or operations associated with the Skagit River Hydroelectric Project. Moreover, the impacts from climate change on water resources are expected to remain relatively small within the 15-20 year lifespan of this plan. Direct and indirect adverse impacts to water resources would remain negligible to moderate and cumulative impacts would be moderate to major because there would be no substantial changes to current management. Therefore, there would be no impairment of water resources under Alternative A.

Geologic Resources and Processes, including Soils

This impact topic includes surficial landforms and soils that would continue to be adversely affected by NPS management and operations and visitor use of the area.

No new facilities or substantial infrastructure changes would be implemented under Alternative A, therefore impacts to geologic resources would be limited to maintenance of existing facilities and minor changes to those facilities as necessary to respond to periodic damages from incidents such as severe weather events, avalanches, landslides, and flooding. Routine maintenance and park operations would have a negligible impact on surficial geologic resources because the facilities would generally remain in the same locations.

Visitor use of the area would likely lead to further social trail development in certain areas. Expansion of social trails would cause negligible adverse impacts to soils. Where bolted sport climbing is authorized, climbing related activities would have negligible to minor, long-term adverse impacts to cliff surfaces from drilling and placement of bolts to create sport climbing routes. Unintentional and/or incidental removal of rock surfaces from off-trail recreational pursuits such as climbing, scrambling, mountaineering and rappelling would cause negligible damage to surficial geologic resources and soils.

Cumulative Impacts
A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect geologic resources and soils in Ross Lake NRA. The soils and geologic resources of Ross Lake NRA have been variously modified over the past century by human activities such as mining, dam construction, highway and railroad construction, and construction of various NPS facilities. The Skagit River Hydroelectric Project has permanently flooded approximately 13,000 acres, and approximately 1,000 acres have been converted to roads and various facilities. Taken together, these permanent modifications account for approximately 12 percent of the natural landscape of Ross Lake NRA. This estimate does not include previous manipulations to the landscape caused by mining, logging, and fire suppression activities, as quantifiable estimates for these past activities are difficult to compile. The cumulative effects of these activities have been moderate to major, long-term and adverse.

Seattle City Light has significantly and irreversibly modified the surficial geology within Ross Lake NRA to construct and maintain the Skagit River Hydroelectric Project. Impacts include approximately one acre of lakeshore lost to erosion annually, sedimentation of the reservoir, changes to the natural hydrologic period, and the cut-off of gravel and large woody debris to the river. While no new above ground facilities are anticipated within the life of this plan, SCL does propose to construct an approximately 2-mile long tunnel from Gorge Dam to the Newhalem powerhouse. Most of the construction-related impacts to surficial geologic resources would be limited to the immediate vicinity of the tunnel portals as well as settling ponds and waste rock sites; however, this project has yet to be approved and no final construction designs have been submitted. Without additional information related to potential construction designs, it is difficult to quantify the magnitude of potential impact.

Regardless of the proposed tunnel, SCL would continue to operate and maintain the Skagit and Newhalem hydroelectric projects and cause adverse cumulative impacts to geologic resources. Operation and maintenance activities could include site-specific stabilization of steep, unstable slopes and related actions intended to mitigate the risks of rockfall. Additional activities includes maintenance of the road network in Ross Lake NRA to microwave sites, powerlines and towers, and the Newhalem Creek hydroelectric station. Some of these actions would occur on NPS lands within Ross Lake NRA, causing minor to moderate, adverse, cumulative impacts to surficial geologic resources and soils.

The surficial geology of Ross Lake NRA was significantly and adversely modified to construct the North Cascades Highway. The maintenance of the North Cascades Highway, SCL infrastructure, and Colonial Creek Campground will continue to have long-term moderate adverse impacts to the Skagit River and its tributaries. The Washington Department of Transportation would continue to cause minor to moderate adverse impacts to surficial geologic resources in certain areas in order to safely maintain the highway. These adverse impacts would be associated with routine maintenance and repairs along the highway, and periodically, more intensive repairs associated with flood damage, rockfall and avalanches.

Other human-caused activities have cumulatively and adversely affected soils and geologic resources in less-perceptible but nonetheless substantial ways. Atmospheric deposition of various pollutants from

regional and global sources has affected the natural chemical composition of soil by reducing soil pH and increasing nitrogen deposition. These impacts have already been documented in certain areas, and are likely to increase given population growth estimates both regionally and globally. The adverse cumulative impacts to soils are poorly understood as data are limited. Additionally, intense wildfires create situations where a hot burn will have serious impacts to soils and hillslope stability.

Global climate change may increase the severity and frequency of storms, and trigger landslides, increased rockfall, and increased soil erosion in unstable areas. Although few statistically significant changes in extreme precipitation have been observed to date in the area, regional climate model simulations generally predict increases in extreme high precipitation over the next half-century, particularly around Puget Sound (University of Washington 2009, p.2). Facility adaptations required to respond to these events could have long-term, major and adverse impacts to soils and geologic resources in the future.

Conclusion
Alternative A would cause minor to moderate, long-term, adverse impacts to the geologic resources locally within Ross Lake NRA and negligible to minor impacts overall, primarily from maintenance of the existing infrastructure of roads, trails, campgrounds and facilities. These actions would also manipulate some hydraulic processes to reduce erosion, causing minor indirect effects to some surficial geologic resources by locally modifying the underlying geologic processes that are fundamental to the dynamic landscape of North Cascades. Cumulative impacts would remain negligible to minor and long-term. Impacts to geologic resources would be negligible to minor. There would be no impairment of surficial geologic resources.

Vegetation (including special status species)

Impacts to vegetation from continued current management would result from management actions that directly or indirectly disturb vegetation communities. These management actions would generally include maintenance of roads, trails, campgrounds; vegetation management such as invasive plant management, site rehabilitation/restoration; and wildland fire management.

Adverse impacts to vegetation would vary according to location and activity, with minor to moderate adverse impacts expected in zones with concentrated development and human use, including the frontcountry and Skagit River hydroelectric project management zones. Negligible to moderate impacts to vegetation would be expected in the less developed areas of the Skagit River and Backcountry zones. Negligible impacts to vegetation would be expected in the wilderness zones, because management actions would be limited to trail maintenance (such as brushing) and minor trail relocations as necessary to respond to floods, windfall, etc.

Human impacts from recreation and visitor use of these areas would continue to be correlated most closely with the quantity and intensity of recreation and visitor use of a given area. Adverse impacts from visitor use would primarily include social trail development, trampling and soil compaction and inadvertent introduction of weeds. Adverse impacts to vegetation would generally range from negligible to moderate, long-term and adverse.

There are no known federally listed plant species within Ross Lake NRA. As a matter of policy, the NPS would continue to survey areas in advance of taking management action that could adversely affect vegetation. If a rare or state listed plant species was found, management actions would be adjusted to avoid harm. In light of these current conditions and mitigations, there would be no adverse impacts to federally listed plant species.

Cumulative Impacts
Vegetation within Ross Lake NRA has been cumulatively and adversely affected from many different types of human activity. Construction and development of the Skagit River and Newhalem Creek Hydroelectric projects has significantly and adversely affected lower elevation forests. Approximately 13,000 acres of low elevation forests and riparian areas have been permanently inundated by Ross, Diablo and Gorge reservoirs. Several thousand acres of forest have also been removed to accommodate development of facilities, roads, campgrounds and related infrastructure associated with the hydroelectric projects, the North Cascades Highway, and National Park Service Operations. Portions of the Newhalem Creek watershed, Goodell Creek watershed and the Skagit River watershed above the dams have also been logged. The whole area has been affected to some degree from fire suppression.

In the reasonably foreseeable future, there are no substantial increases in roads, facilities or other related transportation, hydroelectric or visitor use infrastructure anticipated in the No Action Alternative that could adversely affect vegetation. Therefore,

compared with the past cumulative effects to vegetation, cumulative adverse impacts are expected to remain minor. These adverse cumulative effects would primarily be associated with ongoing operation and management of existing facilities, continued risk of invasion from invasive nonnative plants, fire suppression-related activities, and general visitor use of the area.

Conclusion
Alternative A would continue to result in negligible to minor direct, indirect and cumulative impacts to vegetation, primarily from maintenance-related activities associated with roads, trails, campgrounds. There would be no impairment to vegetation as a result of this alternative.

Fish and Wildlife Resources (including special status species)

Existing conditions and associated impacts from visitor use of the area would continue under the No Action Alternative. Impacts to fish and wildlife would include direct impacts from consumptive activities such as hunting and fishing, and indirect impacts caused by human disturbance of fish and wildlife habitat as consequence of recreational use.

Management of the park infrastructure would include various maintenance activities for facilities, campgrounds, roads and trails; some minor facility relocations would be anticipated. Various resource management-related stewardship projects would also cause some disturbance to wildlife

Impacts from Hunting and Fishing

The most consistent and reliable information for big game species taken in the Diablo Unit was for an 11-year period from 1997-2007. Deer take ranged from 2-20 animals with a mean of 12 deer taken per year. From 1997-2007 a total of 43 bears were taken, with annual rates ranging from 1-7 with a mean of 4 animals per year. Only one cougar was taken from the Diablo GMU during this time period. These data represent the take from the entire Diablo Unit, however 33 percent of the unit lies outside of Ross Lake NRA.

Take data for small mammals and waterfowl are more difficult to compile because they are reported by county as opposed to GMU. Ross Lake NRA spans a very small portion of Whatcom and Skagit County, so there is no reasonable way to draw meaningful conclusions from the data specific to game populations within Ross Lake NRA. However, NPS staff and WDFW biologists mutually concur that hunting of small mammals and waterfowl occurs infrequently within Ross Lake NRA and therefore has a negligible to minor impact on wildlife (Robert Kuntz, NPS Wildlife Biologist, pers. comm.).

It is assumed that demand for hunting within Ross Lake NRA would remain relatively constant under the No Action Alternative. Relatively little is known about the population status of big game species such as deer, elk, bear, cougar and mountain goats in the North Cascades Complex, so there is some uncertainty regarding the magnitude of impact that hunting may have on big game populations. Should hunter takes persist at present levels, it is the professional judgment of NPS Biologists that hunting would continue to have minor impacts on populations of black bear and deer within Ross Lake NRA. There would likely be negligible impacts to cougar populations because cougar are not generally hunted. Information is also limited regarding the population status of furbearers, waterfowl, and upland game birds (Christophersen, 2009), but staff observations indicate that hunting of these species is so infrequent that impacts would remain at negligible to minor levels (Robert Kuntz, NPS Wildlife Biologist, pers. comm.).

Sport fishing in Ross Lake NRA occurs in the reservoirs, several mountain lakes, the Skagit River and various creeks and tributaries. The quality of sport fishing in Ross reservoir, the most popular fishing destination, appears to be declining for various reasons including an "aging" reservoir (less nutrients and reduced aquatic productivity) and possibly parasites. In recent years, the red sided shiner population has increased dramatically, resulting in increased rainbow and bulltrout populations that feed on red sided shiners. This relationship is in the process of being investigated and is not conclusive at this time. The quality of fishing in other areas varies, but in generally, overfishing does not appear to have an impact on fish populations. If fishing demand continues at present levels, it is unlikely that the impacts to native fish populations would rise beyond negligible to minor levels of adverse impact.

Several naturally fishless lakes in Ross Lake NRA contain non-native species of trout and char that were stocked to enhance recreational fishing opportunities. The NPS recently completed the Mountain Lakes Fishery Management Plan to address the longstanding issue of fish stocking. If Congress authorized continued fish stocking, then the plan calls for stocking of select lakes throughout the Complex, including

Ridley and Willow lakes within Ross Lake NRA. Otherwise, the plan mandates no further stocking of fish in any mountain lakes, and calls for the removal of reproducing populations of fish wherever feasible to do so. Within Ross Lake NRA, fish removal would include removal of brook trout from Hozomeen Lake, although there are no plans for removal of these fish in the near term, and the feasibility of removal remains uncertain because Hozomeen Lake is very large and deep. Impacts from continued stocking would remain long-term and negligible to moderate and adverse. If stocking is not authorized, impacts of discontinuing stocking would be long-term and beneficial. Impacts of fish removal, if feasible, would be long-term and beneficial.

Human Disturbance

Visitor use of Ross Lake NRA occurs primarily along the North Cascades Highway corridor, and quickly drops off as one leaves the highway corridor and travels into the backcountry and wilderness area. The majority of Ross Lake NRA receives very little use because it is untrailed, rugged wilderness. Where recreational use is high, such as frontcountry areas, the presence and noise associated with human activity could displace various wildlife species and cause other conflicts. Some of the most common conflicts between recreation and wildlife would involve noise from motor vehicles, boats, and in places where high visitor use causes frequent noise and disturbance.

Staff and visitor observations and preliminary soundscape data suggest that vehicle traffic along the North Cascades Highway produces substantial noise well beyond the highway corridor. Motorcycles in particular are often perceived to be very loud, especially when traveling in large groups. Soundscape studies are presently underway to quantify existing noise and monitor the trends in noise duration, frequency and intensity in relation to visitor use and park operations. There are no data or studies available to correlate noise within Ross Lake NRA with disturbance to wildlife, so the present impact of noise is uncertain.

The North Cascades Highway is a very popular scenic drive from spring through fall. Thousands of vehicles travel the highway each day, causing an unquantified number of deaths to various species of wildlife. The impact of wildlife mortality from vehicles is presently unknown and will likely remain poorly defined given the challenges of monitoring. In addition to wildlife mortality, the extent to which the highway corridor disrupts wildlife movement is also poorly understood.

The risk of conflicts between bears and humans is of longstanding concern. The NPS presently manages this risk by educating visitors about the harm caused by poor food storage and inadvertently feeding bears ("a fed bear is often a dead bear") and by providing bear proof food storage boxes at some frontcountry campsites and all boat-in sites on Ross Lake. To date there have been relatively few bear-human conflicts. If visitor use numbers continue to remain at current levels, the adverse impacts to bears would continue to remain at negligible to minor levels.

Special Status Species

This subsection covers potential impacts to various special status species including federal and state listed species and other species of conservation concern. The No Action Alternative would continue the current management of these species, such as selective monitoring, mitigating disturbance from visitors and park operations, and cooperating with various agencies and organizations to improve recovery efforts throughout the greater ecosystem. The beneficial impacts from the protection of sensitive species and their habitat within the park would continue under Alternative A, primarily through continued protection of the largely unfragmented core habitat provided by the North Cascades NPS Complex.

Special status species such as grizzly bears will realize benefits from the NPS establishing a formal policy for maintaining high ratios of core area and ensuring impacts on high quality spring and fall grizzly bear habitat will be minimized, mitigated or avoided altogether. Trail construction will be routed to avoid sites assessed to be of special importance and/or unique for the general area. This policy will be consistent with anticipated direction among other agencies and partners in the greater North Cascades ecosystem, and ensure stability of habitat quality and availability over the long term.

Management of grizzly bears on federal lands within grizzly bear recovery zones is also guided by the Interagency Grizzly Bear Guidelines (1986). In accordance with these Guidelines grizzly bear presence will be actively discouraged only where human presence results in conditions which make grizzly presence untenable for humans and/or grizzly bears. This includes private property, Hozomeen, Colonial Creek, Gorge, Newhalem and Goodell Creek campgrounds; the Environmental Learning Center; North Cascades National Park Visitor Center; Ross Lake resort, Diablo and Newhalem. Grizzly bear-human conflicts will be "resolved in favor of grizzly

bears" (Interagency Grizzly Bear Committee citation), unless the bear is determined to be a nuisance.

~~Special status species such as grizzly bear would realize additional benefits from the NPS establishing quantifiable targets for maintaining core area and from adopting more formal policies for maintaining core area habitat. These policies could also stimulate action among other agencies and partners in the greater North Cascades ecosystem, resulting in additional long-term benefits.~~

Some unavoidable adverse effects associated with ongoing park operations and recreational use would continue. These impacts would include disturbance in the vicinity of frontcountry areas and along other areas such as trails. Management and operation of the transportation and facility infrastructure would continue to adversely affect habitat for special status species, especially along the North Cascades highway corridor. Backcountry trail and campsite maintenance would potentially displace certain species in the vicinity of the affected areas. Recreational use of Ross Lake NRA could also potentially displace certain species that are sensitive to human disturbance.

To mitigate these adverse effects, the NPS would continue to conduct plant and wildlife surveys in advance of taking management actions. Should species be present, the timing and location of management activities would be adjusted to minimize disturbance. Seasonal closure of certain areas would also be implemented as necessary to prevent disturbance. For example, to prevent disturbance to nesting loons, Hozomeen Lake would continue to be closed to visitor use during the nesting season. Seasonal closure of the Newhalem Crag would be implemented if surveys find continued nesting of peregrine falcons in that area.

Special status wildlife species would continue to receive some beneficial impacts within Ross Lake NRA by virtue of the area's protected status as a unit of the NPS, including the large quantity of relatively undisturbed habitat within and surrounding the unit.

This management alternative may affect, but is not likely to adversely affect the following federally listed species wolf, bear, lynx, murrelet, owl, trout and salmon. This "may affect, but is not likely to adversely affect" determination is based upon the conclusion that effects would be limited to inadvertent, short term disturbance to listed species, the wide variety of undisturbed habitats available throughout Ross Lake NRA, and no anticipated changes in current management and operations.

Cumulative Impacts

No new facilities, roads, major trail construction, or related changes in park infrastructure or operations are anticipated under the No Action Alternative, so the cumulative impacts of park operations on fish and wildlife resources would be limited to those ongoing impacts associated with current park operations and associated recreational use of the area. These cumulative impacts would be minor, long-term and adverse because no additional habitat loss or fragmentation would be anticipated within the boundaries of Ross Lake NRA.

Beyond the park boundaries, a broader qualitative analysis of development trends occurring within the greater North Cascades ecosystem suggests there will be more fish and wildlife habitat loss, degradation and fragmentation in order to accommodate an estimated population growth of one million people in the next 15-20 years (University of Washington Climate Impacts Group, 2009). The cumulative impacts related to population growth and habitat loss and consumptive actions such as hunting and fishing outside the boundary of Ross Lake NRA may have adverse effects on populations of terrestrial species with large home ranges, anadromous aquatic species such as salmon, and certain migratory bird species that rely on unprotected habitat outside the park boundary. The degree of impact to these species is uncertain to predict, and will ultimately depend upon the relative success—or failure—of various large scale efforts currently underway to protect and restore the greater North Cascades ecosystem.

There is a great deal of uncertainty regarding the rate and magnitude of human-forced climate change and its potential to impact ecosystem health, including fish and wildlife habitat. However, there is general scientific consensus regarding several broad patterns of effect that are likely to unfold. Predictions within the planning horizon indicate reduced snowpack, rising streamwater temperatures, higher summer temperatures, expansion of drier (water-limited) forest types, and increased acreage of burned forests and other habitat types (University of Washington Climate Impacts Group, 2009). How these environmental changes will affect fish and wildlife species and habitats is less certain.

High elevation habitats such as those associated with sub-alpine and alpine environments are likely to shift upward in elevation and become smaller. Latitudinal shifts northward in species ranges are also expected, as these shifts have already been documented for

landbird species such as American three-toed woodpecker and pine siskins (Audubon Society, 2009). Wildlife species incapable of dispersing, and/or dependent upon alpine and subalpine environments will likely experience adverse impacts. Conversely, some species may benefit from expansion of habitat ranges precipitated by climate change. The magnitude of impacts, both beneficial and adverse, is uncertain.

Fish species will also be affected to varying degrees from climate change. Models predict that western Washington will experience reduced snowpack, lower summer stream flows, higher stream temperatures and more severe storms with greater precipitation extremes. The changes will likely reduce the quality and quantity of freshwater habitat to varying degrees through a combination of adverse habitat effects including thermal stress, streambed scouring and barriers to migration created by lower flows. These adverse impacts are likely to be most severe for species that migrate, spawn or rear in summer and fall, such as summer Chinook, coho salmon, summer steelhead and bull trout.

The impacts to fish species will take time to unfold, and may not be notable within the timeframe of this plan. In addition, the impacts to the quantity, timing, and temperature of flows from the reservoirs into the Skagit River may buffer some of the potential adverse impacts, at least in the near term. Taken together, the cumulative impacts to fish caused by climate change are likely to be adverse, but the magnitude of impact is uncertain and will vary among species.

Conclusion
Consumptive recreational uses such as hunting and fishing would continue to cause minor adverse impacts to fish and wildlife populations. Other recreational uses within Ross Lake NRA would have negligible to minor impacts, primarily associated with temporary disturbance such as noise and transient human presence. Park management and operations would continue to result in minor direct, indirect and cumulative impacts to fish and wildlife, primarily due to localized disturbance of habitats to operate and maintain the transportation and facility infrastructure within Ross Lake NRA. These management actions may affect, but are not likely to adversely affect federally listed species. Direct, indirect and cumulative impacts would remain minor to moderate and adverse. There would be no impairment of fish and wildlife species or their habitats.

Cultural Resources

The No Action Alternative is required by the National Environmental Policy Act and provides the baseline from which to compare the other alternatives. Under Alternative A, current management practices would continue, as funding allows. The emphasis in this No Action Alternative would be to protect the values of the park without substantially increasing staff, programs, funding support or facilities.

Archeological Resources

Under Alternative A, the archeology program would continue to:

A) Focus on identification, documentation, assessment and protection of archaeological sites.
B) Conduct research investigations, through the archeology program and in partnership with others, that increase understanding of human use of the North Cascades.
C) Offer qualified researchers and visitors opportunities to participate in archeological excavations.

Activities associated with the archeology program would contribute to long-term preservation and enhanced understanding of archeological resources and human use in Ross Lake NRA. Engaging qualified researchers and visitors in excavations could result in building future stewards for archeological preservation. These activities would result in moderate long-term benefits to archeological resources.

Resources adjacent to or easily accessible from trails or day-use areas would continue to be vulnerable to surface disturbance, inadvertent damage, and vandalism. Loss of surface archeological material, alteration of artifact distribution, and a reduction of contextual evidence could result in loss of site integrity. Continued ranger patrol, staff presence throughout Ross Lake NRA, and thoughtful site design at areas like the Newhalem Rockshelter would discourage inadvertent destruction of cultural remains and vandalism, and no adverse effects would be anticipated. Known archeological resources would be avoided to the greatest extent possible whenever ground disturbing activities such as road and trail maintenance or construction of new facilities was needed. Archeological surveys and/or monitoring would precede any federal undertaking, consistent with the mitigation measures outlined in this plan. If National Register-eligible or listed archeological resources could not be avoided, impacts on such

resources could be minor to major and adverse, and an appropriate mitigation strategy would be developed in consultation with affiliated tribes and the Washington State Historic Preservation Officer.

Cumulative Impacts
A number of cultural resources, including archeological resources, have undoubtedly sustained adverse impacts from natural and human forces over the lengthy period of human occupation of the area. Ross Lake NRA has the largest number of surveyed archeological sites in the park complex and overall lands within Ross Lake NRA have a high level of archeological sensitivity. However, much acreage of Ross Lake NRA has not been surveyed and inventoried, therefore it is possible that archeological sites, especially those with archeological resources exposed on or located near the surface, have been disturbed by past development, construction, management actions, vandalism, artifact collection, and natural processes. Past actions and processes include the construction of hydroelectric facilities, prescribed burns, trail rehabilitation and relocation, rehabilitation of park roads, effects of climatic conditions, visitor use, unintentional disturbance, vandalism and artifact hunting, and stream and shoreline erosion. Cumulative natural impacts such as erosion and general weathering, coupled with human impacts have resulted in adverse impacts of unknown intensity.

Dam and reservoir construction during the 20th century, along with construction of related hydroelectric facilities (including the company towns of Newhalem and Diablo), likely resulted in major cumulative adverse impacts to cultural resources, including archeological resources, that continue today. Filling of the Ross, Diablo, and Gorge reservoirs undoubtedly inundated an unknown number of prehistoric and historic cultural resources. Archeological sites are known to currently exist in drawdown zones of Ross Lake. It is likely that the degradation of recorded and unrecorded sites along shorelines and drawdown zones as a result of wave action, changing reservoir levels, and recreational activity creates ongoing negligible to major adverse site-specific impacts to archeological sites, depending on the site or resource. Inventory and appropriate mitigation of these vulnerable resources would be of benefit to these resources.

Implementation of Alternative A would not contribute to the overall adverse cumulative effects on archeological resources.

Conclusion
Activities associated with the archeology program would contribute moderate long-term benefits from enhanced preservation activities and increased understanding and awareness of resources. Avoidance of National Register eligible or listed archeological resources during excavation, construction, and demolition would result in no adverse effect. If, however, archeological resources could not be avoided, the historic property would be managed in accordance with 36 CFR Part 800. Implementation of Alternative A would not contribute to overall adverse cumulative effects on archeological resources. There would be no impairment to this resource as a result of implementing this alternative.

Historic Structures and Cultural Landscapes

Under Alternative A, ~~historic structures and landscapes would continue to be surveyed, inventoried, and evaluated under National Register of Historic Places criteria to determine their eligibility for listing in the National Register. C~~current preservation maintenance would continue on historic structures and cultural landscapes within the park. Designed park landscapes including developed areas, and park trail systems and associated features would be stabilized and preserved. These activities would result in moderate, long-term benefits.

Alternative A would be expected to have no adverse effects on historic structures and cultural landscapes. The continued program of cultural resources management in the park, including preservation and maintenance activities, would have minor to moderate beneficial impacts on these resources. The park would carry out preservation maintenance on historic structures. Those historic structures and cultural landscapes located in wilderness would be stabilized and preserved according to the pertinent laws and policies governing cultural resources and wilderness, using management methods that are consistent with the preservation of wilderness character and values, consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties (1995).*

Under Alternative A, the buildings and infrastructure in the Hollywood district of Diablo, including historic properties that are ~~and may be eligible for~~ listeding on the National Register, would continue to be owned and managed by Seattle City Light. ~~If the buildings continued to remain under SCL, even if eligible or newly listed buildings were added, SCL would still~~ who would be responsible for complying with the terms of the FERC Settlement Agreement with respect to cultural resources. The NPS would continue to

lease individual buildings for staff housing as needed and made available by Seattle City Light. The NPS leasing of housing would result in long-term benefits to historic structures.

~~Seattle City Light's need for their former company townsites in Diablo and Newhalem along with other infrastructure, such as water towers and the incline lift among others, has changed as new technologies evolve. Seattle City Light is currently implementing a plan from the 1990s that calls for housing only essential staff that would be needed to respond to emergencies (Email from Chip Jenkins, October 28, 2009).~~

~~Seattle City Light is consolidating their housing in Newhalem, using only those houses in the historic district (approximately twelve to thirteen houses). All houses not in the historic district would be removed. These houses outside the historic district were constructed using creosote treated lumber for floor joists and the rehabilitation costs exceed the value of the buildings (Email from Chip Jenkins, October 28, 2009). Seattle City Light is also working to renovate and restore the former "hotel" in Newhalem, providing an opportunity for future adaptive reuse of the property (Email from Chip Jenkins, May 20, 2009).~~

~~Under the current plan, all Seattle City Light staff would be moved out of Hollywood in Diablo. Seattle City Light employees housed in Diablo would occupy houses on Reflector Bar, requiring approximately eleven houses. After condition assessments and eligibility determinations are completed, Seattle City Light would be prepared to remove or rehabilitate the houses in Hollywood, depending on their needs. The cookhouse in Diablo would also be closed and torn down as structural issues make it cost prohibitive to rehabilitate. (Email from Chip Jenkins, October 28, 2009).~~

~~Future plans for Hollywood would depend largely on the outcome of the National Register Eligibility Determination for Hollywood and the facility condition assessments of the buildings currently underway. The magnitude of impacts are difficult to assess without additional eligibility information and plans for the site, but impacts could range from no effect (if buildings are not deemed eligible) to major and adverse (if buildings are deemed eligible and removed).~~

Cumulative Impacts

Over the years historic structures and cultural landscapes in the park have been adversely affected by natural processes and wear and tear associated with visitor access, administrative use, and deferred maintenance. In addition, some structures that would be considered historic today were moved, removed or modified in the past.

Seattle City Light's continued use and maintenance of historic buildings and landscapes would have long-term benefits. Should SCL choose to remove buildings or alter landscapes there could be adverse effects to cultural resources; however, the intensity of those effects would be determined through SCL's consultation with the State Historic Preservation Office as projects are identified.

~~Resource management activities would continue to consider the natural resource values of cultural landscapes as well as their culturally important character-defining patterns and features. Cultural landscapes would be preserved and maintained. Overall, the cumulative effects would be long-term, minor to moderate, adverse, and beneficial. Alternative A would provide beneficial effects to historic structures and cultural landscapes and would not contribute to the adverse cumulative effects.~~

Conclusion

The implementation of the No Action Alternative would have no adverse effect on the historic structures and cultural landscapes of Ross Lake NRA. The continued program of cultural resources management in the park, including preservation and maintenance activities, would have minor to moderate beneficial impacts on these resources. The magnitude of cumulative impacts to cultural resources is also dependent on SCL's future plans and could be both adverse and beneficial. ~~The magnitude of impacts to the Hollywood district could range from no effect to major and adverse depending on the outcome of National Register Eligibility determinations and Seattle City Light's plans to concentrate operations in Newhalem and reduce their presence in Diablo.~~ The cumulative effects from past activities could have adversely affected these resources. Ongoing cultural resource management, such as the identification, preservation, and maintenance of historic structures and cultural landscapes, has resulted in minor beneficial cumulative effects, resulting in no adverse effect. This alternative would contribute modestly to the overall beneficial cumulative effects, and would not contribute to the adverse cumulative effects. There would be no impairment to this resource or value as a result of implementing this alternative.

Tribal Issues and Ethnohistory

Under Alternative A, the park would:

A) Consult with the Skagit Tribes, upon request, to access locations used for ceremonial activities. Monitor levels of use and potential resource effects.
B) Upon request, conduct tours and guided visits for the Skagit Tribes and selected groups to archeological and ethnographic sites.
C) Consult with Skagit Tribes to document traditional resource use areas and traditional cultural properties.
D) Research and inventory traditional tribal uses of traditional plant, animal, and mineral resources.
E) Continue to conduct oral histories and research investigations documenting human use of the North Cascades.

Consultation with the Skagit Tribes for ceremonial activities, guided tours, and assessing traditional resource use areas and traditional cultural properties would continue to promote and encourage positive relationships with tribal members. Activities associated with research, inventory and monitoring of traditional plant, animal and mineral resources as well as locations used for ceremonial activities would generally result in moderate, long-term benefits to these resources.

Inadvertent visitor use and park-related actions could potentially impact ethnographic resources, however, should such impacts occur, communications among the NPS, affected Tribes, and the State Historic Preservation Officer would be initiated, and any adverse effects would be mitigated to negligible through a cooperative agreement.

Cumulative Impacts
Dam and reservoir construction during the 20th century, along with construction of related hydroelectric facilities (including the company towns of Newhalem and Diablo), likely resulted in cumulative adverse impacts to cultural resources, and potentially impacted ethnographic resources. Magnitude of these impacts is unknown. Inventory and appropriate mitigation of these vulnerable resources would be of benefit to these resources.

Park development and administrative/maintenance operations, as well as increasing visitor use of the national park since its establishment, could contribute to cumulative long-term adverse impacts on ethnographic resources through resource loss from ground disturbing activities or vandalism.

Alternative A's contribution to any adverse impacts on ethnographic resources would be negligible to minor.

Conclusion
Actions under Alternative A would result in moderate long-term benefits from ongoing consultation with Skagit Tribes and any adverse effects to ethnographic resources would be mitigated to negligible through a cooperative agreement. Past actions including dam and reservoir construction have contributed cumulative long-term adverse impacts on ethnographic resources in Ross Lake NRA of unknown magnitude. Alternative A would also contribute a negligible to minor increment to the long-term adverse cumulative impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Museum Collections

Under the No Action Alternative, the park would maintain collections and archives in their existing locations and provide access for qualified researchers and maintain existing exhibits that contain collections objects. These activities associated with collections management would have long-term benefits to the preservation of museum collections.

Cumulative Impacts
The history of park collections has been one of growth during which collections dispersed to available spaces then consolidated again with the development of the dedicated collection facility in 1993. This has allowed for increased efficiency in curation and maintenance of the collections as well as provided for access by park staff, outside researchers, and others with interest in the collections. The program will continue to improve collection preservation and access. The planned collection upgrade will be equipped to maintain collections for the next 10 to 20 years when the upgrade is completed. These efforts would have a major long-term beneficial impact on museum collections in the park. The cumulative impacts would result in major beneficial long-term impacts on the museum collections.

Conclusion
The ongoing program has resulted in major beneficial impacts on the museum collections. The planned cumulative activities would result in major beneficial long-term impacts. Alternative A would not add to these impacts. There would be no impairment to this

resource or value as a result of implementing this alternative.

Wilderness Character

Under the current management alternative, the Stephen Mather Wilderness within Ross Lake NRA would continue to be managed as it is now. A Minimum Requirement Analysis would be used to determine if, when, and how actions that might impact wilderness character could be implemented. The backcountry permit system would remain in place and would continue to be used to manage overnight use. Opportunities for visitors to experience wilderness character would continue to be abundant.

Current management actions that manipulate wilderness include the stocking or removal of non-native fish and fire suppression. Since these actions would only be slightly detectable (after the action is taken) to some visitors and would not have an overall effect on wilderness values or recreational opportunities, the impact of these actions would be adverse and minor.

There are a number of natural resource issues that currently have an impact on the natural quality of wilderness character. These issues include invasive species issues, increases in the range of certain species, such as the barred owl, that impact listed species, such as the northern spotted owl, persistent pollutants in vegetation and fish tissue, habitat loss and migration alteration, and a number of climate change impacts. Although most of these impacts would only be slightly detectable to most visitors, the potential for landscape-scale changes could occur, especially as a result of vegetation changes due to invasive species, fire suppression, and climate change. Therefore, adverse impacts to the natural quality of wilderness character would range from minor to moderate.

Infrastructure and facilities within wilderness include one installation, the Ruby Mountain radio repeater, numerous recreational developments (well-developed trails, bridges, and camps), and two historic structures. Motorized equipment, including helicopters and chainsaws, is used by park employees for emergency activities and non-emergency administrative purposes throughout the wilderness. Examples of emergency operations include fire suppression and search and rescue operations while examples of non-emergency practices include trail maintenance, resource management projects, and some fire management activities. Most non-emergency work that uses motorized equipment in wilderness has been evaluated using the Minimum Requirement Analysis, and found to be the minimum tool necessary to administer the area. However, these features impact the undeveloped quality of wilderness as well as opportunities for solitude and unconfined recreation. Although trails and other developments would be clearly detectable by most visitors, the use of motorized equipment would be more locally noticeable, and of a short-term duration. Therefore, impacts to the undeveloped quality of wilderness character would range from minor to moderate.

Opportunities for solitude become more abundant with distance from the reservoirs and the North Cascades Highway. Noise intrusions still occur from aircraft throughout the wilderness, and in many places motorboats and highway vehicles can still be heard. Management restrictions such as required backcountry permits for designated campsites and limitations on campfire opportunities can reduce opportunities for unconfined recreation; however, the same restrictions help to manage visitor use by reducing impacts to natural qualities. Since these conditions would only be slightly detectable to some visitors and clearly detectable to others, impacts on opportunities for solitude or primitive and unconfined recreation would range from minor to moderate.

Cumulative Impacts
Other past, present, or future actions that could impact wilderness character are mostly related to ongoing activities such as the existence and maintenance of infrastructure and facilities, including trails, bridges, camps, and historic structures. Maintenance could involve motorized equipment such as chainsaws, power drills, and helicopters, resulting in minor to moderate adverse impacts. The planned installation of the Desolation Peak radio repeater, which was determined to meet the minimum requirement, would have moderate adverse impacts. Other park administrative uses that might require helicopter use, such as fire management (including suppression and prescribed burns), search and rescue operations, and other resource management tasks would result in minor to short-term moderate impacts to wilderness character. The impacts of climate change on naturalness could result in minor to moderate impacts. In combination with the No Action Alternative, these cumulative impacts would result in minor to moderate impacts.

Conclusion
Adverse impacts to wilderness character would range from minor to moderate. Minor impacts would result

from manipulation of wilderness by fish stocking or removal and fire suppression. Minor to moderate impacts would result from natural resource issues, development, motorized vehicle and equipment use, and management restrictions on unconfined recreation. Cumulative impacts would range from minor to moderate. Implementation of this alternative would not result in impairment.

Wild and Scenic River

Beneficial Measures Common to All Alternatives

Under all alternatives measures would be taken to protect and enhance the Outstandingly Remarkable Values (ORVs) and free-flowing condition of eligible rivers as described in the alternatives. These measures include evaluation of water resources projects in accordance to the criteria in section 7 of the WSR Act. While these rivers are not officially designated, it is NPS policy to apply the same standard of review for eligible rivers. NPS mission and Ross Lake NRA's enabling legislation direct NPS to protect natural resources while also providing for high quality visitor experiences. All alternatives include protection measures regarding natural, scenic, and cultural resource monitoring and restoration; maintaining and enhancing recreation opportunities; collaboration with SCL on maintaining Skagit River flows for fishery resources; and managing impacts on riverbanks. These measures will provide minor to moderate benefits to the eligible river segments, free-flow character, and the ORVs. Backcountry use on eligible rivers including camping and trail use is regulated via a permit process limiting the party size and number of people in the backcountry. Use of front-country and back-country is also limited by number and size of existing facilities including parking lots, trails, river access areas, roads, and camping opportunities. Existing limitations provide minor to moderate beneficial impacts to natural resources and the visitor's experience on eligible WSR segments.

Impacts Common to All

The Skagit River and Newhalem Creek Hydroelectric Projects, owned by Seattle City Light, will continue to operate in accordance with their FERC licenses. These projects would continue to have moderate adverse impacts on flows in the Skagit River and minor adverse impacts to Newhalem Creek. Both of these licenses contain a number of measures to avoid and mitigate adverse impacts and enhance resources related to fish, wildlife, cultural, and recreational values. Park managers will continue to work with SCL to restore and enhance resources impacted from these facilities. In addition, the waste water treatments plants would continue to be operated. These facilities are regulated by the Washington State Department of Ecology to high water quality standards. However, during storm events, these systems may be overloaded, causing temporary discharges that exceed water quality standards.

In addition, the North Cascades Scenic Highway, existing SCL and park facilities, and trails are expected to have continued impacts on eligible river segments. These facilities would have minor to moderate adverse impacts on scenic, fishery, and free-flow values due to erosion and river bank manipulation projects constructed to protect the facilities. In addition, these facilities would have beneficial impacts to visitor experiences providing access to Ross Lake NRA and opportunities for people to enjoy the Skagit River and its tributaries.

Analysis

Under Alternative A, there would be some beneficial long-term impacts to wild and scenic river resources and values such as to free-flow, water quality, fish, wildlife, geologic, recreation, scenery and cultural resources due to on-going monitoring, management, and restoration efforts related to these resources. Depending on the type and duration of future flood events and the response taken, there could be minor to moderate localized adverse impacts to free-flow and scenery due to emergency bank stabilization methods such as riprap or similar techniques being employed. NPS would be conducting water resource evaluations on all federally assisted projects to avoid adverse effects on river values. These evaluations often are not able to occur during emergency situations.

For recreation, depending on the increase in use, there could be negligible to minor adverse impacts to the whitewater boating experience on the Skagit because of the presence of motor boats and lack of active monitoring or management of the private non-motorized users. Commercial boating use on the Skagit would continue to be regulated through the permit process. There would be negligible adverse impacts to Newhalem Creek, Goodell Creek, Thunder Creek, and Big Beaver Creek due to increase in erosion due to trail use by people and stock. Activities including fishing and overnight use would continue to be regulated and available in formal frontcountry campgrounds and dispersed backcountry sites; helping protect recreational values.

Cumulative Impacts
In the past, flows and resources in the Skagit River and Newhalem Creek were adversely impacted due to the construction and operation of the hydroelectric facilities on the river system. These projects were relicensed in the mid-1990s and new flow regimes were developed to protect and enhance river values. SCL is currently proposing an amendment to Skagit Hydroelectric Project to construct a new tunnel between Gorge Dam and powerhouse. A detailed impact analysis will be conducted by SCL and reviewed by park managers once the proposal is further developed. However, this project is not expected to change the flows in the Skagit River and therefore will have limited impact to flow-dependent values including fish, recreation, and free-flow character. Some adverse impacts to water quality and scenery may occur due to this project.

In the past construction and reconstruction of roads (North Cascades Scenic Highway and other smaller access roads) and park facilities contributed to minor to moderate adverse impacts on scenic values and free-flow character. These roads and facilities also have beneficial impacts to recreation providing access to boating, fishing, hiking, camping, and climbing opportunities.

Conclusion
Impacts due to the No Action Alternative are dependent on unknown factors regarding flood events and what actions would be taken to protect roads or facilities vs. river protection. Impacts are also dependent on the type and amount of boating and trail recreation use that occurs in the future. Resource and river values are also expected to have beneficial impacts due to water resource project evaluations done to avoid adverse impacts and continued monitoring, management and restoration of resource areas. Overall, some minor adverse impacts are likely to occur under the No Action Alternative. There would be no impairment of wild and scenic river resources or values.

Visitation

Visitation would be expected to increase proportionate to regional population growth. Heaviest use would still occur along the North Cascades Highway, and traffic congestion during peak summer weekends would continue. Waysides and pull-outs may become slightly more crowded. Auto campgrounds that are currently filled to capacity only a few weekends each summer may be at capacity more often. In developed areas, visitation would be limited by the number of facilities, parking spaces, and campsites available. In the backcountry, overnight visitation would be limited by the number of campsites available and permits issued. At Ross Lake Resort and the Environmental Learning Center, overnight stays would be limited by the number of beds available. Day use may slightly increase along trails, particularly on those segments that are closest to the highway and within one to two miles of trailheads. Wintertime and shoulder season use may also slightly increase; however, little to no crowding or congestion would occur.

During most of the year, the impacts of increased visitation would be negligible. Infrastructure and facilities would accommodate additional visitors easily. However, during the peak summer season, especially on weekends, impacts would be adverse and range from minor to moderate. Since the majority of visitors to Ross Lake NRA limit their visits to areas within the highway corridor, most of them would be affected by traffic congestion and crowding at facilities during the busy summer season.

Cumulative Impacts
Potential future actions could include general road, trail, or campground maintenance and various types of work on the North Cascades Highway by WSDOT. Although traffic delays may occur during road projects, there is no planned expansion of roadway capacity, and visitors would not likely alter their travel destinations. Occasional road or trail closures occur due to fire, avalanches, rockfalls, etc. Overall impacts to visitation due to these cumulative impacts would be negligible.

Conclusion
The impacts of continuing current management on visitation would result in adverse negligible impacts during most of the year, and minor to moderate impacts during the peak summer season. Because visitation to Ross Lake NRA is condensed into a few months per year, and is largely concentrated along the North Cascades Highway, actions that occur along the highway will impact a large proportion of NRA visitors.

Visitor Opportunities

General Recreation Opportunities

Recreational activities would continue to be characterized by frontcountry experiences along the scenic North Cascades Highway, backcountry and

some frontcountry lake and river recreation, and the ability to experience wilderness and use Ross Lake NRA as a gateway to explore the greater North Cascades. Continuation of these recreation activities would have long-term moderate benefits to visitor opportunities.

North Cascades Highway based opportunities

Along the North Cascades Highway, a wide variety of recreational activities would continue to be available, including scenic driving, enjoying overlooks and wayside exhibits, picnicking and road biking. There are opportunities to view the wilderness and experience a natural setting while accessing numerous amenities and services. Continuation of these activities would have long-term benefits for visitors along the North Cascades Highway.

Car camping opportunities with a range of amenities would continue to be available at Goodell Creek, Newhalem Creek, Gorge Lake, Colonial Creek, and Hozomeen Campgrounds, plus Upper and Lower Goodell and Newhalem group camps. Campgrounds that are especially susceptible to changing stream flows and storm events, particularly Colonial Creek Campground and Goodell Creek Campground (lower group camp and main sites), would be rebuilt in place if possible. If reconstruction is not possible some sites or parts of these campgrounds may need to be abandoned and a reduction in camping opportunities over time could occur as storm events dictate. Loss of campsites, depending on the number and location of sites, could result in long-term minor to moderate adverse impacts.

Hozomeen Campground will continue its current loosely organized arrangement, with no delineated sites or use limits at Winnebago Flats, providing RV- and car-camping opportunities limited only by the physical restraints of the space. Continuation of the current management at Hozomeen would have both beneficial and adverse impacts – benefitting those who prefer unstructured camping and adversely affecting those who prefer more organization to their camping experience.

Currently, stock parties do not have a car-camping option, as there are no campgrounds with a formal capacity for stock parties, resulting in a moderate adverse impact.

Winter activities are limited by lack of road access to much of Ross Lake NRA as well as adverse weather, and primarily include skiing, snow-shoeing, and bird watching, as well as snow-mobiling along the North Cascades Highway corridor. Continuation of this limited access to wintertime recreation opportunities would have minor impacts, both beneficial and adverse, to winter recreationists.

Land/trail-based opportunities

These opportunities allow visitors to move beyond the road corridor for short or long distances and times for a variety of activities, and to launch deeper wilderness explorations. A number of short walks ranging in length from 100 yards to a few miles would continue to be available, as well as access to longer day hikes, backpacks, stock trails, and mountaineering routes in the wilderness and greater North Cascades. There are over 100 miles of trail within Ross Lake NRA, over half of which are open to stock use. Several of the trails within Ross Lake NRA are long-distance segments that continue on into North Cascades National Park or the Pasayten Wilderness. Perpetuation of these opportunities provides a long-term moderate benefit to visitor opportunities.

Hunting would continue to be allowed within the entirety of Ross Lake NRA (including all backcountry camps), with the following existing exceptions: hunting is not allowed within ¼ mile of: nature trails, Thunder Knob Tail, the first few miles of Thunder Creek Trail as far as the Thunder Creek Bridge, Happy Creek Boardwalk, North Cascades Environmental Learning Center, Hozomeen Road, Ross Lake Resort, Colonial Creek and Goodell Creek Campgrounds, the towns of Newhalem and Diablo, the dams and their powerhouses, and the Ross Dam Trail and haul road. The potential for safety issues or conflicts of interest would continue between the small number of hunters and the majority of non-hunters—including many families and youth groups—who may be backpacking, camping, or hiking in the same areas, some of which are very busy, including the camps along Ross Lake, resulting in moderate to major adverse impact. Sport climbing in the Newhalem Gorge would continue in four designated areas under an Adopt-a-Crag program, and new and emerging uses such as canyoneering would be managed as any resource protection or visitor experience issues arose.

Overall, the impact on land/or trail-based recreational activities would be minor to moderate, both beneficial and adverse and long-term as a result of a potential increase in users on short day hikes as visitation increases, potential minor adverse impacts on non-hunters concerned for safety or conflict of interest with hunters, and minor beneficial impacts to hunters

because the activity continues as currently established. Impacts on the sport climbing community would be negligible, beneficial, and long-term because activities would continue within established parameters. For other recreational activities, effects are negligible and beneficial, as these opportunities would continue to be available.

Additional hiking opportunities and providing new trails in the future could be constrained by formal policies for maintaining core habitat for special status species such as grizzly bear, resulting in a negligible to minor long-term impact given the extent of the land base and likelihood of expanding trails beyond the highway corridor and into core area habitat.

Water-based opportunities

Visitors would continue to have access to a range of water-based recreation in both front and backcountry, as well as numerous associated day and overnight activities. There are 19 boat-accessible camps on Ross Lake (including Hozomeen Campground) and three on Diablo Lake. On average there are three sites per camp, but numbers range from one to seven sites per camp. Nine of the sites are also accessible by trail. Over half of the sites have boat docks and group site availability. All sites are furnished with picnic tables, bear boxes for storage, well-defined tent pads, and outhouses. Group party size is limited to 12 in the backcountry, regardless of location. Overnight boat-in camping on Ross and Diablo lakes would remain accessible by all watercraft (motorboat, seaplane, non-motorized craft), with use limits set by the capacity of the current docks and campsites, as administered by the backcountry permit system.

Unlimited day use opportunities, including recreational towing, would also be available on all three reservoirs for all boat types, and on Ross and Diablo lakes for seaplanes. Current seaplane use, which is infrequent according to anecdotal data and staff observation, would remain unrestricted in the future. The overwhelming majority of boats on Ross Lake are currently paddle-craft or small motorized boats. Under Alternative A, there would continue to be no limit to the size, horsepower, wake zone, or speed of motor boats (with the exception of personal watercraft, which are prohibited). Self-powered watercraft (and motor boats, where feasible) would continue to have unlimited day use opportunities on the Skagit River, with unlimited party size. Fishing would continue under current Washington State regulations.

Under current conditions, there would be a long-term minor to moderate adverse impacts to most current and potentially future users of water-based recreation opportunities. Continuation of current management and available activities would have long-term moderate benefits. If seaplane use were to increase greatly, or if more, larger, or faster boats were to increase in number, impacts could be moderate and adverse. There would be a negligible to minor beneficial effect for seaplane users and visitors who enjoy speed-boating or large-horsepower boating as these activities would continue with no restrictions. Impacts would be long-term because of repeated use over time. There would also be a negligible to minor positive and negative effect to boaters on the Skagit River, as rafters and kayaks may continue to experience conflict and big wakes from power boaters, or as those who desire to boat up the entire Skagit continue their use. For other recreational activities, effects are negligible and beneficial, as these opportunities would continue to be available.

Visitor and Information Centers

A range of facilities and services currently exist to meet a variety of visitor needs for Ross Lake NRA. The NPS information centers at Marblemount, Sedro-Woolley, Hozomeen, and the North Cascades Visitor Center in Newhalem provide orientation, information and trip-planning services to an average of 70,000 park visitors annually. Current staffing levels and hours would be maintained as funding priorities allow. Currently, only Sedro-Woolley maintains year-round visitor services. Most other stations are closed during winter and spring months, generally November to May.

For visitors entering Ross Lake NRA from the east side, there are no NPS visitor contact facilities. However, visitors can stop at the U.S. Forest Service ranger station in Winthrop for limited information. This station also has limited, non-weekend hours. The Wilderness Information Center in Marblemount was recently upgraded to include expanded staff and search and rescue areas, but the visitor side of the building is older and in need of updated displays and services. The station in Hozomeen has very limited hours due to the poor condition of this facility and periodic lack of staffing, so the services offered here are very limited and access is variable.

Impacts under Alternative A would be short to long-term, beneficial for those stations that continue an adequate service level, or minor to moderately adverse impacts at those stations with reduced or limited staffing and services.

Permits, Reservations, and Fees

Primary backcountry permitting services are provided at the Wilderness Information Center in Marblemount, with limited ancillary services available at Newhalem, Sedro-Woolley, and Hozomeen (occasionally Winthrop, Chelan, and Glacier). Backcountry permits are free and required for all overnight backcountry stays in Ross Lake NRA, including all boat-in and hike-in camps. Demand varies from very high for sites on Ross Lake, especially the south end, to very low. Permits could continue to be obtained up to a day in advance, but no earlier, and no reservations are available for the general public. Impacts from lack of reservations can be both beneficial for those who prefer spontaneous trips and adverse for those visitors who prefer advanced confirmation for their trip planning.

There is a limited mail-in reservation service for commercial companies with a fee, a beneficial impact on those organizations that allows advance coordination of their commercial services.
The majority of frontcountry car campgrounds would also continue to be first-come, first-served, with reservations available six months in advance at one loop of Newhalem Campground, and the three group camps. Campground fees would continue to vary from free (Gorge and Hozomeen Campgrounds) to $32. Where reservations are available, there is an additional fee.

Overall, the permit and reservation systems would continue to ensure quality recreation experiences that distribute use and maintain opportunities for solitude, a long-term benefit to visitor opportunities. There would be long-term, minor to moderate beneficial impacts to those spontaneous users, ensuring popular areas are not booked far in advance, and maintaining no fees for permits, and also ensuring permit holders receive current first-hand information. There would be long-term minor to moderate adverse impacts to those users who prefer advance trip planning, a guarantee of a specific campsite and/or do not want to have to drive out of their way to obtain a permit first-hand.

Campground Facilities

Maintenance will continue on the five campground facilities and three group camps, some of which are very susceptible to damage from storm events—particularly Colonial Creek and parts of Lower Goodell Group and Goodell Creek Campgrounds. In the event that a campground is impacted by flooding, debris flow, or erosion, the campground would be repaired when possible and practicable. Some net loss of sites could occur, resulting in a moderate long-term adverse impact. Hozomeen Campground, especially Winnebago Flats, is currently poorly delineated and organized. Existing facilities vary between campgrounds, but there are no hook-ups or showers at any campground. No campground has overnight facilities for stock users.

The NPS would also rehabilitate Hozomeen Campground and Winnebago Flats to provide a more traditional camping experience, as well as partnering with BC Parks to provide a joint campground host to provide additional visitor services. Users at Hozomeen who enjoy traditional camping would benefit from rehabilitation and reconfiguration of the area and Winnebago Flats, but there would be less capacity overall which could result in a moderate adverse impact. In addition, those recreationists who like the current unconfined configuration of the campground would be adversely affected.

Under Alternative A, there would be a moderate to potentially major long-term adverse impact on visitor opportunities if some net loss of camping facilities occurs, but impact on most campground facilities would be negligible, long-term and beneficial as there would be no change. Impacts at Colonial Creek would be more severe because finding a comparable location would be extremely difficult. Impacts at Hozomeen would be minor and adverse due to poor layout of this facility; however, some campers who prefer the unstructured nature of Hozomeen would benefit. There would be a minor negative impact on stock users wanting a stock facility for car-camping.

Trails, Boat Launches, Picnic Facilities, etc.

The current number of trails and trail uses would be maintained at current levels, with any potential new trails or trail closures evaluated on a case by case basis. There are over 100 miles of trail within Ross Lake NRA, over half of which are open to stock use. Several of the trails within Ross Lake NRA are long-distance segments that continue on into North Cascades National Park or the Pasayten Wilderness. Existing park entrance signs, picnic sites, waysides, and overlooks would be maintained in a variety of locations along the North Cascades Highway corridor. Current lake and river boat launches and boater facilities would be maintained at existing locations. There is some threat that the main boat launch at Colonial Creek Campground may slowly silt in as debris washes from Rhode Creek into Diablo Lake and the Thunder Creek Delta expands, making this launch

more difficult to use, especially for larger boats. Should this boat ramp become unusable in the future, the NPS would relocate the boat launch to the north side of the highway in the vicinity of Diablo Lake boathouse. Ensuring access to a boat launch in the vicinity of Colonial Creek Campground would have a long-term benefit to visitors. Facilities and services specifically for bicyclists are limited, but those that exist would be maintained under Alternative A.

Under Alternative A, there would be long-term moderate to major beneficial impacts as most uses continue, with some minor adverse impacts if some trails close or boat launches silt in. Cyclists who lack additional facilities may also experience minor adverse impacts.

Commercial Services and Facilities

Under Alternative A, commercial services and facilities would continue at present levels, with any new proposals considered on a case by case basis. Ross Lake Resort would be maintained at its existing capacity, with any replacement facilities following established NPS guidelines. The Resort would continue to operate portage service between Ross and Diablo lakes, as well as a single water taxi for shuttles on Ross Lake. An unlimited number of commercial use authorizations would continue to be given to guiding outfits, camps, and other commercial or special use enterprises in Ross Lake NRA, mainly for use on Ross Lake but with some land-based services as well. In Diablo and other areas, Seattle City Light and NPS would continue present uses, with no public lodging or other services here. SCL would also continue to run the General Store and North Cascades Visitor Center in Newhalem, providing snacks and beverages to visitors as well as orientation to SCL history and activities, such as the dam tour.

Impacts under Alternative A would be long-term, mostly negligible and beneficial for those uses that would continue at present levels, or minor adverse if demand for some services, such as overnight lodging or water taxi, increases. Impacts of services provided by commercial use authorizations would be beneficial to those who use the services but potentially adverse if these services grow to the point that public use is displaced.

Cumulative Impacts
Ample recreation opportunities would continue to be available both regionally and in areas adjacent or in close proximity to Ross Lake NRA that complement those available in Ross Lake NRA. Additional recreation activities including winter recreation, climbing, equestrian and stock use, motor-boating, hunting, and seaplane use are all available on public lands both east and west of Ross Lake NRA, offsetting demand for use within Ross Lake NRA. Many of these areas offer similar settings to Ross Lake NRA, including Baker Lake and Lake Chelan NRA. Areas or lakes that emphasize paddle craft or small motorized boats are less common in the region, making the perpetuation of the current visitor opportunities at Ross Lake NRA important to preserve.

Awareness raising initiatives about the North Cascades may highlight recreation opportunities in the region and increase demand for recreation opportunities, facilities, and services.

Visitor and recreation facilities and services in the area would also continue to complement those available at Ross Lake NRA, notably trails, ranger stations, visitor support facilities and camping facilities. The closure of some U.S. Forest Service ranger stations to the east of Ross Lake NRA, notably at Twisp, and reduced hours and staffing levels could result in increased demand for visitor information and easier access to permits and reservations within Ross Lake NRA.

Commercial services and facilities, including lodging, food services, and additional types of recreation, cultural and educational opportunities would continue to be provided in the region, complementing what is available in Ross Lake NRA. The construction of the Environmental Learning Center for overnight stays associated with educational programming with the North Cascades Institute increased the capacity for overnight stays within Ross Lake NRA. The conversion of Baker Lake Resort to camping only may increase demand for additional overnight lodging within Ross Lake NRA. Most of these operations would continue to remain seasonal, resulting in no year-round enclosed lodging within Ross Lake NRA or in immediate proximity.

Taken as a whole, the reasonably foreseeable past, present and future cumulative actions would continue to provide diverse and expansive visitor experiences, recreational opportunities, and visitor services and facilities within the region, resulting in long-term moderate benefits to visitors. However, some visitors may wish to have year-round lodging opportunities within Ross Lake NRA, or be able to have easier access to greater portions of Ross Lake NRA. The impacts above, in combination with the impacts of implementing the No Action Alternative, would result in moderate long-term beneficial cumulative impacts. This alternative's contribution to these cumulative impacts would be a modest to moderate increment.

Conclusion
The full spectrum of visitor opportunities would continue to provide for visitor enjoyment and recreation activities. Continuing current management practices under Alternative A, little would change in the array of opportunities along the North Cascades Highway or in Ross Lake NRA's backcountry areas and designated wilderness. Impacts would be negligible to moderate, long-term, and both beneficial and adverse. Beneficial impacts would be minor to moderate from the continuation of existing opportunities that serve the needs of most visitors. Adverse impacts could occur from reservations and fees, conflicting uses, possible loss of campsites due to severe weather or reorganization of Hozomeen, lack of stock-accessible front country camping opportunities, and limited access to wintertime activities.

There would be moderate long-term beneficial cumulative impacts on visitors in the broader North Cascades. Implementation of this alternative would have a modest contribution to these cumulative impacts.

Information, Interpretation and Education Opportunities

Under Alternative A, on-site non-personal services, such as waysides and nature trails, provide opportunities for resource immersion within Ross Lake NRA. Personal services and formal interpretive programs, including interpretative walks, talks, and roving interpreters, provide opportunities for visitors to explore interpretive themes. Educational programs will be offered at existing facilities, within Ross Lake NRA, and in the local communities. NPS staff will also participate in outreach to provide programming for organized groups and events outside Ross Lake NRA boundaries. Other non-personal services, such as websites and publications, provide information and educational messages that can be accessed remotely and inside Ross Lake NRA.

Interpretive programs and materials that offer visitors opportunities to learn about and find meaning in resources throughout Ross Lake NRA, along with information provided through both formal and informal ranger-led programs and activities, exhibits, and diverse media (such as video, publications, website, etc.) will have a moderate, long-term beneficial impact to visitor experience .

Curriculum-based programs will help educate students about the North Cascades ecosystem and history, resulting in a moderate beneficial impact to visitor experience as they generate curiosity, passion, and respect for park resources among students.

The NPS would continue to participate in community meetings, festivals and events, which would have a moderate long-term beneficial impact on visitor experience through the communication of Ross Lake NRA's themes and messages.

Visitor orientation and informal education would continue to be offered throughout Ross Lake NRA and off-site via waysides, signs, interpretive trails, multi-media and additional visitor contact stations, such as the Park and Forest Information Center and the Wilderness Information Center which will have a moderate beneficial impact on visitor experience. NPS information centers along the North Cascades Highway would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information.

The use of partnerships to help interpretive messages reach a broader audience through programs, additional interpretive displays, and distribution of interpretive material and media, including retail will have a moderate beneficial impact on visitor experience through expanded stewardship. Continued reliance on Seattle City Light (SCL) to provide interpretive information about the history, function, and value of the Skagit Hydroelectric Project would have a moderate impact on visitor experience through their engagement with the Skagit Tours Information Center, interpretive trails, boat tours, and the passenger ferry on Diablo Lake.

Newhalem

The maintenance of the existing North Cascades Visitor Center with exhibits and multi-media will have a moderate beneficial impact on visitor experience through opportunities to explore the essence of the North Cascades.

Environmental Learning Center

Maintenance of existing partnerships with North Cascades Institute in a range of education and interpretation programs offered at the Environmental Learning Center would have a moderate beneficial impact on visitor experience through interpretive rangers available to conduct programs and assist in program development.

Hozomeen

Continued maintenance of the partnership with British Columbia Parks and the interpretive shelter at International Point would have a moderate beneficial impact on visitor experience through regularly scheduled joint NPS/Canadian interpretative programs.

Cumulative Impacts
Current management would result in additional improvements to information, interpretation, education and outreach. The North Cascades Institute continues to provide additional educational programming that complements the information and programs available within Ross Lake NRA and in the surrounding region.

Opportunities for visitors to obtain information from a variety of outside local, state, and federal offices are somewhat limited. The closure of the Twisp ranger station and reduction of hours of other U.S. Forest Service ranger stations would limit outlets for visitors to obtain information outside Ross Lake NRA, notably on the east side. Maintenance of the information desk in Sedro-Woolley for year round information would continue to benefit visitors. Seattle City Light's visitor center would also continue to benefit visitors.

These facilities and information outlets would result in long-term moderate beneficial cumulative impacts on visitor enjoyment in Ross Lake NRA. Implementation of Alternative A would have a moderate, long-term beneficial impact on visitor enjoyment as it relates to opportunities to access useful information and orientation, to interact with interpretive and educational programs and media, and have meaningful experiences and interaction with resources in Ross Lake NRA.

Conclusion
Overall, the impacts of implementation of Alternative A, the No Action Alternative, would result in long-term moderate beneficial impacts to visitor experiences. Continuation of current programming and activities would generate curiosity, interest and respect for resources. NPS information centers Ross Lake NRA along the North Cascades Highway would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information.

Opportunities for visitors to obtain information from a variety of outside local, state, and federal offices would continue. These facilities and information outlets would result in long-term moderate beneficial cumulative impacts on visitor enjoyment in Ross Lake NRA. Implementation of Alternative A would have a cumulative moderate, long-term beneficial impact on visitor enjoyment as it relates to opportunities to access useful information and orientation, to interact with interpretive and educational programs and media, and have meaningful experiences and interaction with resources in Ross Lake NRA.

Access and Transportation

Under the No Action Alternative, access would not change from current levels and conditions. The number and capacity of roads, parking lots, and other visitor facilities would stay the same. However, visitation numbers are expected to increase proportionate to regional population growth. Consequently, some additional crowding and congestion could occur, especially on weekends during the peak summer season. Some of the more popular areas, such as Diablo Overlook, the North Cascades Visitor Center, and the Ross Dam Trailhead parking lot may see more crowding and congestion more frequently, resulting in minor to moderate adverse impacts.

During weekdays, the shoulder seasons, and in the wintertime, visitation would be low enough that crowding and congestion would not occur. Access to popular destinations would not be not be affected by overuse. Impacts would be beneficial and negligible.

Cumulative Impacts
Potential future actions could include general road, trail, or parking lot maintenance and various types of work on the North Cascades Highway by WSDOT. Although traffic delays may occur during road projects, there is no planned expansion of roadway capacity, and visitors would not likely alter their travel destinations. Occasional road or trail closures occur due to fire, avalanches, rockfalls, etc. Overall impacts to access due to these cumulative impacts would be negligible.

Conclusion
The impacts of continuing current management on access and transportation would result in adverse, minor to moderate impacts during the peak season and beneficial, but negligible impacts during non-peak times. Access would be most impacted during busy summer weekends at popular destinations.

Socioeconomic Environment

This analysis of the No Action Alternative compares impacts of current management to impacts of continued current management for the 15-20 year life of the plan. Continuing impacts are those that do not change over time from the current condition. New impacts are those that change over time.

Impacts to Demographics

The recreation area has an authorized employment level of 133 FTE (full-time equivalencies). If the recreation area were able to fund additional authorized FTEs, a slight change in the local population would occur. However, additional FTEs may not be funded.

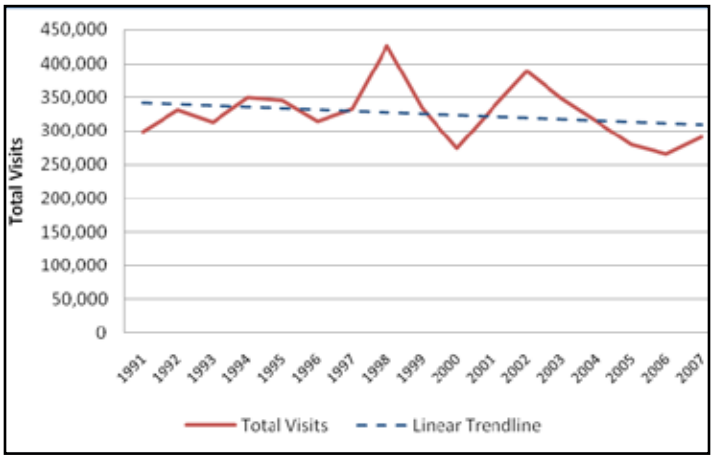
Beneficial impacts of population increases include increased demand for housing, which can cause an increase in home values and rental rates; and increased government tax revenues. Adverse socioeconomic impacts of population increases include potential for more crowding on roads and in public areas and greater demands on government services, including schools, sanitation, and water.

Population increases due to Alternative A would be minute compared with the total population of the influence area, which is about half a million people; therefore the impact would be negligible, long-term, and of indeterminate effect since there are both adverse and beneficial impacts to population growth. The local area has a much smaller population. The combined population of Sedro-Woolley, Concrete, Rockport, and Marblemount is approximately 12,000, with the majority of those living in Sedro-Woolley (US Census 2007). Even so, the addition of new employees and their families would represent a small but detectible number. The impact of hiring to the fully authorized level would be long-term, minor, and of indeterminate effect.

Economic Impacts to Influence Area

The North Cascades NPS Complex has $6.6 million funded for future projects in Fiscal Year 2009, including construction. Increases in National Park Service spending during construction of new facilities would result in short-term impacts; long-term impacts may also result from increases in yearly budgets for maintenance of any new facilities or wages for additional employees. Companies in the construction industry would see increased business if contracted to provide services. This in turn would strengthen construction employment and incomes,

Figure 6.1 Ross Lake National Recreation Area Visitation Statistics, 1991-2007



Source: NPS 2008.

meaning that perhaps instead of providing new jobs, workloads would expand to fill unused worker capacity. Construction workers frequenting the area would spend income on food and materials, increasing service business and government sales tax revenues. However, $6.6 million is small in comparison to the influence area's $7.7 billion in total personal income (Washington State 2006, BC Stats 2006). Construction spending would result in negligible, short-term, beneficial impacts to the influence area's economy, since this amount likely would be spread over the 20-year planning timeframe.

The North Cascades NPS Complex's spending would also have long-term effects. Employment of staff would keep jobs in the influence area and generate personal income that would be spent in the area. The staff spends a percentage of income on housing, food, entertainment, and other services, which would increase incomes in those industries, government tax revenues, and housing. However, new staff would put demand on local government services such as schools. NPS spending on operations at the recreation area also has a long-term positive impact on employment and incomes. Annual spending on NPS operations in 2009 was $7.1 million. The continued impact of this spending is moderate, long-term, and beneficial; however, since the No Action Alternative proposes no changes to annual operational spending, no new impacts would occur.

Since 1991, visitation levels to Ross Lake National Recreation Area have varied from year-to-year but have trended slightly downward. Under the No Action Alternative, visitation trends could remain stable or increase proportionate to regional population growth. Visitor spending patterns would not be expected to

change appreciably due to the No Action Alternative. However, visitation would continue to affect the economic environment by providing business sales, employment, incomes, and government tax revenues. See Figure 6.1.

Economic Impacts to Local Commercial Services and Neighboring Businesses

The communities of Sedro-Woolley, Marblemount, Rockport, Concrete, Hope, Mazama, and Winthrop have varying degrees of economic relationship to the national recreation area. These communities offer lodging, food, shopping, and other services to tourists; as well as housing and other needed services for staff. Under the No Action Alternative, stable visitation trends could result in some adverse to no economic change to local businesses. While present management policies and programs would continue, new construction spending would impact local businesses, especially those in the construction and related industries. The impact from construction spending would be short-term, minor, and beneficial to the local construction industry. The continuing impact from visitation and recreation area operations would be long-term, moderate to major, and beneficial to local businesses.

Impacts to Social Characteristics

Construction activities would affect traffic and congestion, as construction vehicles may be moving slowly and turning in and out of construction areas. There would be an increased level of traffic due to workers coming to the area and the presence of construction vehicles. Construction activities would result in a minor, short-term, adverse impact to traffic.

The presence of a national recreation area is a beneficial social impact to the influence area, allowing residents and visitors to experience beauty and solitude in the outdoors. This benefit would continue under the No Action Alternative and therefore would result in no new impact to the social character of the influence area.

Because the No Action Alternative would continue existing trends in the national recreation area, the current baseline socioeconomic effects to the influence area economy would continue. While there is a mix of beneficial and adverse impacts, the overall continuing impact to social characteristics in the influence area would be short- and long-term, moderate, and beneficial.

Cumulative Impacts

Projects that are not associated with the general management plan can interact with projects proposed in the GMP alternatives, resulting in a cumulative impact on the influence area's social and economic environment.

Continued WSDOT operations along the North Cascades Highway as well as continued SCL operations contribute to the economy by providing employment that results in incomes that are spent largely within the local economies. The continuing impacts of WSDOT and SCL operations would result in both short- and long-term, minor, beneficial impacts to the influence area's socioeconomic environment.

The 2008 Fire Management Plan will be implemented during the life of this general management plan. The plan proposes to continue with the current fire management budget, including worker payroll, which provides a stable input to the local economy. The economy is and would continue to be affected by this source of personal income that is spent on goods, services, housing, and food in the area. If fire suppression activities were to occur in the area, tourism could be affected due to road or trail closures, visibility impairment, and physical irritation from smoke; this could lead to decreased spending in local communities if visits are shortened or cancelled. However, closures that impact tourism could be offset by the presence of fire personnel during suppression operations, who would need food, supplies, and temporary housing. The Fire Management Plan will result in negligible long-term impacts to the influence area's socioeconomic environment, but impacts would be of indeterminate effect since the adverse and beneficial impacts could offset each other.

Implementation of the Mountain Lakes Fishery Management Plan would have a negligible long-term effect on the socioeconomics of the local and regional area due to changes in expenditures associated with sport fishing (NPS, 2005).

The narrowband radio implementation project, implementation of the Invasive Plant Management Plan, and the Seattle City Light Gorge project would strengthen employment and incomes in the influence area during implementation of these programs. The impacts would be short- and long-term, negligible to minor, and beneficial to the influence area's socioeconomic environment.

Impacts of implementation of Alternative A, in combination with the short- and long-term, minor, beneficial effects on the influence area described above, would result in both short-and long-term moderate, beneficial cumulative impacts to the influence area's social and economic environment. Alternative A would have a substantial contribution to the overall cumulative impact.

Conclusion
The No Action Alternative would have a continuing moderate, beneficial impact to the influence area socioeconomics, but adverse impacts on traffic. The impact would be greater in the immediate areas surrounding the recreation area. The impacts of the No Action Alternative and impacts of other projects would combine to have short- and long-term, moderate, beneficial cumulative impacts to the influence area's social and economic environment.

NPS Operations

Facilities and Sustainability

Most of the infrastructure and development for the entire North Cascades NPS Complex, including the majority of operational facilities, is located in Ross Lake NRA. While there are some facilities, including trails, campgrounds and parking areas, throughout Ross Lake NRA, major visitor and operational buildings and infrastructure, including headquarters, staff offices, and visitor centers, are concentrated in Sedro-Woolley, Marblemount, Newhalem, Diablo, and Hozomeen. Under the No Action Alternative, there would be no major changes to these facilities. The ongoing routine maintenance of these facilities would continue under current management and there would be little overall change to park operations. Incremental changes in green facility design, continued maintenance of hybrid vehicles of in Ross Lake NRA's vehicle fleet and implementation of photovoltaics at select facilities could all have minor long-term benefits to the sustainability of park operations.

Operational Efficiency

Maintenance of the current infrastructure in Alternative A would result in no change to the distribution of staff and work areas in Ross Lake NRA.

Staffing

Funding for staffing levels would continue to be inadequate to meet the increased resource management, interpretation, visitor protection and safety, maintenance and administrative needs of Ross Lake NRA, resulting in long-term minor adverse impacts to NRA operations. Implementation of Alternative A would incrementally result in minor adverse impacts on park operations.

Cumulative Impacts
Past and ongoing projects, including road, trail, and facility maintenance and repairs have had long-term moderate beneficial impacts on park operations. Aging facilities and infrastructure, including utilities and systems, would continue to be repaired, upgraded or replaced as needed on a case-by-case basis, subject to available funding. Over time, more sustainable and efficient facilities and infrastructure would replace those that are aging or no longer meet the needs of Ross Lake NRA, resulting in moderate, long-term benefits to the recreation area by reducing maintenance needs.

Conclusion
Under Alternative A, there would be little overall change to facilities for park operations, and sustainability of the facilities and operations would improve incrementally, resulting in minor long-term benefits. Staffing levels would continue to be inadequate to meet the future needs of NRA operation, resulting in minor, long-term adverse impacts to NRA operations. As more projects are completed that repair, upgrade, and replace aging facilities and infrastructure, and more sustainable systems are installed, maintenance needs would be reduced, resulting in moderate, long-term benefits. However, until those facilities are replaced, periodic and extensive maintenance would be required. The overall effects of implementing Alternative A on park operations would be long-term, minor and beneficial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are defined as moderate to major impacts that cannot be fully mitigated or avoided.

Under the No Action Alternative, there would be a negligible potential for unavoidable adverse impacts on natural resources because there would be little new development. There would be no unavoidable adverse impacts on cultural resources.

Some existing conditions have resulted in unavoidable adverse impacts. The location of park facilities, the Skagit Hydroelectric Project, and roads, including the North Cascades Highway, in floodplains, and

the maintenance of this infrastructure has resulted in adverse impacts to floodplains and riparian areas. Most of the infrastructure would remain in these locations. Additional unavoidable impacts would likely occur on vegetation and soils, primarily in the existing developed areas where visitor use is concentrated.

Relationship between Local Short-Term Uses and Long-Term Productivity

Under all of the alternatives, most of Ross Lake NRA would be protected in a natural state and would continue to be used by the public. Under all the alternatives, the National Park Service would continue to manage Ross Lake NRA to maintain ecological processes and native and biological communities, and to provide for appropriate recreational activities consistent with the preservation of natural and cultural resources.

Some previously disturbed areas would be rehabilitated to return these areas to productivity. Any actions the National Park Service takes in Ross Lake NRA would be taken with consideration to ensure that uses do not adversely affect the productivity of biotic communities. Under the No Action Alternative, there would be no appreciable loss of ecological productivity because there would be little new development. Existing developed areas and infrastructure within Ross Lake NRA, including the Skagit Hydroelectric Project and the North Cascades Highway, would remain.

Irreversible or Irretrievable Commitments of Resources

Irreversible commitments of resources are actions that result in the loss of resources that cannot be reversed. Irretrievable commitments are actions that result in the loss of resources, but only for a period of time.

No actions would be taken as a result of the No Action Alternative that would result in the consumption of nonrenewable resources that would preclude other uses for a period of time. Thus, there would be no irreversible or irretrievable commitments of resources in Ross Lake NRA by the National Park Service.

No actions would be taken that would result in irreversible or irretrievable effects on historic properties. NPS staff would continue to conduct appropriate cultural resource management in accordance with the *Secretary of the Interior's Standards and NPS policies*.

Impacts from Alternative B (Preferred Alternative)

Natural Resources

Air Resources

Air Quality

Air quality management under Alternative B and each of the other "action" alternatives would focus on sustaining air quality monitoring and pursuing additional research regarding atmospheric contaminants such as mercury and persistent organic pollutants. This alternative also seeks to reduce carbon dioxide and other greenhouse gas emissions whenever and wherever possible by (a) identifying and implementing emission mitigation actions; (b) adapting to current and future impacts of climate change; and (c) increasing climate change education and outreach efforts.

This alternative proposes redesignation of Ross Lake NRA to a Class I airshed, which would require legislation. If legislation were passed, then this redesignation would have limited practical effect given the intermingled geography of the North Cascades National Park and Ross Lake NRA. The airsheds are essentially comingled, so the Prevention of Significant Deterioration (PSD) provisions in the Clean Air Act, which afford the highest protection to the Class I airshed of North Cascades, would inadvertently afford a similar level of protection to Ross Lake NRA regardless of whether it remains as a Class II airshed or is converted to a Class I airshed. Therefore there would be a negligible beneficial impact to air quality and air quality related values such as visibility.

Air Pollution

This alternative proposes to sustain air quality monitoring for visibility, acid deposition, particulates, and criteria air pollutants (ozone, sulfur dioxide, lead, carbon monoxide, nitrogen oxides, and particulates). The NPS would also pursue research and monitoring to establish levels of atmospheric contaminants (such as mercury and persistent organic pollutants such as DDE [dichlorodiphenyldichloroethylene]) in Ross Lake NRA. These data would continue to provide quantitative and qualitative information on the status and trends of air quality within Ross Lake NRA and the surrounding area and help to inform and potentially improve air quality in the greater Puget

Sound area. In addition, this monitoring information could help to enhance visitor understanding of the trends in air quality, and could indirectly serve to enable protection by increasing public understanding of the impacts of air quality on park resources.

NPS management activities and visitor use activities would both result in releases of a wide spectrum of potential air pollutants. Primary sources of emissions would be from motor vehicles, wildfires, and campfires in campgrounds. The indirect impacts to air quality from these activities would generally be negligible to minor and short term. Impacts would generally be concentrated in high use areas, and along the SR20 corridor. Wildfires could occur anywhere, and vary in scale of area and release of pollutants, thus impacts to air pollution would range from negligible to major and adverse.

One specific proposal under Alternative B that would directly benefit air quality at the local scale is to require exclusive use of either four-stroke engines, or the new direct injection two-stroke engines (or equivalent lower emission technology), for all motorized vessels on all lakes in Ross Lake NRA by 2015. Compared to Alternative A, this management action would have locally beneficial impacts to air quality by reducing emissions of volatile organic carbon compounds (VOC's) and particulates. The impact would most likely be negligible because it would only affect motorboat use in the reservoirs, and the contribution to air pollution from motorboats is relatively negligible compared to automobile emission sources along the North Cascades Highway corridor.

Greenhouse Gas Emissions

Through various methods and means, the NPS would potentially reduce greenhouse gas (GHG) emissions associated with park operations by approximately 35 percent below 2006 levels by 2016 (National Park Service, 2009). These reductions would have a negligible beneficial effect in terms of directly reducing the adverse impacts of human-forced climate change. However, by seriously addressing climate change impacts associated with park operations and reducing emissions, North Cascades NPS Complex would reduce its local contribution to the global problem of climate change. In addition, by demonstrating leadership through action and education, the NPS may help mitigate climate change far beyond the park's boundaries.

Visibility (Regional Haze)

North Cascades is one of 30 western National Parks that have monitored visibility for at least 6 years that have stable or improving visibility on both the clear and hazy days. Whether this trend will continue is uncertain, given predicted increases in population throughout the Puget Trough and the likely increased levels of regional haze that would result (NPS, 2005). Increasing trends in atmospheric ozone concentration at North Cascades underscore the possibility of future cumulative impacts to haze, as elevated ozone concentration and visibility impairment are often related.

Alternative B calls for expanding coordination for fire management between the NPS, the U.S. Forest Service and if possible across the border into Canada. The goal is to foster increased natural (lightning-caused) wildfires to burn as opposed to being suppressed. The adverse impacts to air quality from fire would largely depend on both the size of the fire and the weather conditions that influence smoke production and dispersion conditions. A large fire could produce a lot of smoke, and stable air masses and temperature inversions could prevent the dispersion of smoke into the atmosphere, directly impacting local air quality and scenic visibility. Large natural wildfires would emit various pollutants including (but not limited to) particulate matter, nitrogen oxides, carbon monoxide, and myriad organic compounds. The duration of these impacts would generally be short term and depending on the duration and intensity of the wildfire event. The potential impacts to air quality from increased natural wildfires would range from negligible to major and adverse; the broad difference in scale of impacts represents the uncertainty associated with weather, prevailing winds, and many other factors that affect wildfire-related air pollution.

Cumulative Impacts
Cumulative impacts to air quality would be expected generally to be similar to current conditions because Alternative B management actions would not substantially increase or decrease air pollution related emissions.

Urban growth is projected to continue throughout the region, including the urban centers of Victoria, Vancouver, and Seattle whose emissions can be transported to the park under westerly wind patterns. In the reasonably foreseeable future the potential for deterioration of air quality appears to be high because of the location of the Complex relative to the large urban/industrial areas of the Puget Sound

lowlands. This proposed alternative would be similar to Alternative A in terms of the potential cumulative impacts to air quality because air quality in Ross Lake NRA is profoundly affected by regional and in some cases global pollutant emissions, and the NPS has very limited management control over those impacts. Second, transportation-related emissions from visitation are not expected to differ among the alternatives because visitation is not expected to vary among the alternatives at a level that would noticeably affect air resources.

One reasonably foreseeable management action that could have short term adverse impacts to air quality, but long-term benefits, is the proposed construction of a second tunnel from Gorge Dam to Gorge powerhouse. If constructed, this tunnel would reduce frictional losses to turbulence and capture enough additional energy to power 5,420 homes in Seattle, and thus offset fossil fuel emissions from coal-fired power plants.

Conclusion
Direct and indirect impacts to air quality under Alternative B would generally be similar to Alternative A, except for negligible beneficial impacts (reduced emissions) from prohibiting 2-stroke engines on Ross Lake. Cumulative impacts to air quality would generally be similar to Alternative A, because the air quality within Ross Lake NRA is predominately influenced by human activities outside of Ross Lake NRA, including regional and global sources of air pollution. These impacts would range from minor to possibly major, as there is a great deal of uncertainty over the planning horizon as to how air resource –related impacts will evolve in the face of rapidly changing technologies and increased awareness of the need to take aggressive measures to reduce fossil fuel consumption and human-caused sources of greenhouse gas emissions.

The management actions proposed under Alternative B would have short-term negligible to short-term major adverse impacts, primarily from wildfires, on air resources. There would be no impairment of air resources within Ross Lake NRA as a result of implementing this alternative.

Natural Soundscapes

Under the preferred alternative, the soundscape monitoring program would expand to include a complete inventory of all acoustic zones within Ross Lake NRA. The NPS would use this data to actively manage soundscapes by identifying unacceptable sounds and sound levels, and taking actions that might include increased education and interpretation about protecting natural sounds and enforcement of existing noise standards. These actions would result in a beneficial impact to the natural soundscape. Noise disturbance along the highway and in the air would still occur, however, resulting in minor to moderate adverse impacts.

Most actions that would be taken on the reservoirs and the Skagit River would have a beneficial impact on the natural soundscape by reducing noise caused by motorized boats and seaplanes. Actions on the reservoirs would include restrictions on motorboat use, establishing no wake zones or speed, size, and/or horsepower limits, and requirement of 4-stroke engines. ~~Restricting seaplane landings to the frontcountry zone only and establishing permit requirements~~ Implementing seaplane noise abatement procedures and educating pilots about these procedures will also have beneficial impacts. However, the addition of boat transportation services, a second water taxi and/or a scheduled boat ferry around the lake, and additional boat rentals will have adverse impacts ranging from minor to moderate. On the Skagit River, ~~a ban on~~ prohibiting motorboats within Ross Lake NRA will have a beneficial impact to the natural soundscape by reducing motorized noise on the river.

Other actions that would benefit the natural soundscape include developing an air tour management plan, which would involve establishing use levels and designating tour locations; developing alternative transportation solutions, including shuttles, which could reduce highway traffic and noise; providing outreach and education about protection of natural sounds to motorcyclists and other drivers; limiting the use of explosives for avalanche control along the North Cascades Highway; and closure of the portion of Thornton Lakes Road that is in wilderness. These actions may help to counteract the impacts that growing visitation could have that would otherwise impact the natural soundscape.

Actions that would have an adverse impact on the natural soundscape generally involve expansion of activities or facilities. By providing a broader range of visitor activities such as day use trails and water recreation along the highway corridor and additional overnight experiences, natural soundscapes could be adversely impacted in localized areas by increasing and concentrating use. In addition, expanding visitor facilities or adaptively reusing current buildings could result in short-term adverse impacts to soundscapes from construction activities. Expanding or adding

facilities could also result in long-term impacts to soundscapes. The expansion of parking lots such as the Ross Dam Trailhead parking would not only allow for an increase in visitors, but an increase in the vehicles, both numbers and types (such as passenger vehicles, RVs, and oversized vehicles) that could result in greater impacts to soundscapes from increased noise. In addition, expanded or new construction could result in a new or larger noise footprint to an area, resulting in additional noise from increased people using a facility or the associated infrastructure such as HVAC systems and potential minor to moderate long-term impacts.

Likewise, the potential expansion of camping facilities at Newhalem and Goodell group sites could increase visitation in these areas and impact the surrounding natural soundscape. Conversely, reconfiguring camping at Hozomeen might improve the natural soundscape by providing a more traditional camping experience. The continued wintertime use of the closed portion of the North Cascades Highway by snowmobiles will continue to adversely impact the natural soundscape. Taken together, these actions would be localized and only a small increment above the natural ambient sound levels for any of the areas, so impacts would be minor.

Cumulative Impacts
Cumulative impacts would be similar to those identified in Alternative A, except that impacts on natural soundscapes due to ongoing public automobile traffic, motorboat use, and aircraft use may be reduced. Impacts from NPS administrative uses, Seattle City Light, and Ross Lake Resort would be the same as Alternative A. Depending on the action and time of year, these actions could result in minor to moderate adverse impacts. In combination with the Preferred Alternative, these cumulative impacts would result in minor to moderate impacts on the natural soundscape; however, many actions would be beneficial and would help to preserve the natural soundscape.

Conclusion
Under Alternative B, many actions would be taken that would result in further protection or improvement in the natural soundscape compared to current conditions. Impacts would vary based on the time of year and location and would range from minor to moderate. Minor impacts would occur along the highway during the wintertime and as a result of expansion of activities and facilities. Minor to moderate impacts would occur during peak use times along the highway and on the reservoirs due to an increase in boating opportunities. Cumulative impacts would range from minor to moderate. Implementation of this alternative would not result in impairment.

Water Resources

Water Quality

Similar to Alternative A, threats to water quality in Ross Lake NRA under Alternative B would continue to include non-point source runoff from various developed and impermeable surfaces including roads, parking lots, and facilities. Diffuse pollution from sources such as these typically includes various heavy metals (such as zinc, lead), organic matter, excess nutrients, sediment, oils, and hydrocarbons (Novotny and Olem, 1994). Under Alternative B, the NPS would seek ways to upgrade or mitigate effluent from point and non-point source threats to water quality.

In general, this alternative proposes very little expansion of the park infrastructure. Instead, certain areas have been targeted for fixing deficiencies such as inadequate parking and facilities that may not be defensible from future severe weather events. Taken together, this alternative includes a modest net expansion of up to 4.5 acres of impermeable surfaces that could adversely affect water quality by collecting and transporting pollutants into the environment, including surface waters and groundwater (Table 6.1). This 4.5 acre estimate does not include impermeable surfaces that could be reduced if severe weather events prompt facility closure or relocation, because the possibility of relocation is uncertain at this time. At present there are approximately 1,115 acres of impermeable surfaces, so this action would increase the total acreage of impermeable surfaces by less than half of one percent.

Some facilities, such as the upper 1.25 mile stretch of Thornton Road, would be closed and rehabilitated. Compared with existing conditions, adverse impacts to water quality from increased non-point source runoff would have minor, long-term adverse impacts to surface water quality in areas proposed for expansion. In other areas, such as the upper Thornton Lakes road, impacts to water quality would be long-term, minor, and beneficial because shortening the road (which is currently in designated wilderness) would reduce diffuse pollutant runoff.

Erosion control would continue at priority areas on Ross and Diablo reservoirs. This management action would continue to result in long-term, negligible to minor beneficial impacts to water quality by reducing sediment input. Bank stabilization along the reservoir

shorelines would also indirectly benefit water quality by helping to promote growth of riparian vegetation.

Hydrologic Processes

The hydrologic processes of the Skagit River watershed within Ross Lake NRA would generally be minimally affected by continued management activities proposed for Alternative B. As with Alternative A, the scale of potential management actions would simply be too small to have any measurable effect on the broad patterns and processes of weather, climate and precipitation that substantially govern the hydrology and hydrologic processes of the Skagit River Watershed in Ross Lake NRA.

In certain locations, such as Goodell and Colonial Creek Campgrounds, development on debris cones and alluvial fans has prompted the NPS to implement erosion control measures (bank hardening, site-specific dredging) to protect these facilities during flooding. These actions, which have locally adverse impacts on stream channel hydrology, are discussed in the following section on hydraulic processes.

Hydraulic processes

Hydraulic processes are an impact topic that includes various dynamic physical processes and conditions that affect the surface and subsurface flow of water in the environment. The hydraulic processes of surface streams, creeks and the Skagit River could be affected to varying degrees by the management actions proposed for Alternative B. Broadly speaking, management actions intended to reduce erosion would continue to adversely impact the hydraulic processes of running waters to varying degrees as described in the following sections.

As with Alternative A, the NPS would continue to maintain and repair the transportation infrastructure, including roads, bridges, culverts, trails and transportation facilities. However, one substantive difference would involve a more holistic emphasis on responding to severe flood damage by placing a higher priority on relocating facilities (such as roads, structures, recreational sites) as opposed to protecting facilities via bank hardening and channelization. If relocation is not an option, the NPS would follow the Washington Department of Fish and Wildlife's "integrated streambank protection guidelines" whenever possible, and avoid habitat-harmful

Table 6.1 Approximate Area of Impermeable Surfaces for Recreational Use and Park Operations

Facility Name	Potential Management Action	Approximate Area of Additional Disturbance (Acres)
Newhalem Creek Campground drive in campsites	Expansion of drive in camping capacity	2 acre increase (additional loop roads and drive-in parking)
Upper and Lower Goodell Group Camps	Possible expansion of group camping sites	1 acre increase (possible road lengthening and drive in parking)
RV sites for volunteer staff at Newhalem, Colonial and Hozomeen Campgrounds	Expand and upgrade the RV sites at Newhalem, Colonial and Hozomeen for ~~V~~volunteer ~~S~~staff	</= 1 acre increase
North Cascades Environmental Learning Center	Additional outdoor learning centers and new campsites at Buster Brown and Diablo Gorge	</=1 acre increase
Thornton Lake Road	Closure of Thornton Lake Road at Wilderness ~~B~~boundary	2 acre decrease (14' wide roadbed would be foreshortened by 1.25 mile and rehabilitated. Several perennial creeks cross under this road section)
Ross Dam Trailhead	Proposed expansion of Ross Dam trailhead	1.5 acre increase in parking capacity
Net impermeable surface expansion		4.5 acres

This ~~T~~table focuses on proposals of known scope, and does not include estimates of impermeable surfaces that could be reduced if severe weather events prompt facility closure or relocation.

practices such as bank armoring with rip-rap (WDFW, 2003). Bank protection techniques would include rock barbs, engineered log jams, and bioengineering; each measure would be tailored to the site. When possible, the NPS would seek to address the underlying causes of damage (such as undersized culverts) and seek improved engineering solutions to reduce the risk of further damage to facilities and the environment. Areas that would most likely be adversely affected by bank protection measures include Goodell Creek Campground, Colonial Creek Campground, and various stream crossings at Rhode Creek, Sourdough Creek, Damnation Creek, Thornton Creek and Pyramid Creek.

Colonial Creek Campground is constructed on the debris cones of Colonial and Rhode Creeks. Periodic debris flows from these creeks, especially Rhode Creek, block entrance roads and damage campground roads and facilities. Goodell Creek Campground is situated on an alluvial fan at the confluence of Goodell Creek and the Skagit River. The alluvial fan is aggrading, and the creek is now flooding certain campsites.

In response to these flood risks, management Alternative B proposes to consider facility relocation first before attempting to defend facilities via management actions such as bank stabilization and channelization. Under this scenario, portions of Goodell Creek and Colonial Creek campground could be closed, and/or a longer bridge across Goodell Creek could be constructed to enable better alluvial transport. These actions would have negligible to moderate benefits to stream channel hydraulic processes because the channels would be less adversely affected by channel stabilization and confinement. If closure and relocation is not feasible, then NPS would make repairs in a manner that seeks to minimize adverse impacts to natural hydraulic processes. These actions would continue to cause minor to moderate adverse impacts to the natural hydraulic processes, and could possibly encourage further problems in the future by encouraging a "negative feedback" cycle of head cut formation and further channel instability. These unintended consequences could require further management action in the future (Bolton and Shellberg, 2001). Should such action require the dredging of lacustrine wetlands, a Wetland Statement of Findings would be considered at that time.

Alternative B calls for continued erosion control measures in response to wave induced erosion on Ross and Diablo reservoirs. Erosion control would prevent further shoreline loss, stabilize campsites and facilities such as docks, and encourage growth of shoreline vegetation. However, it would cause neither beneficial nor adverse impacts to natural hydraulic processes because wave-induced erosion of soils and landforms is an artificial consequence of reservoir inundation.

The North Cascades Highway would continue to adversely influence hydraulic processes in the vicinity of running waters along its alignment within Ross Lake NRA. Alternative B commits the NPS to working more proactively with WSDOT to encourage habitat-friendly streambank protection measures and other habitat-friendly techniques whenever possible. However, WSDOT has the legal jurisdiction and authority to operate and maintain SR20, so the NPS's ability to proactively influence the manner in which WSDOT responds to flood damage would remain limited. In most circumstances, it is assumed that due to limitations on funding and higher priorities elsewhere in the state, WSDOT would continue to respond in a reactive (and most likely emergency) capacity to harden and dredge stream channels in the vicinity of bridge crossings and culverts. It is also assumed that WSDOT would also seek to dredge or otherwise modify the streambed to ensure waters continue to flow under—not around—bridges. These actions would continue to result in localized, long-term adverse impacts to hydraulic processes of running waters in Ross Lake NRA.

Cumulative Impacts

Within Washington State, between 50 and 90 percent of riparian habitat has been lost or extensively modified by human activities (WDFW, 2003). The cumulative impacts to the Skagit River riparian zone within Ross Lake NRA generally reflect the statewide trend of riparian degradation, but mainly via management actions other than those taken by the NPS. Alternative B would result in some expansion of facilities and cause varying degrees of cumulative adverse impacts to water quality and hydraulic processes. However, these impacts would generally be minor to moderate, and significantly smaller in magnitude when compared with the other cumulative and connected actions that are adversely affecting water resources within Ross Lake NRA.

Similar to Alternative A, the Skagit and Newhalem Creek Hydroelectric Projects would continue to cause cumulative adverse impacts to the quantity and quality of water resources within Ross Lake NRA. The reservoirs would continue to modify the hydrology of the Skagit River, reducing peak flows, increasing

base flows, and modifying the physical and chemical characteristics of the Skagit River.

Water quality impacts would continue to be associated with point and non-point source pollutants from the hydroelectric facilities. Point source pollutants would include contributions from the wastewater treatment plants in Newhalem and Diablo and from effluents inadvertently discharged from the hydroelectric facilities. These point source effluents would continue to release increased levels of nutrients, oils and greases, and trace levels of various toxins including metals. The reservoirs would continue to release water that has been thermally altered by dam storage, and physio-chemically modified by loss of suspended sediment. When added to the past releases of various pollutants, including highly toxic materials such as PCB's, the cumulative impacts to water quality and quantity and timing of flows would be long-term, moderate to major and adverse.

Seattle City Light proposes to drill a second tunnel from Gorge Dam to Gorge powerhouse to capture energy that is currently being lost to turbulence. If this project proceeds, it could have temporary adverse impacts to water quality in the Skagit River during and possibly following construction. However, data are currently lacking to determine the degree to which this project could adversely and cumulatively affect water resources within Ross Lake NRA.

Wet and dry atmospheric deposition of toxins including Persistent Organic Pollutants (POP's) such as PCB, DDT, and mercury would presumably continue to settle on the landscape of Ross Lake NRA (Moran et al., 2007). These pollutants enter the atmosphere as volatile contaminants and can be transported for long distances, then deposited through condensation and precipitation, with disproportionate amounts falling as snow. The highest amounts of contaminated snowfall are often deposited at high elevations in glaciers and snowfields. Meltwater washes these pollutants into mountain lakes and streams, where they can become absorbed and accumulated in the food chain. This process has been well documented in the Canadian Rockies where researchers there found that contaminant levels in fish tissues are well above the residue guidelines for piscivorous wildlife such as otters, bald eagles and ospreys (Blais et al 1998).

Certain tributaries to the Skagit, including Ruby Creek and Thunder Creek, have experienced fairly extensive mining activity since the late 1800's. Recreational placer mining, in some cases at nearly an industrial scale, still occurs in Ruby Creek upstream and outside of Ross Lake NRA. Within Ross Lake NRA, monitoring data indicate benthic macroinvertebrate communities are experiencing adverse impacts from the mining runoff (Rawhouser, 2008). Other aquatic species may also be adversely affected, but there are no monitoring data. The lingering past impacts of mining, coupled with the present impacts of continued mining on Ruby Creek, would continue to cumulatively adversely affect the surface water resources within Ross Lake NRA, however, there are no data to quantify the magnitude of adverse impact to surface waters associated with past mining or current mining activities.

The high elevation snowpack sustains most of the running waters within Ross Lake NRA during the summer dry season. Climate change research indicates the volume of the April 1st snowpack in the low- and mid-elevations of the Cascades has a high sensitivity to surface temperatures. Projected warming in the future will substantially diminish springtime snowpack and cause large changes in the volume of stream flows. Peak flows are expected to shift from spring dominated flows caused by snowmelt, to fall and winter flows associated with increases in extreme precipitation during those times, including less snow at lower elevations (University of Washington, Climate Impacts Group. 2009).

Floodplains and wetlands within Ross Lake NRA have been cumulatively impacted by past construction of roads and other facilities. As with Alternative A, past, present, and future activities may include further bank armoring, replacement of culverts and bridges, and various channel modifications to protect facilities and bridges. These actions will continue to cause long-term, minor to moderate adverse impacts on hydrologic systems by affecting streambed composition, sediment transport, natural stream dynamics, flow regimes, lateral water infiltration, and other hydrologic components and processes.

Conclusion

Impacts to water quality would range from negligible to minor and adverse. Impacts would be associated with NPS operations and maintenance related activities, including road and facility maintenance, and boating operations. There would also be impacts stemming from the industrial uses associated with Seattle City Light, with motor vehicle use, and with maintenance of the SR20 corridor. There would be negligible impacts to hydrology. Impacts to hydraulics would be localized, long-term, adverse and of

negligible to moderate intensity. These impacts would be primarily associated with local manipulation of hydraulics to protect roads, campground and facilities from erosion. Cumulative impacts to water resources would be negligible to moderate, long-term and adverse because there would be no substantive changes to existing park operations or operations associated with the Skagit River Hydroelectric Project. Moreover, the impacts from climate change on water resources (water quantity, quality and hydrology) are expected to gradually increase within the 15-20 lifespan of this plan, but then accelerate rapidly beyond the planning horizon (University of Washington Climate Impacts Group, 2009).

Direct, indirect and cumulative adverse impacts to water resources would remain negligible to moderate because there would be no substantial changes to current management. Therefore, there would be no impairment of water resources under Alternative B.

Geologic Resources, including Soils

Alternative B proposes various management actions that would affect geologic resources and soils. NPS management actions that would adversely impact surficial geology and soils would broadly include:

- maintenance of trails and associated facilities, including minor relocations
- flood-damage repairs to facilities and the transportation network
- construction of several new trails in various locations, mainly in frontcountry areas
- expansion and/or relocation of new trailhead facilities (such as expansion Ross Dam Trailhead)

Various best management practices would be employed to minimize soil erosion during construction and maintenance. New or relocated facilities would be sited when possible in areas that have been previously disturbed and/or are not located near geologically unstable areas.

Recreational activities would continue to cause impacts to soils as a result of social trail formation and expansion. These impacts would occur in a relatively small portion of Ross Lake NRA, primarily in areas of high recreational use such as popular frontcountry areas including trailheads, sport climbing areas, and campgrounds. Similar impacts would also continue to occur in backcountry camps and along informal trails such as mountaineering routes. These adverse impacts to soils would be long-term, negligible to minor and adverse.

Road management practices would continue to adversely impact surficial geologic processes and soils in the vicinity of road prisms, including NPS-managed roads and the SR20 corridor. Facility relocation and expansion would cause adverse impacts to geologic resources and soils in frontcountry, Skagit River, and the hydroelectric management zones. Expansion of Ross Dam trailhead would require blasting and removal of several thousand cubic yards of soil and bedrock over an approximately 2-acre area. The protection of some sites in the north loop of Colonial Creek Campground represent a long-term management issue due to the potential for flooding and the need to manipulate geology to protect those sites long-term. The adverse impacts to geologic resources and soils would be long-term, minor to moderate in scale.

Alternative B proposes some actions that when compared to existing conditions would have long-term negligible to minor beneficial impacts to soils, and indirect benefits to surficial geologic resources. For example, in certain areas such as Goodell Creek Campground and Colonial Creek Campground, roads could be realigned and/or foreshortened in response to flooding or geologically unstable areas. Erosion control measures along Ross and Diablo reservoir shorelines would continue to protect the soils along the shorelines from motor boat wakes and wind-driven waves. Site rehabilitation in areas impacted by recreation would help to promote soil-forming processes.

Cumulative Impacts

A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect geologic resources and soils in Ross Lake NRA. The soils and geologic resources of Ross Lake NRA have been variously modified over the past century by human activities such as mining, dam construction, highway and railroad construction, and construction of various NPS facilities. The Skagit River Hydroelectric Project has permanently flooded approximately 13,000 acres, and additional approximately 1,000 acres have been converted to roads and various facilities. Taken together, these permanent modifications account for approximately 12 percent of the natural landscape of Ross Lake NRA. This estimate does not include previous manipulations to the landscape caused by mining, logging, and fire suppression activities, as quantifiable estimates for these past activities are difficult to compile. The cumulative effects of these activities have been moderate to major, long-term and adverse.

Seattle City Light has significantly and irreversibly modified the surficial geology within Ross Lake NRA to construct and maintain the Skagit River Hydroelectric project. Impacts include approximately one acre of lakeshore lost to erosion annually, sedimentation of reservoir, changes to the natural hydrologic period, and the cut-off of gravel and large woody debris to river. While no new above ground facilities are anticipated within the life of this plan, SCL does propose to construct an approximately 2-mile long tunnel from Gorge Dam to Newhalem powerhouse. Most of the construction-related impacts to surficial geologic resources would be limited to the immediate vicinity of the tunnel portals; however, this project has yet to be approved.

Regardless of the proposed tunnel, SCL would continue to operate and maintain the Skagit and Newhalem hydroelectric projects and cause adverse cumulative impacts to geologic resources. Operation and maintenance activities could include site-specific stabilization of steep, unstable slopes and related actions intended to mitigate the risks of rockfall. Additional activities are the maintenance of road network in Ross Lake NRA to microwave sites, powerline and towers, and Newhalem Creek hydroelectric station. Some of these actions would occur on NPS lands within Ross Lake NRA, causing minor to moderate, adverse, cumulative impacts to surficial geologic resources and soils.

The surficial geology of Ross Lake NRA was significantly and adversely modified to construct the North Cascades Highway. The maintenance of the North Cascades Highway, SCL infrastructure, and Colonial Creek Campground will continue to have long-term moderate adverse impacts to Skagit River and tributaries. The Washington Department of Transportation would continue to cause minor to moderate adverse impacts to surficial geologic resources in certain areas in order to safely maintain the highway. These adverse impacts would be associated with routine maintenance and repairs along the highway, and periodically, more intensive repairs associated with flood damage, rockfall and avalanches.

Other human-caused activities have cumulatively and adversely affected soils and geologic resources in less-perceptible but nonetheless substantial ways. Atmospheric deposition of various pollutants from regional and global sources has affected the natural chemical composition of soil such as by reducing soil pH and increasing nitrogen deposition. These impacts are likely to increase given population growth estimates both regionally and globally. The adverse cumulative impacts to soils are poorly understood as data are limited. Additionally, suppression of fires creates situations where hot burn will have serious impacts to soils and hillslope stability.

Global climate change may increase the severity and frequency of storms, and trigger landslides, increase rockfall, and increase soil erosion in unstable areas. Although few statistically significant changes in extreme precipitation have been observed to date in the area, regional climate model simulations generally predict increases in extreme high precipitation over the next half-century, particularly around Puget Sound. Facility adaptations required to respond to these events, would have long-term, major and adverse impacts to soils and geologic resources in the future.

Conclusion
Direct and indirect impacts to soils and geologic resources from recreation-related activities would be negligible to minor, long-term and adverse. Impacts from management of facilities and the transportation infrastructure would be minor to moderate, long-term and adverse. Cumulative impacts from past and reasonably foreseeable future management actions associated with hydroelectric projects and the North Cascades Highway primarily beyond the scope of NPS jurisdiction would be moderate to major and long-term.

Adverse impacts associated with the GMP would range from negligible to moderate in intensity. There would be no major, long-term adverse impacts from NPS management actions. There would be no impairment of soils and geologic resources as a result of implementing this alternative.

Vegetation (including special status species)

Alternative B proposes to continue to maintain the existing infrastructure with the following limited facility expansions and improvements that may adversely affect vegetation: (a) replacement of the Hozomeen Ranger Station, (b) construction of east and west entrance portals along SR20, (c) ~~widening of the single-lane bridge across the Skagit River in Newhalem, and (d)~~ expansion of the Ross Dam Trailhead. Vegetation in most of these areas generally has been previously disturbed by development, so impacts from maintenance and limited new facility construction would be minor to moderate, generally long-term, and adverse.

New trails proposed in Alternative B would result in localized removal of vegetation along new trail alignments, however, some existing trails could be

closed and mitigation measures include avoiding sensitive vegetation and avoiding removal of mature trees. Overall, trail construction from Alternative B would result in long-term minor impacts to vegetation.

If Colonial and/or Goodell Creek Campgrounds are damaged by flooding, then affected portions of those campgrounds would be abandoned and rehabilitated. The Thornton Lake Road would be closed at the wilderness boundary and converted to a trail. Taken together, management of the transportation and facility infrastructure would have negligible adverse impacts on vegetation. In some areas, there would be long-term minor benefits to vegetation by closing facilities and restoring the abandoned areas.

Vegetation management actions proposed for Alternative B would emphasize more holistic approaches to ranking and prioritizing areas for restoration, including areas for control of invasive, non-native plants. In developed areas, such as campgrounds, the hazard tree management program would continue to have localized adverse impacts on vegetation, but these impacts would be localized to campgrounds and facilities.

Fire management activities would involve a mixture of strategies for managing and responding to wildfires. Allowing natural fires to occur will help to restore or maintain ecosystem processes, resulting in beneficial impacts to vegetation. Suppression of lightning caused fires would cause adverse impacts including direct harm from fire line construction, and indirect impacts caused by disrupting the natural processes and functions of fire on forest development and regeneration. Fuel build up could enhance the intensity of future fires, and lead to larger, more intense fires and stand replacing events. These impacts would generally be located in proximity to the international border and in developed areas where fire suppression takes priority. The intensity and severity of adverse impacts from fire suppression could range from minor to moderate or even major during the lifespan of the plan.

Various recreation and visitor uses could adversely affect vegetation via direct harm such as trampling and social trail development, and via indirect means such as importation and spread of invasive, non-native plants, or human caused wildfire. The NPS would continue to mitigate the adverse impacts of recreation on vegetation through education, permit systems, and enforcement of regulations. Certain emerging activities, such as sport climbing and bouldering, would be limited to existing areas and not allowed to expand into new or undisturbed locations. Taken together, recreational impacts to vegetation would be localized in scale, adverse, and negligible to minor.

Special Status Species

Alternative B may affect, but would not adversely affect special status plant species for several reasons. Prior to conducting and work involving potential impacts to vegetation (such as new facility construction, minor relocation of trails, fire management operations) plant surveys would be conducted to locate any special status species that may be found in the area. If species were identified, then projects would be modified to avoid harm to those species.

Cumulative Impacts

Past and ongoing development within Ross Lake NRA has cumulatively and adversely affected vegetation in a variety of ways. The Skagit River Hydroelectric Project has permanently inundated approximately 13,000 acres of low elevation forest and riparian areas, and disrupted various natural ecological processes such as wildfire. Other human activities such as logging, mining, and development have impacted thousands more acres within Ross Lake NRA. The establishment of North Cascades NPS Complex prohibited many of these past adverse and cumulative impacts from continuing, but many of the lingering adverse impacts remain and are readily apparent across the landscape.

Outside the boundaries of the North Cascades Complex, various threats to vegetation continue to persist and expand. These threats include continued logging, forest conversion for development, habitat fragmentation, fire suppression and various other human uses of the land that are individually and cumulatively harmful to vegetation, and the ecosystem functions that enable vegetation to persist. Reasonably foreseeable threats include continued fire suppression, human caused wildfires, spread of forest pathogens and invasive, non-native plants, and global climate change. Human-forced climate change has the potential to exacerbate various cumulative impacts to vegetation by reducing soil moisture availability during the growing season, increasing the risk of severe storms, promoting conditions for forest insects and disease, and enhancing the risk of wildfire. The degree to which these external, adverse impacts may cumulatively threaten vegetation within the boundaries of Ross Lake NRA is uncertain, but likely to be adverse and to increase in severity in the future.

When considered against the backdrop of both internal and external threats to vegetation, Alternative

B proposes few additional impacts to vegetation that would cumulatively contribute to the past adverse impacts that have occurred, or may occur within the timeframe of this plan. In some instances, the past impacts to vegetation would be actively restored, thereby expediting the recovery of natural vegetation, albeit in very localized areas. Taken together, the cumulative impacts of Alternative B on vegetation posed by the management actions in this plan would be negligible to minor and both beneficial and adverse. By any measure, they would be very small compared to the widespread cumulative impacts that are occurring outside the boundaries of Ross Lake NRA.

Conclusion
Alternative B would have negligible to moderate, adverse impacts on vegetation in regard to management of the transportation and administrative infrastructure. Recreation-related impacts would be adverse and negligible to minor. Suppression of natural wildfires would have long-term, adverse and moderate to major impacts on vegetation. This alternative may affect, but would not adversely affect special status plant species. Cumulative impacts to vegetation would be adverse for areas affected by continued development and visitor use, and beneficial for areas that would be restored and revegetated. Impacts to vegetation would generally be negligible to moderate. There would be no impairment of vegetation resources.

Fish and Wildlife (including special status species)

Impacts from Hunting and Fishing
Hunting and fishing would continue at levels similar to that of Alternative A. Impacts to game populations would be negligible to minor and adverse. Impacts to fish populations from fishing-related activities would generally be negligible to minor and adverse.

Human Disturbance

Various forms of human disturbance would continue to occur under Alternative B. Recreation and visitor use would continue to have localized adverse impacts on various species of wildlife, primarily as a result of human presence in certain areas frequented by wildlife. Much of Ross Lake NRA, however, is un-trailed backcountry or wilderness. Wildlife in these areas would be less adversely affected compared to areas readily used by visitors. However, in certain high use areas, certain wildlife would be habituated to human presence and this would continue to be a long–term negligible to minor adverse impact.

Along the SR20 corridor in particular, noise from vehicles, especially extremely loud vehicles such as motorcycles, would continue to cause disturbance to wildlife, prompting avoidance of certain areas and other behavioral effects such as flushing (such as noise can flush birds from nests). In contrast to current management, the NPS would seek to reduce noise from motor vehicles by taking action to enforce existing motor vehicle noise standards and educate visitors about the impacts of noise.

Some wildlife would continue to be harmed or killed by motor vehicles traveling along the highway corridor, although the quantity of wildlife potentially harmed would likely be minor (R. Kuntz, NPS Wildlife Biologist, pers. comm.). There is no indication that overall visitor use of the area would differ compared to Alternative A, so impacts from motor vehicle related activities would generally be negligible to minor adverse and long-term. Enforcement of Washington State motor vehicle noise standards would have a negligible to minor and beneficial impact on wildlife if it reduced the chronic noise-related impacts along the highway corridor.

Under Alternative B, the NPS would provide additional food storage options, such as food storage canisters or boxes, in order to prevent bears and other wildlife from gaining access to human food~~becoming habituated~~. Expansion of existing provisions for backcountry food storage would afford minor, beneficial impacts to wildlife, especially species such as bears.

Park Operations

The goal behind this alternative is to afford protection to park resources. To do this, the NPS would guard against habitat fragmentation by consolidating development and limiting new facility construction in undeveloped areas. Most facilities in Ross Lake NRA are located in frontcountry areas already affected, to varying degrees by habitat fragmentation, so this would likely have a negligible to minor beneficial impact to wildlife.

This Alternative would seek to improve interagency and trans-border coordination with respect to use of wildland fire. Increased coordination could result in minor to moderate, beneficial impacts to certain wildlife species whose habitat depends upon periodic wildland fire. Other species would potentially benefit from reduced impacts of fire suppression-related activities.

The NPS would seek to further protect and enhance spawning habitat on the Skagit River and its tributaries, including maintaining side channels for breeding and rearing habitat. The NPS would also coordinate more aggressively with WSDOT to mitigate emergency road-related repairs and replace use of rip-rap with habitat friendly erosion control techniques. These activities would have an indirect, beneficial impact to certain fish and riparian-dependent wildlife species, primarily along the Skagit River and its various tributary junctions.

Special Status Species

Impacts to special status fish and wildlife species would be similar to Alternative A, although perhaps slightly less severe in magnitude given the emphasis on proactively managing certain activities such as reducing the impacts to the soundscape, consolidating development in previously disturbed areas, more stringently managing backcountry food storage, and proactively coordinating with Washington State Department of Transportation to mitigate impacts of road management activities on the Skagit River.

Special status species would continue to benefit from protection of largely unfragmented core habitat provided by the North Cascades NPS Complex. In addition, special status species such as grizzly bear would realize additional benefits from the NPS establishing quantifiable targets for maintaining core area and from adopting more formal policies for maintaining core area habitat. These policies could also stimulate action among other agencies and partners in the greater North Cascades ecosystem, resulting in additional long-term benefits.

Cumulative Impacts

No new facilities, roads, major trail construction, or related changes in park infrastructure or operations are anticipated under Alternative B. In some instances, however, facilities could be closed and consolidated. This would result in a negligible cumulative benefit to fish and wildlife because the scale of beneficial effect would be very limited.

Similar to Alternative A, the impacts of human-forced climate change would be adverse but of uncertain magnitude.

Similar to Alternative A, the impacts of human development and associated habitat loss and modification outside the boundary of Ross Lake NRA would have adverse effects on populations of terrestrial species with large home ranges, anadromous aquatic species such as salmon, and certain migratory bird species that rely on unprotected habitat outside the park boundary. The degree of impact to these species would be uncertain to predict as it would be substantially related to the relative success—or failure—of various large scale efforts currently underway to protect and restore the greater North Cascades ecosystem.

Conclusion

Impacts to wildlife from hunting and fishing would continue to cause negligible to minor impacts to fish and wildlife. Recreational use and various park operations would continue cause negligible to minor long-term impacts to wildlife. Facility closure and/or relocation would reduce habitat fragmentation and have a negligible to minor beneficial impact on fish and wildlife. There would be no impairment of fish and wildlife resources.

Cultural Resources

Archeological Resources

Under Alternative B, the actions and associated impacts would be the same as Alternative A. In addition, under Alternative B the NPS would a) develop a program for paleoecological investigations to expand understanding of past ecological processes and climate conditions, b) expand partnership opportunities for research related to paleoecological processes, and c) expand opportunities for qualified researchers to engage in existing and new archeological projects. Under Alternative B, the NPS would also increase opportunities for archeological site interpretation in the field.

These new programs and expanded partnership and public involvement opportunities would enhance understanding for paleoecological investigations and potentially increase future stewardship more than Alternative A, resulting in additional moderate long-term benefits to archeological resources.

Alternative B also includes a stronger connection between archeological investigations and research and public interpretation and education. Providing opportunities for archeological site interpretation in the field could be a powerful interpretive experience, providing context as well as personal experience with an archeological site investigation. New interpretive materials based on research results would increase

relevancy of research to the visiting public. The activities could contribute to building future support for archeological investigation and could result additional minor to moderate long-term benefits.

Construction activities associated with Alternative B, including but not limited to new trails and the Ross Dam Trailhead parking lot, would have a greater adverse impact than Alternative A; however, mitigation measures would likely result in minor and localized adverse impacts.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Implementation of Alternative B would not contribute to overall adverse impacts to archeological resources.

Conclusion
Increased emphasis on paleoecological investigations and expanded partnership opportunities for research would contribute to long-term archeological preservation objectives and have moderate long-term benefits. Adverse impacts associated with new construction would likely be minor and localized. Cumulative impacts would be the same as Alternative A and implementation of Alternative B would not contribute to cumulative adverse impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Historic Structures and Cultural Landscapes

This alternative would involve the same activities and impacts as Alternative A. In addition, Alternative B would investigate~~ion~~ the potential for adaptive re-use of historic structures where feasible, and develop preservation treatments that emphasize education or interpretive potential. These treatments would immerse more visitors in cultural resources in Ross Lake NRA, enriching their understanding of cultural resources and contributing to long-term support for preservation. These treatments that emphasize adaptive re-use of historic structures and integrate interpretive or educational opportunities would have moderate long-term benefits to the preservation of historic structures and cultural landscapes.

Should the NPS acquire Hollywood from Seattle City Light there could be additional benefits to historic structures and cultural landscapes given the NPS's preservation mission.

~~Under Alternative B, the NPS would actively work to acquire Hollywood from Seattle City Light through either purchase or exchange for Reflector Bar. The NPS would strive to preserve the contributing elements and provide for a mix of future uses depending on the needs of the park and park partners. Specific recommendations for adaptive reuse would be informed by determinations of eligibility for the National Register, condition assessments of the buildings, and public input. The NPS and its partners have a need for additional infrastructure for operational purposes (e.g. housing, maintenance, research and educational facilities) as well as public recreation (e.g. public overnight opportunities). The NPS would seek opportunities to preserve contributing elements, maintain significant character-defining features of the area and interpret its history as appropriate, regardless of the mixture of new uses that are introduced to the site. These needs and the increased potential for adaptive reuse of National Register listed, eligible, and potentially eligible historic properties would have long-term benefits to these resources.~~

~~The NPS is an agency with a preservation mission and would adhere to the Secretary of the Interior's Standards for the Treatment of Historic Properties for actions taken in Hollywood, which would have long-term beneficial effects to historic properties. Any building determined not necessary for NPS or partner needs could be removed with mitigation to be determined through the NHPA 106 compliance process. Adverse impacts could range from minor to major depending on the level of significance for the individual property affected and the action taken.~~

~~Implementation of Alternative B could also enhance long-term preservation by enabling visitors to experience first-hand historic properties and the story they represent in the history of the Skagit Project. Providing overnight lodging and additional recreational experiences in Hollywood and Diablo could result in an educational opportunity with respect to historic preservation, increasing support for long-term preservation of these historic properties. Increased support for historic preservation through education and personal experiences in Hollywood could have long-term moderate benefits to historic properties.~~

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative B would not contribute to the adverse cumulative effects described above.

Conclusion
The implementation of Alternative B would result in long-term, beneficial effects to historic buildings and cultural landscapes through preservation treatments that emphasize adaptive reuse and education or interpretive potential. Acquisition of Hollywood could result in additional long-term benefits. ~~and potential future uses that involve a mix of opportunities for the NPS, park partners and visitors could result in increased support for historic preservation through education and personal experiences and contribute long-term moderate benefits to historic properties. Adverse impacts to individual properties could range from minor to major depending on the level of significance for the individual property affected and the action taken.~~ Alternative B would not contribute to the adverse cumulative effects. There would be no impairment to this resource or value as a result of implementing this alternative.

Tribal Issues and Ethnohistory

Actions under Alternative B and associated moderate long-term benefits would be the same as under Alternative A. The additional ~~of~~ interpretive opportunities that communicate human use of the North Cascades would contribute additional minor to moderate long-term benefits through increasing awareness and engaging visitors in the history of human use in the North Cascades.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative B would not contribute to adverse cumulative impacts.

Conclusion
Actions under Alternative B would result in moderate long-term benefits similar to Alternative A. Cumulative impacts would be the same as Alternative A and Alternative B would not contribute to adverse cumulative impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Museum Collections

Same as Alternative A plus develop: a) the capacity to preserve and protect paleoecological and emerging collections and archives, such as storage and staffing, b) provide additional access to collections items both online and on-site, and c) expand North Cascades Visitor Center exhibit areas to provide open display of museum collection objects.

Alternative A would result in similar long-term benefits as Alternative A, plus the additional capacity and improved access to museum collections could result in additional long-term benefits through greater preservation capacity, a more complete collection with new collections and archives, and greater appreciation for these resources through better displays in the North Cascades Visitor Center.

Cumulative Impacts
Cumulative impacts are the same as Alternative A and would result in major beneficial long-term impacts on the museum collections. Alternative B would contribute additional long-term benefits to museum collections.

Conclusion
The ongoing program has resulted in major beneficial long-term effects to the museum collections. Alternative B would have minor long-term beneficial impacts on museum collections by adding resources to the collections, making it more complete and more useful for interpretation and research. There would be no impairment to this resource or value as a result of implementing this alternative.

Wilderness Character

Under the Preferred Alternative, a Minimum Requirement Analysis would still be used to determine if, when, and how actions would be implemented. The backcountry permit system would continue to be used to manage overnight use. Opportunities for visitors to experience wilderness character would still be abundant, and in some cases improved.

A number of actions under Alternative B would help to protect or improve wilderness character. Natural qualities would improve with implementation of a vegetation management plan, which would establish priorities for restoration and protect areas containing rare plant populations; with eradication of invasive non-native plants where feasible and collaboration with adjacent landowners in invasive plant management; and with allowing wildland fires to burn across the international boundary if conditions were appropriate.

One notable action would help to improve the natural quality of wilderness character but would impact other qualities. By providing additional food storage boxes and/or requiring the use of food storage canisters, bears would be less likely to obtain human food and become habituated. However, the presence

of food storage boxes at campsites would impact the undeveloped quality of wilderness character and requirements to use canisters would impact the quality of unconfined recreation, resulting in minor adverse impacts.

Other actions that would benefit wilderness character include the potential removal of certain trails and the removal of the Thornton Lakes Road in wilderness, both of which would reduce habitat fragmentation and improve naturalness. Actions taken to protect or improve the natural soundscape outside of wilderness would also benefit opportunities for solitude within wilderness, and would include education about natural sounds, enforcement of noise standards on the North Cascades Highway, boat restrictions, and ~~seaplane restrictions~~ implementing noise abatement procedures for seaplanes.

Cumulative Impacts
Cumulative impacts on natural qualities would range from minor to moderate and include fire suppression (under more limited instances under Alternative B), invasive, non-native plant infestations that cannot be eradicated, fish stocking or removal, and climate change. Other impacts range from minor to moderate and are largely related to ongoing activities such as the existence and maintenance of infrastructure and facilities, installation of the Desolation Peak radio repeater, and other park administrative uses that might require helicopter use. In combination with the Preferred Alternative, these cumulative impacts would result in minor to moderate impacts.

Conclusion
Although a number of actions would be taken that would benefit wilderness character, several past, present, or future activities will have cumulative impacts ranging from minor to moderate. Impacts would result from manipulation of wilderness by fish stocking or removal, fire suppression, other natural resource issues, development, motorized vehicle and equipment use, and management restrictions on unconfined recreation. Implementation of this alternative would not result in impairment.

Wild and Scenic River

This alternative balances protecting resource values with providing visitor experiences. There would be minor to moderate beneficial impacts due to relocating facilities out of the floodplain. Banks would be hardened only after consideration of removing facilities. Fishery resources would also have moderate beneficial impacts. However, beneficial impacts to river and fishery resources would be greater if the undersized bridges on the Skagit tributaries from the North Cascades Scenic Highway would be replaced. ~~NPS would also encourage WSDOT to construct a longer bridge at Goodell Creek which could provide moderate beneficial impacts to free-flow and fishery values of Goodell Creek.~~

Use and preference for fish-friendly bank stabilization techniques would also limit any adverse impacts on free-flow and river resources resulting from bank stabilization projects. Salmon have been found to prefer natural bank habitat five times more than modified banks. Evaluation of the water resource projects would help ensure projects do not cause adverse effects. ~~The proposed two-lane bridge over the Skagit River to the North Cascades Visitor Center could have negligible to minor effects on the river's free-flow character. Once a design is selected a detailed analysis relative to any effects on the free-flowing character, water quality, and Outstandingly Remarkable Values (ORVs) will be conducted. To avoid any adverse impacts, consideration could be given to modifying the bridge without adding to the existing footing and columns.~~

The creation of a vegetation management plan and continuation/improvement relative to invasive, non-native plant removal and native plant restoration will have a minor beneficial long-term impacts to scenic values. Under the preferred alternative, NPS would take protective actions to restore native fish populations. These actions could include managing and creating additional spawning habitat; establishing size limits and fishing moratoriums in the upper tributaries; and minimizing adverse impacts due to the North Cascades Scenic Highway. Depending on the actions taken, fishery resources would likely have minor to moderate long-term beneficial impacts. There would also be negligible to minor beneficial impacts to geologic, wildlife, and cultural resources for management plans and actions related to expanded monitoring, visitor use regulations, protection, and interpretation of these resources.

Long-term minor to moderate beneficial improvements to recreational boating experience on the Skagit River are anticipated due to the elimination of motor boat use and additional monitoring/ regulations on private non-motorized boating use. There would also be minor improvements to the recreation experience and safety for some boaters and spectators through creation of a portage trail around the shovel spur rapids on the Skagit River. In addition,

minor beneficial impacts on recreation are anticipated due to the expanded trail opportunities potentially including additional trails along Goodell Creek and Newhalem Creek. Defined trail access along Goodell Creek is currently not available and this trail would allow visitors to see and experience the creek and provide interpretation opportunities. Likewise, a trail along Newhalem Creek could provide access to a good view of the scenic waterfall in the lower stretch, an outstandingly remarkable value for the creek. There could be temporary minor adverse impacts due to construction of these trails. However, in many cases the trail corridors are using existing impacted corridors. Plowing of pullouts and access areas could provide minor beneficial long-term recreation benefits.

If the Skagit River and key tributaries are designated as WSRs, as recommended in the GMP, then long-term beneficial impacts are expected for the river's free-flow character, water quality, and ORVs. Creation of a comprehensive river management plan will allow focus on the river and its values providing opportunities for access, restoration, interpretation, and management elements necessary to protect the river segments. Designation would also restrict further hydropower development from occurring on the Skagit River. Overall, WSR designation would have moderate beneficial impacts on eligible river segments.

Cumulative Impacts
Similar to Alternative A, impacts would continue from the hydroelectric projects, roads, facilities, visitor use, and air-borne pollutants. Use will continue to be focused in front-country areas. Actions related to increased coordination and management efforts with SCL and WSDOT and designation of the Skagit River, Newhalem Creek, and Goodell Creek will provide moderate beneficial long-term impacts and improvements to river values.

Conclusion
With more regulated river access, improved facilities, and water resource and floodplain protections, eligible wild and scenic river segments would be more protected, ensuring the preservation of ORVs. This would result in moderate beneficial impacts over the long-term.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts to eligible wild and scenic river segments would generally be minor to moderate and beneficial over the long-term.

There would be no impairment of wild and scenic river resources and values.

Visitation

As described in Alternative A, visitation would be expected to increase proportionate to regional population growth. Heaviest use would still occur along the North Cascades Highway, and since there are no proposed changes to roadway capacity, traffic congestion during peak summer weekends would continue. Improvements to waysides, pull-outs, and the Ross Dam Trailhead parking lot may attract additional visitors, but would have negligible impacts on visitation as a whole. Removal of the portion of Thornton Lakes Road in wilderness and relocation of the parking area might slightly increase visitation by making the hike more appealing or decrease visitation since the hike could be longer.

In developed areas, visitation would still be limited by the number of facilities, parking spaces, and campsites available. Additional group camping sites and campground services such as showers or electrical hookups could attract more visitors, but campgrounds would probably still be filled to capacity only a few weekends each summer. Reconfiguration of Winnebago Flats at Hozomeen could decrease visitation by limiting the number of campers that can stay in the campground. In the backcountry, overnight visitation would still be limited by the number of campsites available and permits issued. The addition of a reservation system for backcountry users could slightly increase visitation by making it easier to plan camping trips. These changes to camping opportunities would have negligible to minor impacts on overall visitation.

Potential expanded overnight opportunities near the Environmental Learning Center (additional camping)~~, at Hollywood in Diablo,~~ and at Ross Lake Resort would increase visitation in these areas, and the addition of stock-accessible front country camps could bring more stock users to Ross Lake NRA. The name change from Ross Lake NRA to North Cascades NRA could result in a small increase to visitation immediately following the name change and may result in a short-term change in visitation patterns. The addition of day use trails could also slightly increase visitation in the frontcountry by expanding hiking opportunities close to the North Cascades Highway. These slight increases in visitation would result in minor impacts.

Limitations on ~~seaplane use and~~ scenic overflights would have negligible impacts on visitation, and motorboat restrictions, which could potentially affect a larger group of users, would have minor impacts. As in Alternative A, wintertime and shoulder season use may slightly increase due to plowing selected overlooks and trailheads as well as orienting interpretation and education program to shoulder season visitors; however, little to no crowding or congestion would occur.

Cumulative Impacts
Cumulative impacts would be the same as those identified under Alternative A. Overall impacts to visitation due to these cumulative impacts would be negligible.

Conclusion
The impacts of the Preferred Alternative on visitation would range from negligible to minor during the peak summer season, and negligible during the rest of the year.

Visitor Opportunities

General Recreational Opportunities

Recreational activities would continue to be characterized by frontcountry experiences along scenic North Cascades Highway, backcountry and some frontcountry lake and river recreation, and the ability to experience wilderness and use Ross Lake NRA as a gateway to explore the greater North Cascades. In addition, the NPS would focus on providing a wider range of low-impact recreation opportunities for visitors of all abilities along defined high-use areas such as the North Cascades Highway corridor, as well as opportunities to learn about the wilderness and have hands on stewardship experiences. Backcountry recreation would continue to provide a remote wilderness experience, and Ross Lake would provide many of the same wilderness characteristics. Continuing to provide this range of recreational opportunities, with more intense use concentrated along the highway corridor and preserving backcountry and wilderness experiences, would have long-term moderate to major benefits to visitor opportunities.

North Cascades Highway based opportunities

Along the North Cascades Highway, a wide variety of recreational activities would continue to be available and some opportunities would be expanded, including the potential for new overlooks or waysides, new and group picnic sites, and improving opportunities for winter activities by improving snowplowing for better access. There will still be a variety of opportunities to view the wilderness and experience a natural setting while accessing numerous amenities and services. Car camping opportunities with a range of potentially expanded amenities would continue to be available. The NPS would strive to preserve camping opportunities in popular areas such as Colonial Creek, but if this is not possible due to flood events, sites would be rebuilt or other campgrounds expanded to provide no net loss of camping, resulting in minor to moderate beneficial impacts to visitor experiences. Efforts would also be made to improve the quality of corridor recreation by increasing education efforts or enforcing noise ordinances, contributing additional moderate beneficial impacts.

Camping opportunities could also expand, such as for car camping for stock parties. Camping at Hozomeen would be reorganized with a new site design, which would likely reduce capacity at Winnebago Flats, but would provide for a more tranquil and traditional camping experience. There would be some minor adverse impacts to visitors at Hozomeen if camping capacity was reduced from a new site design, however, improvements would likely lead to a higher quality experience for visitors in the long-term.

Should the NPS acquire Hollywood there could be additional long-term benefits if additional public opportunities were provided at the site.

~~There could be new opportunities for overnight lodging for visitors if Diablo were re-developed for public and staff use following a land exchange with Seattle City Light. The potential for year-round lodging within Ross Lake NRA at Diablo Townsite would have a major beneficial impact on visitor experiences and opportunities by providing a new experience otherwise unavailable, and also on a flat, pre-disturbed piece of land adjacent to the river, which is difficult to find in Ross Lake NRA.~~

There would be moderate beneficial impacts from improving the Sourdough and Stetattle Creek trailheads in Diablo in partnership with Seattle City Light.

Land/trail-based opportunities

Opportunities would continue to allow visitors to move beyond the road corridor for short or long distances and times for a variety of activities. There would also be opportunities to launch deeper

wilderness explorations via existing short walks and access to longer day hikes, backpacks, stock trails, and mountaineering routes. Day hiking and recreation opportunities within the North Cascades Highway corridor could be expanded via new short or loop hikes, a new portage trail for boaters along the Skagit, or new links with trails in Canada in the Hozomeen area, creating long-term moderate benefits to visitors. Some sections of trails in Ross Lake NRA could be lost if their adjoining trail segment in the national park is closed or abandoned, slightly reducing hiking opportunities, a minor long-term adverse impact.

Hunting would be allowed within most existing permitted areas, but under Alternative B the NPS would seek to consult with WDFW to expand safety zones for hunting, and reduce potential conflicts during peak visitation months between hunters and other recreationists, as well as expanding educational efforts to make non-hunters more aware of hunting activities. Negligible to minor adverse impacts would result from additional hunting restrictions that would affect a small number of people, offset by beneficial impacts to larger numbers of non-hunting recreationists.

Sport climbing in the Newhalem Gorge would continue, but would be formalized under "Climbing Management Areas" with a resource plan and defined boundaries. Impacts on the sport climbing community would be negligible, beneficial, and long-term because activities would continue with additional oversight to protect the resource and visitor experience.

Additional hiking opportunities and providing new trails in the future could be constrained by formal policies for maintaining core habitat for special status species such as grizzly bear, resulting in a negligible to minor long-term impact given the extent of the land base and likelihood of expanding trails beyond the highway corridor and into core area habitat.

Overall, impacts under Alternative B would be both beneficial and adverse, and long-term as a result of some potential losses in little-used trails, offset by additional opportunities for larger numbers of people in more popular locations.

Water-based opportunities

Visitors would continue to have access to a range of water-based recreation in both front and backcountry, as well as numerous associated day and overnight activities similar to Alternative A. Unlimited day use opportunities would also be available on all three reservoirs for motorized and non-motorized boats. Motor boat use would be managed to protect water quality, soundscape, and visitor experience by maintaining existing access points and numbers of campsites on Ross Lake, applying limits to size, horsepower, or speed limits, as well as establishing a no-wake zone near other boaters ~~or sensitive shorelines~~ and prohibiting recreational towing on all reservoirs. Under Alternative B, impacts on water-based recreation activities would also be affected by the requirement for motorboats to meet the four-stroke engine requirement for all boats on Ross Lake by 2015. Paddle craft would be encouraged, possibly via a boat rental option on Diablo Lake. Personal watercraft would remain prohibited.

Overnight boat-in camping on Ross and Diablo lakes would remain accessible by motorized and non-motorized boats, with use limits set by the capacity of the current docks and campsites, as administered by the backcountry permit system.

Impacts from these and other management actions would range from negligible to moderate, be both beneficial and adverse, and largely long-term as a result of improved experiences for a majority of boaters, characterized by paddlers and boaters with small motors. There would be some short-term negative impacts to motorboaters who would need to conform with the elimination of two stroke engines, but there would be long-term benefits as most motorboating uses would continue and the character and quality of the boating experience would be preserved.

~~Seaplane use would be restricted to designated frontcountry zones. Zones where seaplanes would be allowed would include almost all of Diablo Lake, and the north and south ends of Ross Lake (from Ross Resort to Cougar Island in the south, and from Hozomeen to Silver Creek Camp in the north). Seaplane use would be regulated under a permit system to protect the soundscape and other visitors' experiences. In addition the NPS would work with the FAA to establish use levels and patterns for scenic overflights. Management of seaplane use would have an overall minor adverse impact, though impacts to individual users may be moderate, because of the relatively small numbers of seaplanes that would be affected and numerous other seaplane opportunities exist within the region.~~

Seaplanes would continue to have access to Diablo and Ross lakes and the NPS would work with the

seaplane pilot community to gather data on seaplane use and establish noise abatement procedures. Management actions would have long-term benefits to pilots by preserving access and working to maintain a high quality and uncongested experience in Ross Lake NRA, though there could be some negligible to minor impacts from the inconvenience associated with providing data to the NPS to better understand seaplane use.

On the Skagit River, regulations to limit party size or number of boats would be considered. Motor boats would be banned on the section of the Skagit River within Ross Lake, approximately ten river miles out of 93 total river miles. Fishing opportunities would remain unchanged, with the exception of prohibiting lead tackle. Impacts on Skagit River users would be mostly beneficial due to maintaining a quality experience and some increased opportunities. Adverse impacts would be negligible because demand does not yet exceed capacity, and motor boaters would still have the vast majority of the Skagit available to boat on.

Visitor and Information Centers

A range of facilities and services would continue to meet a variety of visitor needs similar to Alternative A. Within Ross Lake NRA, information centers at Marblemount and Hozomeen—as well as the North Cascades Visitor Center in Newhalem—would provide orientation, information and trip-planning services to park visitors. There would be no visitor centers open in Ross Lake NRA during the winter and spring months, generally from November to May. Outside Ross Lake NRA, visitors could still access the information station in Sedro-Woolley year-round. The park would seek to partner with the USFS to provide NPS staffing at east side locations to provide basic services throughout the visitor season for visitors entering Ross Lake NRA from the east, a moderate to major benefit to visitor access to information.

The Wilderness Information Center in Marblemount was recently upgraded to include expanded staff work areas, including wilderness equipment and search and rescue storage and a staging area, and under Alternative B the public side of this building would also be rehabilitated, to provide additional and improved services in its current location. The NPS would also seek to partner with BC Parks to build a small new ~~joint visitor and information center~~ ranger station at Hozomeen in order to expand basic visitor services ~~and provide interpretative programs~~. Both these actions would have long-term moderate to major benefits to visitors.

Maintaining or increasing staffing levels and adding staff locations would provide long-term moderate to major beneficial impacts to most visitors. During certain seasons or at certain stations, where staffing or services are limited, there would be a minor short-term adverse impact to visitors seeking orientation and information to Ross Lake NRA.

Permits, Reservations, and Fees

Primary backcountry permitting services would continue to be available at the Wilderness Information Center in Marblemount, with ancillary services available at Newhalem, Sedro-Woolley, and Hozomeen similar to Alternative A. Backcountry permits would still be required for all overnight backcountry stays in Ross Lake NRA, including all boat-in and hike-in camps. The NPS would develop or expand web-based reservations for backcountry or additional frontcountry camps. An advance permit system for frequent backcountry users would be evaluated, and a range of fees for reservations and other specialized visitor services could be considered. A portion of both frontcountry and backcountry sites would be held for walk-ins. Fees would be evaluated for special services, reservations, and permits.

Under Alternative B, impacts would be negligible to major, both beneficial and adverse, and mostly long-term. A streamlined permit process would benefit some frequent users. Expanded permit availability would result in a moderate to major benefit to users in obtaining permits but could reduce resource protection due to the lack of personal contact with rangers and thus diminish the quality of experience. Reservations would benefit those users seeking permits well in advance or for high-use areas, especially larger public groups, but could negatively impact people planning spontaneous, weather dependent trips. Popular sites could also be booked well in advance, adversely affecting some spontaneous walk-in users. Permits provide for opportunities for solitude and a quality recreational experience but also limit opportunities for unconfined recreation. Increased fees could potentially dissuade some visitors from using these services, especially lower income households.

Campground facilities

Under Alternative B, similar to Alternative A, maintenance would continue on the five campground facilities and three group camps, some of which are very susceptible to damage from storm events—particularly Colonial Creek and parts of Lower

Goodell Group and Goodell Creek Campgrounds. The NPS would strive to preserve camping facilities in popular areas such as Colonial Creek, but if this is not possible due to flood events, sites would be rebuilt or other campgrounds expanded to limit net loss of campground capacity, a moderate long-term benefit. However, due to the potential loss of some favorite camping facilities, moderate long-term adverse impacts are also possible.

~~The addition of the Hollywood district would have moderate to major long-term benefit to visitor experience by providing an already impacted or developed site along the river for possible public overnight opportunities.~~

The NPS would also evaluate additional services such as showers and electrical hookups at some or portions of campgrounds, as well as developing new group camps or new Diablo Lake camps. Some visitors would enjoy expanded services such as showers and RV hookups while some may view these services as diminishing a primitive camping experience.

The NPS would also rehabilitate Hozomeen Campground and Winnebago Flats to provide a more traditional and organized camping experience, the same as Alternative A.

Overnight stock camping and other facilities would be considered for some areas with trail riding opportunities nearby. Stock users would experience a long-term, minor benefit from having car camping facilities that would benefit the small number of stock parties.

Trails, Boat Launches, Picnic Facilities, etc.

Under Alternative B, the NPS would maintain the majority of the current trail system at current levels. New trails could be developed under Alternative B, primarily within the North Cascades Highway corridor or near Hozomeen, including short or loop trails, a portage trail along the Skagit S curves, or links to trails in Canada resulting in moderate long-term benefits. Some sections of trails could be lost if their adjoining trail segment in the national park is closed or abandoned. There would be a negligible adverse impact on a small number of visitors who highly value solitude due to the impact of some new trails.

A variety of small recreation facilities primarily along the North Cascades Highway could be developed under Alternative B including: improved or new boat launches on Diablo Lake or at river access points, facilities for bicyclists, group or new picnic areas that could accommodate additional visitors including large groups, improved signage at the Ross Lake NRA entrance points on the North Cascades Highway as well as at overlooks or waysides, and improved snow plowing to allow better access in wintertime. These improvements could have a moderate long-term beneficial impact on visitors, enhancing enjoyment of opportunities along the highway corridor that is traveled by a majority of visitors.

Parking for climbers in the Newhalem Gorge would be also evaluated and could be formalized to provide safer access to climbing routes, a moderate long-term benefit.

Commercial Services and Facilities

The NPS would develop a commercial services plan to determine the optimal level of commercial services and facilities, and could consider establishing a carrying capacity or use limits which would have a moderate long-term beneficial impact by ensuring preservation of the experience desired by most visitors. Commercial use guiding services would continue, but could be limited under the commercial services plan, which could have both beneficial and adverse impacts depending on the user group. Some concessions services could be expanded, such as boat rentals, a second water taxi or boat ferry on Ross Lake, or a concession-operated store in Newhalem if SCL ceased store operations, which would also contribute moderate long-term benefits.

Ross Lake Resort could be expanded up to 10 percent, guided by NPS design standards, a moderate long-term benefit. ~~The NPS would seek to acquire the Hollywood District of Diablo Townsite from SCL, and would re-develop this area for NPS or public use, such as new camping and overnight lodging facilities, potentially concession-run, contributing a major long-term beneficial impact.~~

~~The addition of the Hollywood district could provide another venue for exploring commercial services and facilities in an already developed area, a potential moderate to major long-term benefit given the limited areas in the NRA that are already developed and potentially compatible with these activities.~~

Impacts under Alternative B would be minor to moderate ~~major~~, beneficial and adverse, and long-term. Benefits would include the continuation or expansion of most facilities and services that are used by the majority of visitors, with potentially

enhanced visitor experience due to use limits, and new opportunities available for some. Some commercial operators, and the visitors who use their services, could be adversely affected if their use was restricted, but most visitors would benefit.

Some users could also be adversely affected by the presence of additional facilities that could detract from a sense of peace and tranquility.

Cumulative Impacts
Cumulative impacts would be similar to Alternative A. Alternative B would have a greater long-term contribution to moderate to major benefits with enhancements along the highway corridor ~~and the potential to convert the Hollywood District to public use~~.

Conclusion
The full spectrum of visitor opportunities would continue to provide for visitor enjoyment and recreation activities. Under Alternative B, there would be moderate to major beneficial impacts to most users from potential expansion, improvements, and new opportunities along the highway corridor and at Hozomeen. There would also be moderate ~~to major~~ benefits from limiting net loss of camping opportunities ~~and possibility of public overnight lodging at Hollywood~~. Cumulative effects would be similar to Alternative A. Adverse impacts could occur from reservations and fees, conflicting uses, and possible loss of campsites due to reorganization of Hozomeen~~, reduction in areas where seaplanes can land~~. Alternative B would have a greater long-term contribution to moderate ~~to major~~ benefits with enhancements along the highway corridor, and the addition of overnight stock camping facilities~~, and the potential to convert Hollywood to public use~~.

Information, Interpretation and Education Opportunities

Under Alternative B, Ross Lake NRA is used as a platform and classroom for interpretation and education about the North Cascades, its history and resources, as well as civic engagement, stewardship, and public leadership. There would be numerous opportunities for both structured and unstructured activities, including self-exploration and discovery. The NPS would consult and collaborate with partners when appropriate, and partners would assist the NPS in delivering educational messages and programs.

Use of the most current and dynamic methods to generate curiosity, passion, enthusiasm and respect for park resources to build a sense of stewardship would have a major, long-term beneficial impact on visitor experience. The improvement of traditional interpretive programming within existing facilities, possible new facilities in select areas of Ross Lake NRA and the development, delivery, and evaluation of the programs so that they convey the full spectrum of interpretive themes will also have a major, long-term beneficial impact on visitor experience. Curriculum-based programs that focus on the full spectrum of interpretive and educational themes and objectives, and which emphasize low impact practices for hands-on activities that make learning relevant to students' lives will have a major benefit by engaging learners directly with the resource.

Expanded participation in outreach programs as one of many mechanisms to deliver Ross Lake NRA's full spectrum of interpretive themes and build local and regional stewardship of the North Cascades ecosystem will have a moderate beneficial impact to visitor experience.

The enhancement of visitor orientation and informal education through improved signage, multi-media, and exhibits at existing waysides, contact stations, and along interpretive trails would provide major beneficial impacts to visitor experience. Improved signage would provide visitors a sense of approach and arrival as well as better orientation to the services and resources within Ross Lake NRA. NPS information centers within the Ross Lake NRA boundary along the North Cascades Highway would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information.

The expansion of partnerships to attract a broader audience of visitors would have a major beneficial impact on visitor experience by connecting an increased number of people to the outdoors and the North Cascades in meaningful ways. Interpretive rangers co-located at other visitor contact stations, such as the Skagit Tours Information Center, the Environmental Learning Center, and at eastside entry points will have a major beneficial impact to visitor experience by making park staff more available to foster such connections.

Working with Seattle City Light to develop a more collaborative relationship that could involve additional programming and exhibits that tell the history and operations of the Skagit Hydroelectric Project and

enhanced collaboration with concessionaires and the U.S. Forest Service in order to share best practices and standards in order to disseminate information have a major beneficial impact on visitor experience by reaching a broader audience.

Newhalem

Updated exhibits, multi-media programs, and activities at the North Cascades Visitor Center would have a major beneficial impact on visitor experience as visitors would be provided with more active and interactive opportunities for fun and engaging educational activities that communicate the full spectrum of interpretive and educational messages and cultivate stewards of the North Cascades ecosystem. The North Cascades Visitor Center would serve as a hub of activity and provide the starting point to a network of ranger-led and self-directed resource immersion activities. Partners would also be encouraged to use the North Cascades Visitor Center as a point of origin for their programs and activities. Focusing activity around a hub such as the North Cascades Visitor Center would have a moderate long-term benefit to visitors by enhancing their orientation.

Environmental Learning Center

The devotion of a moderate level of resources to Environmental Learning Center (ELC) programs and operations would have a moderate to major beneficial impact on visitor experience. The NPS would develop and evaluate the interpretive and educational messages with North Cascades Institute (NCI), setting a standard of excellence, and increasingly collaborate with NCI at the ELC to distribute and deliver relevant interpretive and educational messages, a moderate long-term beneficial impact.

Hozomeen

An increased partnership with British Columbia Parks to provide joint NPS/Canadian land- and water-based interpretive programs would have a moderate beneficial impact to visitor experience by enhancing learning opportunities related to preservation of the greater North Cascades ecosystem.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative B would contribute greater long-term benefits to cumulative impacts by focusing on the North Cascades Visitor Center as a hub of activity for visitors. Increased partnerships, collaboration and outreach would also contribute to long-term cumulative benefits by increasing the availability and quality of information delivery to visitors and the public.

Conclusion
Overall, implementation of Alternative B would result in moderate to major long-term beneficial impacts to visitor experiences in the area of information, interpretation, and education. Expansion of partnerships with Seattle City Light, North Cascades Institute and British Columbia Parks would all contribute to beneficial impacts. Focusing the North Cascades Visitor Center in Newhalem as a hub of information, and updating exhibits and programming would also contribute long-term benefits. NPS information centers within Ross Lake NRA boundary along the North Cascades Highway would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information.

Cumulative impacts would be the same as Alternative A. Alternative B would contribute greater long-term benefits to cumulative impacts by focusing on the North Cascades Visitor Center as a hub of activity for visitors. Increased partnerships, collaboration and outreach would also contribute to long-term cumulative benefits by increasing the availability and quality of information delivery to visitors and the public.

Access and Transportation

Under the Preferred Alternative, several small changes would occur that would impact access. Improvements to waysides, pull-outs, and several parking areas will have a beneficial impact on access. However, as in Alternative A, visitation would be expected to increase proportionate to regional population growth. Heaviest use would still occur along the North Cascades Highway, and since there are no proposed changes to roadway capacity, traffic congestion during peak summer weekends would continue, resulting in minor to moderate adverse impacts. If implemented, however, a shuttle system could potentially help to alleviate some of the congestion.

Access will be improved at the Ross Dam Trailhead parking lot by constructing a turn lane at the entrance and redesigning the parking lot. Although parking lot capacity will not increase under Alternative B, clearly defined parking spaces will reduce confusion and some of the congestion related to drivers trying to find an adequate parking space. Other parking areas, such as Diablo Ferry dock, Upper Goodell group

campsite, Goodell Creek raft area, and the Sourdough, Stetattle Creek, and Thunder Knob trailhead parking areas will be reconfigured, formalized, or developed. Parking and access to climbing routes in the Gorge could be formalized. Some overlooks and trailheads could be plowed to provide wintertime access. ~~The existing one-way bridge that provides access to the North Cascades Visitor Center, Newhalem Creek Campground, and several trails, would be replaced with a two-lane bridge that accommodates two-way traffic, pedestrian access, and interpretive platforms.~~ Impacts to access would be beneficial and minor to moderate.

Removal of the portion of Thornton Lakes Road in wilderness would still allow access to the trailhead, and depending on the new trail location, the access route to the lakes could either be shortened or lengthened. The new parking area could potentially accommodate a larger number of vehicles than the current parking lot, thus improving access.

Other changes in access include the potential expanded overnight opportunities near the Environmental Learning Center (additional camping), ~~at Hollywood~~, and at Ross Lake Resort, which would increase access for more people in these areas; the addition of stock-accessible front country camps, which could bring more stock users to Ross Lake NRA; the addition of day use trails; and improvements to river access and take-out at the Portage. These slight increases in access would result in beneficial impacts.

Restrictions on access would be imposed on ~~seaplanes, which would be allowed to land and take off only in the frontcountry management zone; and~~ motorboats along the Skagit, which would be prohibited. The impacts from ~~these~~ this proposed actions would vary among individuals and could range from negligible to major depending upon personal preferences. Overall impacts to Ross Lake NRA access would be negligible given the small percentage of the visiting population that accesses Ross Lake NRA exclusively via ~~these~~ this modes of transportation. There could also be beneficial impacts for user groups who are seeking non-motorized experiences.

Cumulative Impacts
Cumulative impacts would be the same as those identified under Alternative A. Other potential future actions, including general road, trail, or parking lot maintenance, and various types of work on the North Cascades Highway by WSDOT, could impact access; although delays may occur, visitors would not likely alter their travel destinations. Occasional road or trail closures also occur due to fire, avalanches, rockfalls, etc. Overall impacts to access due to these cumulative impacts would be negligible.

Conclusion
The impacts of the Preferred Alternative on access and transportation would result in adverse, minor to moderate impacts during the peak season as well as beneficial impacts due to improvements in access and during non-peak times.

Socioeconomic Environment

In Alternative B, impacts to the socioeconomic environment would result from changes in operational spending, changes in visitor spending, and changes in visitor patterns. The impact of Alternative B is evaluated in comparison with the No Action Alternative.

Implementation of Alternative B would occur against the same backdrop of economic, demographic, and social changes across the influence area described under the No Action Alternative. The economic and social effects of Alternative B would add to those changes, but would not fundamentally change the area's economic and demographic outlook.

Impacts to Demographics

Alternative B would have little direct impact on the influence area's population growth. It is likely that individuals already residing in the area would fill many of the construction and related jobs. However, new staff proposed in Alternative B likely would come from outside as well as from within the influence area. Additional employees proposed in Alternative B include 22 permanent full time equivalent positions (FTEs). Beneficial and adverse impacts associated with population increases are similar to Alternative A.

Population increases due to Alternative B and its associated impacts would be minute compared with the total population of the influence area, which is about half a million people; therefore the impact would be negligible, long-term, and of indeterminate effect since there are both adverse and beneficial impacts to population growth. The addition of 22 new employees and their families would represent a small but detectible number. The impact of hiring all proposed new employees would be long-term, minor, and of indeterminate effect.

Economic Impacts to Influence Area

Increases in National Park Service spending during construction of new facilities would result in short-term impacts; long-term impacts may also occur due to the resulting increases in annual budgets (for costs such as new facility maintenance and new employee wages). Prominent proposed construction projects could include a new Wilderness Information Center, and rehabilitation or rebuilding of the Hollywood district for housing, research, visitor and educational purposes~~, and replacement of the bridge to Newhalem~~. Companies in the construction industry would see increased business if contracted to provide services. This in turn would strengthen construction employment and incomes. Construction workers frequenting the area would spend income on food and materials, increasing service business revenues and government tax revenues. While construction spending would strengthen these areas of the economy, it would be to a small degree in relation to the influence area's total economy. Short-term construction spending is estimated at $11.2 ~~17.3~~ million ($11.1 ~~17.2~~ million above that of the No Action Alternative). Construction spending would result in negligible, short-term, beneficial impacts to the economy of the influence area, since this amount likely would be spread over the 20-year planning timeframe.

Increases in the recreation area's annual spending also would have long-term effects. Employment of new staff would add jobs to the influence area and generate personal income. New staff would spend a percentage of income on housing, food, entertainment, and other services; this would increase incomes and government tax revenues, and strengthen the housing sector. However, new staff would put demand on local government services such as schools. Maintenance and operational spending at the recreation area would also have long-term positive impacts on employment and incomes. Annual operations spending is estimated at $8.5 million ($1.4 million more than the No Action Alternative) resulting in minor, long-term, beneficial impacts to the influence area economies.

Alternative B would provide a broader range of visitor activities and accessible recreation opportunities, including development of new interpretive programs, establishment of partnerships to attract broader audiences, and additional day-use opportunities. Opportunities to allow concessioners to expand services would be pursued, including water taxi, ferry, and rental services. Construction actions which might generate new interest from visitors and allow for greater visitor capacity include establishment of a ranger station and orientation center near Hozomeen, construction of research and educational facilities in the Hollywood district, construction of new campgrounds and additional outdoor learning shelters, expansion of Ross Lake Resort, and the formalization of parking at climbing areas.

The following actions would possibly reduce visitation and visitor spending: ~~restricting seaplane landings to frontcountry zones,~~ setting use levels for scenic overflights of the recreation area; requiring special boat motors, prohibiting motor boats on the Skagit River, and limiting concession authorizations if user capacity is exceeded.

Overall, the actions proposed in Alternative B could result in small increases in the number of visitors and the length of visitor stays, and related visitor spending; however, some proposed actions could restrict visitation. Visitation would have the potential to increase in the shoulder and winter seasons as well as during off-peak summer days. Peak summer visitation would remain limited to some extent by available parking spaces and campsites. Increased visitation would increase employment, business sales, and incomes in the tourism industry, as well as government tax revenues. An increase in the number of visitors and in visitor spending would also reduce unemployment in the tourism industries. Because of the enhanced recreational opportunities proposed in Alternative B, implementation of the alternative might indirectly enhance the influence area's attractiveness for economic development. However, the expected changes would be small, and increased visitation would have negligible, long-term, beneficial impacts to the influence area's economy.

Partnering with Seattle City Light to use excess housing at the Hollywood site for recreation area staff would make more housing available, perhaps resulting in slightly higher vacancy rates and lower rental rates in surrounding communities. Alternative B also proposes to build ~~tent cabins~~ temporary seasonal housing for ~~housing~~ employees at Marblemount. The impacts would be minor, long-term, and beneficial to renters and employees, but minor, long-term, and adverse to individuals leasing room space in the adjacent community.

Economic Impacts to Local Commercial Services and Neighboring Businesses

Park Service spending related to new construction would strengthen those businesses providing construction services. In turn, construction worker

spending on food and materials would strengthen local services. Government revenues would also see increases due to increased sales and associated taxes. Increases in construction spending would result in minor to moderate, short-term, beneficial impacts to commercial service providers and neighboring businesses.

The impact of wages for new staff and annual operational spending by the recreation area would be greater on the local area than in the entire influence area. Impacts to employment, incomes, and government revenues would be long-term, minor to moderate, and beneficial to the local communities.

With small increases in visitation, visitor spending, and the length of visitor stays, local businesses providing services to tourists would benefit through increased business. An increase in the number of visitors might allow for businesses to provide expanded services. However, the small increases in visitation that could occur would result in negligible to minor, long-term, beneficial impacts to commercial service providers and outfitters.

Alternative B calls for a transportation study that would look at the feasibility of a shuttle system to provide service to the recreation area. If a shuttle system were implemented, a concessioner would have the opportunity to provide the service. This would increase a concessioner's business or provide a new business opportunity. A shuttle service would result in a minor to moderate, long-term, beneficial impact to the operator.

~~The NPS would limit seaplane landings to frontcountry zones, which may limit the frequency of seaplane use in Ross Lake NRA, and perhaps reduce business sales, employment, and incomes. This would have an adverse, long-term, minor impact to seaplane service providers.~~

The NPS also would request that the FAA establish tour routes and set use limits on scenic overflights of Ross Lake NRA. This would limit the number of customers that flight tour operators could take to Ross Lake NRA, and perhaps diminish business sales, employment, and incomes. This would result in a negligible to minor, long-term, adverse impact given the estimated numbers of providers using the NRA.

Prohibition of motor boats on the Skagit River would result in a negligible, long-term impact to outfitters, given the estimated number of outfitters using this section of the Skagit River for motorized recreation; however, it would be of indeterminate effect since non-motorized boat rentals and tours might increase in place of motorized boat tours and rentals.

Alternative B proposes the placement of limits on commercial use authorizations (CUAs) if user capacity limits are exceeded. CUAs are used by the National Park Service to authorize individuals or businesses to provide commercial services to recreation area visitors in limited circumstances. These limitations would limit visitors to capacity levels and therefore would limit sales, incomes, and employment; this would result in a long-term, negligible to minor adverse impact to concessioners.

Alternative B also proposes exploring expanding concessioner opportunities, such as water taxi, ferry, lodging, and rentals. If found feasible, additional services would expand concessioner business and result in a minor, long-term, beneficial impact, if not, no impact would occur.

Impacts to Social Characteristics

~~This alternative also proposes to acquire the Hollywood district from Seattle City Light through exchange or purchase. The recreation area would preserve structures eligible for listing in the National Register of Historic Places, and adaptively re-use or remove structures not eligible for listing. New structures would be built to suit the needs of the NPS and its partners. This land is within the recreation area boundaries, and the dam facilities would remain in operation by Seattle City Light. The result of this proposal would have beneficial impact to the social character of the influence area because the historic structures would be preserved, and additional park and partner uses would be accommodated. The impact to land use would be minor, long-term, and beneficial to the social character of the influence area.~~

Increases in the number of visitors and length of visitor stays would impact traffic in the local area, but since increases could be small, the impact would be negligible, long-term, and adverse. This impact would occur primarily in the gateway community of Marblemount, along the North Cascades Highway ~~State Route 20~~, within and on either side of the recreation area, and in and around the district municipality of Hope.

Potential shuttle service in and around the recreation area would relieve some traffic in the service area. Local residents would have the opportunity to use this

service, and therefore, it would provide a negligible, long-term, beneficial impact to the social character of the local area.

Construction activities would affect traffic, as construction vehicles may be moving slowly and turning in and out of construction areas, and because there would be an increase in the amount of traffic due to workers coming to the area. Construction of a turn lane at Ross Dam Trailhead parking lot would also disrupt traffic temporarily, but would relieve some congestion once built. Construction activities would result in a minor, short-term, adverse impact to traffic and long-term, minor beneficial impacts to traffic.

While there is a mix of beneficial and adverse impacts, the overall impact of Alternative B to the influence area socioeconomics would be both short and long-term, minor, and beneficial.

Cumulative Impacts
Projects that are not associated with this general management plan can interact with projects proposed in the GMP alternatives, resulting in a cumulative impact on the influence area's social and economic environment. Cumulative Impacts are the same as Alternative A.

Impacts of Alternative B, in combination with short- and long-term minor beneficial effects on the influence area's economy described above would result in both short- and long-term, minor, beneficial cumulative impacts to the influence area's socioeconomic environment. Alternative B would have a modest contribution to the overall cumulative impact.

Conclusion
Alternative B would have a minor beneficial impact to the socioeconomic environment of the influence area. The impact would be greater in the immediate areas surrounding the recreation area. The impacts of the actions proposed in Alternative B and impacts of other projects in the area combine to have short- and long- term, minor, beneficial cumulative impacts to the influence area's social and economic environment.

Park Operations

Facilities and Sustainability

Under Alternative B, major visitor and operational buildings and infrastructure, including headquarters, staff offices, and visitor centers, would continue to be concentrated in the same general areas of Ross Lake NRA as Alternative A; however, some facilities would be replaced, others would be expanded in size or services and utilities offered and new facilities could be added. The Wilderness Information Center in Marblemount would be remodeled in the current location, new seasonal housing would be constructed in Marblemount, a new ranger/orientation station would be constructed in Hozomeen, the parking area for the Ross Dam trailhead and the Thunder Knob trailhead parking area would be reconfigured and expanded, new campsites could be constructed and additional services could be added to existing campgrounds. In addition, the potential acquisition of the Hollywood District could add a substantial new operational and management responsibility for Ross Lake NRA. Activities associated with the construction and maintenance of these new facilities could result in short-term minor impacts by focusing staff efforts on these projects and potentially long-term minor to moderate adverse impacts by increasing the facilities that need to be maintained. If staffing (both numbers and areas of expertise) and funding to support the infrastructure changes was not fulfilled, negative impacts could be moderate to major.

Facilities that were not deemed to be sustainable could be relocated under Alternative B. Relocating facilities or portions of facilities that require substantial efforts to retain them in the event of severe weather such as flooding would have a moderate-long-term benefit by locating facilities in areas that require less intensive effort to sustain them.

While new trails could also be constructed under Alternative B, trails that are not used could also be decommissioned, resulting in minor long-term benefits by reducing the needs for trail maintenance in seldom used areas of Ross Lake NRA.

Incremental changes in green facility design would be similar to Alternative A; however, additional changes to reduce carbon emissions and increase energy and fuel efficiency whenever and wherever possible could result in long-term moderate benefits to park operations by creating a more sustainable infrastructure.

Operational Efficiency

The replacement and reconstruction of facilities that are declining would have long-term minor to moderate benefits on operational efficiency by reducing the needs for maintenance. Creating opportunities for housing both in Marblemount and Hollywood would result in minor to moderate long-term benefits to operations by locating staff closer to their work

locations, and also creating housing opportunities for the often short seasons that can be limited to three months in the North Cascades and often preclude seasonal staff from finding private housing options in the vicinity. Making better use of the existing facilities along the North Cascades Highway, and increasing collaboration with partners in utilizing these facilities, would have moderate long-term benefits to operational efficiency.

Staffing

In the short term, impacts from staffing are the same as Alternative A with funding for staffing levels continuing to be inadequate to meet the increased needs of Ross Lake NRA, resulting in long-term minor adverse impacts to NRA operations. In the long-term, staffing increases in resource management, interpretation, visitor protection, facilities and maintenance, and administration coupled with expanded emphasis on partnerships could have long-term moderate benefits to operations by increasing the capacity of Ross Lake NRA to meet the needs of the operation and visitors.

Cumulative Impacts
Cumulative impacts are similar to those in Alternative A. Past and ongoing projects, including road, trail, and facility maintenance and repairs have had long-term moderate beneficial impacts on park operations. Aging facilities and infrastructure, including utilities and systems, would continue to be repaired, upgraded or replaced as needed on a case-by-case basis, subject to available funding. Over time, more sustainable and efficient facilities and infrastructure would replace those that are aging or no longer meet the needs of Ross Lake NRA, resulting in moderate, long-term benefits to the recreation area by reducing maintenance needs.

Conclusion
Under Alternative B, there would be some noticeable changes to facilities as facilities like the Hozomeen contact station would be replaced, others like the Ross Dam trailhead parking would be expanded in size, and new facilities like trails could be added, resulting in both moderate benefits and adverse effects. Additional changes to improve the environmental sustainability in all aspects of facility and infrastructure management could have long-term moderate benefits to park operations. Changes in staffing and operational efficiency would have long-term moderate benefits to park operations. As more projects are completed that repair, upgrade, and replace aging facilities and infrastructure, and more sustainable systems are installed, maintenance needs would be reduced, resulting in moderate, long-term benefits. However, until those facilities are replaced, periodic and extensive maintenance would be required. The overall effects of implementing Alternative B on park operations would be long-term, moderate and beneficial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are defined as moderate to major impacts that cannot be fully mitigated or avoided.

Under Alternative B, there would be a negligible potential for unavoidable adverse impacts on natural resources because there would be little new development, although there could be some new or renovated facilities, such as the Ross Dam Trailhead parking lot, the potential relocation of some campsites from Colonial Creek in the event of a catastrophic flood event, and the changes to the Wilderness Information Center.

There would be little to no unavoidable adverse impacts on cultural resources because the NPS would strive to preserve and adaptively use buildings, structures, and landscape features that are eligible for the National Register~~, notably in the Hollywood District of Diablo Townsite should the land be acquired by the NPS.~~

Some existing conditions have resulted in unavoidable adverse impacts. The location of park facilities, the Skagit Hydroelectric Project, and roads, including the North Cascades Highway, in floodplains, and the maintenance of this infrastructure has resulted in adverse impacts to floodplains and riparian areas. Most of the infrastructure would remain in these locations. Additional unavoidable impacts would likely occur on vegetation and soils, primarily in the existing developed areas where visitor use is concentrated.

Relationship between Local Short-Term Uses and Long-Term Productivity

Under all of the alternatives, most of Ross Lake NRA would be protected in a natural state and would continue to be used by the public. Under all the alternatives, the National Park Service would continue to manage Ross Lake NRA to maintain ecological processes and native and biological communities, and to provide for appropriate recreational activities

consistent with the preservation of natural and cultural resources.

Some previously disturbed areas would be rehabilitated to return these areas to productivity. Any actions the National Park Service takes in Ross Lake NRA would be taken with consideration to ensure that uses do not adversely affect the productivity of biotic communities. Under the Alternative B, there would be no appreciable loss of ecological productivity because there would be little new development. Existing developed areas and infrastructure within Ross Lake NRA, including the Skagit Hydroelectric Project and the North Cascades Highway, would remain.

Irreversible or Irretrievable Commitments of Resources

Irreversible commitments of resources are actions that result in the loss of resources that cannot be reversed. Irretrievable commitments are actions that result in the loss of resources, but only for a period of time.

No actions would be taken as a result of the Alternative B that would result in the consumption of nonrenewable resources that would preclude other uses for a period of time. Thus, there would be no irreversible or irretrievable commitments of resources in Ross Lake NRA by the National Park Service.

No actions would be taken that would result in irreversible or irretrievable effects on historic properties. NPS staff would continue to conduct appropriate cultural resource management in accordance with the Secretary of the Interior's Standards and NPS policies.

Impacts from Alternative C

Natural Resources

Air Resources

Air Pollution

Emissions of various air pollutants as a result of visitor use, and park operations including wild land fire management would be similar to Alternatives B. The impacts of these activities on air pollution would generally be negligible to minor, except for large wildfires which could be major and adverse.

Greenhouse Gas Emissions

Greenhouse gas emissions would generally be similar to Alternative B. The impact of these emissions on human-forced climate change would be adverse but negligible.

Visibility (Regional Haze)

Impacts to visibility would generally be similar to Alternative B. Impacts would primarily result from wildfires, and would be negligible to possibly major depending upon the severity and location of the fire in relation to Ross Lake NRA.

Cumulative Impacts
Cumulative Impacts to Air Resources would generally be similar to Alternatives A and B. These cumulative impacts would overwhelmingly result from various activities outside the boundaries of Ross Lake NRA

Conclusion
Similar to Alternatives B, direct and indirect impacts to air quality would generally be negligible to minor and adverse. Cumulative impacts to air quality would remain negligible to minor, because the air quality within Ross Lake NRA is predominately influenced by human activities outside of Ross Lake NRA, including regional and global sources of pollution. The management actions proposed under Alternative C would generally be negligible to minor and adverse. Impacts from wildland fire could be adverse and major, but would not endure. There would be no impairment of air resources within Ross Lake NRA.

Natural Soundscapes

Under Alternative C, several impacts would be the same as those identified under the Preferred

Alternative. Actions would include an expansion of the soundscape monitoring program, identification of unacceptable sounds and sound levels, and active management of soundscapes; enhanced visitor education and orientation; motorboat restrictions on reservoirs and on the Skagit River; reconfiguring camping at Hozomeen; alternative transportation opportunities; limited use of explosives to manage avalanches along the North Cascades Highway; and closure of the portion of Thornton Lakes Road that is in wilderness. All of these actions would result in a beneficial impact to the natural soundscape.

In addition to the actions described above, there are several actions unique to this alternative that would have a beneficial impact by further protecting the natural soundscape. These actions include keeping the range of visitor opportunities more traditional (hiking, backpacking, water recreation, and other self-powered activities that have a minimal impact on resources); instituting a ban on seaplane landings, development of an air tour management plan, and a request to ban scenic overflights throughout Ross Lake NRA; no net increase in trails; and regulating snowmobile use on the closed portion of the North Cascades Highway.

Although there are numerous actions that would be taken under Alternative C that would benefit the natural soundscape, several factors would still have adverse impacts. Short-term adverse impacts to soundscapes could still result from construction activities related to new facilities or adaptive reuse of existing buildings. However, Alternative C proposes modest construction and new facilities such as the Ross Dam Trailhead parking would be designed to accommodate their existing capacity as opposed to expanded capacity. Impacts from the noise footprint of these areas could still result in greater types of vehicles but likely not a substantial increase in numbers. Therefore, long-term adverse impacts from these activities would likely be minor.

The largest impact would continue to be noise generated along the North Cascades Highway. Although education and enforcement would help to mitigate the highest levels of noise, impacts would still be moderate during the peak summer season due to high traffic volumes. Impacts along the reservoirs due to boat noise would be minor.

Cumulative Impacts
Cumulative impacts would be similar to those already identified in Alternatives A and B, except that impacts on natural soundscapes due to ongoing public automobile traffic, motorboat use, and aircraft use will be further reduced. Impacts from NPS administrative uses, Seattle City Light, and Ross Lake Resort would be the same as Alternative A. Depending on the action and time of year, these actions could result in minor to moderate adverse impacts, and many beneficial impacts. In combination with the No Action Alternative, these cumulative impacts would result in minor to moderate impacts on the natural soundscape; however, many actions would be beneficial and would help to preserve the natural soundscape to a larger extent than Alternative B.

Conclusion
Under Alternative C, several more actions would be taken that would result in further protection or improvement in the natural soundscape compared to current conditions. Impacts would vary based on the time of year and location and would range from minor to moderate. Minor impacts would occur along the reservoirs, and moderate impacts would occur during peak use times along the highway. Cumulative impacts would range from minor to moderate. Implementation of this alternative would not result in impairment.

Water Resources

Water Quality

Impacts to water quality from primarily non-point sources of pollution would generally be similar to Alternative A. These impacts would primarily be associated with runoff from impermeable surfaces in Ross Lake NRA. Impacts would be minor to moderate, long-term and adverse.

Hydrologic Processes

The hydrologic processes of the Skagit River watershed within Ross Lake NRA would generally be minimally affected by continued management activities proposed for Alternative C. As with Alternative A, the scale of potential management actions would simply be too small to have any measurable effect on the broad patterns and processes of weather, climate and precipitation that substantially govern the hydrology and hydrologic processes of the Skagit River Watershed in Ross Lake NRA.

Hydraulic processes

The hydraulic processes of surface streams, creeks and the Skagit River could be affected to varying degrees by the management actions proposed for Alternative C. Broadly speaking, management actions intended to reduce erosion would continue to adversely impact

the hydraulic processes of running waters to varying degrees as described in the following sections.

As with Alternatives A and B, the NPS would continue to maintain and repair the transportation infrastructure, including roads, bridges, culverts, trails and transportation facilities. However, this alternative would be more like Alternative B in that facility relocation would be favored over bank hardening and channelization. Bank hardening and channelization would continue to cause minor to moderate adverse impacts to natural hydraulic processes at the local scale (i.e. individual stream reaches), and could possibly cause further problems in the future by encouraging a "negative feedback" cycle of head cut formation and further channel instability. These unintended consequences could require further management action in the future (Bolton and Shellberg, 2001). Should such action require the dredging of lacustrine wetlands, a Wetland Statement of Findings would be considered.

The North Cascades Highway would continue to adversely influence hydraulic processes in the vicinity of running waters along its alignment within Ross Lake NRA. Similar to Alternative B, Alternative C commits the NPS to working more proactively with WSDOT to encourage habitat-friendly streambank protection measures and other habitat-friendly techniques whenever possible. Continued bank armoring to protect the North Cascades Highway ~~SR20~~ would cause long-term adverse impacts to hydraulic processes of running waters in Ross Lake NRA.

Cumulative Impacts
Management actions associated with Alternative C would have negligible to minor cumulative impacts because there would only be a modest expansion of some facilities and the slightly increased overall footprint of impermeable surfaces within Ross Lake NRA. Otherwise, most cumulative impacts to water resources would result from activities within Ross Lake NRA associated with management of the North Cascades Highway, and with hydroelectric operations. Outside of Ross Lake NRA, cumulative impacts to water resources would remain similar to Alternatives A and B.

Conclusion
Impacts to water quality would range from negligible to minor and adverse. Impacts would be associated with NPS operations and maintenance related activities, including road and facility maintenance, and boating operations. There would also be impacts stemming from the industrial uses associated with Seattle City Light, with motor vehicle use, and with maintenance of the North Cascades Highway corridor. There would be negligible impacts to hydrology. Impacts to hydraulics would be localized, long-term, adverse and of negligible to moderate intensity. These impacts would be primarily associated with local manipulation of hydraulics to protect roads, campgrounds and facilities from erosion. Cumulative impacts to water resources would be negligible to minor, long-term and adverse because there would be no substantive changes to existing park operations or operations associated with the Skagit River Hydroelectric Project. Moreover, the impacts from climate change on water resources (water quantity, quality and hydrology) are expected to gradually increase within the 15-20 year lifespan of this plan, but then accelerate rapidly beyond the planning horizon (University of Washington Climate Impacts Group, 2009). Direct, indirect and cumulative adverse impacts to water resources would remain negligible to moderate because there would be no substantial changes to current management. Therefore, there would be no impairment of water resources under Alternative C.

Geologic Resources, including Soils

The impacts of Alternative C would generally be similar to Alternative B in regard to:

- maintenance of trails and associated facilities, including minor relocations
- flood-damage repairs to facilities and the transportation network
- construction of several new trails in various locations, mainly in frontcountry areas

Impacts from recreation-related management activities would be similar to Alternative B. Impacts would be associated with social trail formation, backcountry use, rock climbing and development of new routes, and various off trail activities such as mountaineering. The adverse impacts to surficial geologic resources and soils would be long-term, negligible to minor and adverse.

Impacts from road management practices would generally be similar to Alternatives B. Overall, the impacts to surficial geologic resources and soils would be long-term, negligible to moderate and adverse.

Cumulative Impacts
Cumulative impacts to geologic resources would generally be similar to Alternative B, although there would be slightly increased ground disturbance. Otherwise, cumulative impacts associated with non-

NPS management actions within Ross Lake NRA (such as hydroelectric operations, the North Cascades Highway ~~SR20~~ maintenance) and outside Ross Lake NRA would be similar to Alternatives A and B.

Conclusion
Direct and indirect impacts to soils and geologic resources from recreation-related activities would be negligible to minor, long-term and adverse. Impacts from management of facilities and the transportation infrastructure would be adverse, negligible to minor and long-term. Cumulative impacts from past and reasonably foreseeable management actions would range from negligible to moderate in intensity. There would be no major, long-term adverse impacts from NPS management actions. Impacts to special status plant species would be similar to Alternatives A and B. There would be no impairment of soils and geologic resources as a result of implementing this alternative.

Vegetation (including special status species)

Impacts to vegetation under Alternative C would be generally similar to Alternative B with respect to vegetation management and fire management programs. These impacts would be minor to moderate, long-term and both beneficial and adverse. Adverse impacts would primarily be associated with fire suppression; impacts could range from minor or even major depending upon the extent of fire suppression. Beneficial impacts would be associated with restoration of previously disturbed areas, and with non-native plant management.

Various recreation and visitor uses could adversely affect vegetation via direct harm such as trampling and social trail development, and via indirect means such as importation and spread of invasive, non-native plants, or human caused wildfire. Certain emerging activities, such as sport climbing and bouldering, would be allowed to expand into new or undisturbed locations provided resource surveys indicated no special status plant species would be harmed. Taken together, recreational impacts to vegetation are localized in scale, adverse, and negligible to minor in intensity.

Cumulative Impacts
The cumulative impacts of activities within Ross Lake NRA including NPS operation and maintenance of Ross Lake NRA's administrative and visitor service infrastructure, and recreational uses would generally be negligible to moderate and adverse. Cumulative impacts to vegetation-related resources would be similar to Alternatives A and B, as most cumulative impacts would result from activities outside of NPS control. The degree to which these external, adverse impacts may cumulatively threaten vegetation within the boundaries of Ross Lake NRA is uncertain, but likely to be adverse and to increase in severity in the future as development outside of Ross Lake NRA places greater pressure on park resources.

Conclusion
Impacts to special status plant species would be similar to Alternatives A and B. Alternative C would have negligible to moderate, adverse impacts on vegetation in regard to management of the transportation and administrative infrastructure. Recreation-related impacts would be negligible to minor, and adverse. Suppression of natural wildfires would have long-term, adverse and moderate to major impacts on vegetation. Cumulative impacts to vegetation would be adverse for areas affected by continued development and visitor use, and beneficial for areas that would be restored and revegetated. Impacts to vegetation would generally remain negligible to moderate. There would be no impairment of vegetation resources.

Fish and Wildlife (including special status species)

Impacts from Hunting and Fishing

Hunting and fishing would continue at levels similar to that of Alternatives A and B. Impacts to game populations would be negligible to minor and adverse. Impacts to fish populations from fishing-related activities would generally be negligible to minor and adverse.

Human Disturbance

Alternative C would continue to cause various forms of human disturbance as a result of recreation and visitor use. The impacts of these activities would be similar to Alternative A, and perhaps slightly less than Alternative B because this alternative could reduce certain visitor attractions such as closing affected portions of campgrounds in response to severe flooding. The difference would probably be negligible given the very limited area that would be affected by either the alternative.

Noise from vehicles traveling along the North Cascades Highway, especially extremely loud vehicles such as motorcycles, would continue to cause disturbance to wildlife, prompting avoidance of certain areas and other behavioral effects such as flushing (such as noise can flush birds from nests). In contrast to Alternative A, but similar to Alternative

B, the NPS would seek to reduce noise from motor vehicles by taking action to enforce existing motor vehicle noise standards and this could result in negligible to minor benefits to wildlife in the vicinity of highway.

Similar to Alternatives A and B, wildlife would continue to be harmed or killed by motor vehicles traveling along the highway corridor. There is no indication that overall visitor use of the area would differ compared to Alternative A, so impacts from motor vehicle related activities would generally be negligible to minor adverse and long-term.

Similar to Alternative B, Alternative C would provide additional food storage options, such as food storage canisters or boxes, in order to prevent bears and other wildlife from becoming habituated. Expansion of existing provisions for backcountry food storage would afford minor, beneficial impacts to wildlife, especially species such as bears.

Park Operations

Impacts from park operations under Alternative C would generally be similar to Alternative B.

Special Status Species

Impacts to Special Status fish and wildlife species would be similar to Alternatives A, B and D.

Cumulative Impacts
Alternative C would result in cumulative impacts that would generally be similar to other alternatives: negligible to minor over the planning horizon.

The impacts of human-forced climate change would be cause adverse cumulative impacts of uncertain magnitude.

Similar to Alternatives A and B, the impacts of human development and associated habitat loss and modification outside the boundary of Ross Lake NRA would have adverse effects on populations of terrestrial species with large home ranges, anadromous aquatic species such as salmon, and certain migratory bird species that rely on unprotected habitat outside the park boundary. The degree of impact to these species would be uncertain to predict as it would be substantially related to the relative success—or failure—of various large scale efforts currently underway to protect and restore the greater North Cascades ecosystem.

Conclusion
Direct and indirect impacts to fish and wildlife would be negligible to minor in regard to impacts from hunting and fishing (a consumptive use) and for general recreation use of the area. NPS management and operations would cause negligible to moderate impacts to fish and wildlife in limited areas, primarily those areas associated with the park's visitor service infrastructure. Cumulative impacts from NPS management actions would be negligible to minor. Most cumulative adverse impacts would result from management activities outside the boundary of Ross Lake NRA, or associated with the hydroelectric facilities. The cumulative effect of human-forced climate change would be uncertain, but likely to be adverse. Alternative C would cause generally negligible to minor impacts to fish and wildlife resources. Impacts to special status fish and wildlife species would be similar to Alternatives A and B. There would be no impairment to this resource or value as a result of implementing this alternative.

Cultural Resources

Archeological Resources

Actions under Alternative C would be the same as Alternative B, however the new program for paleoecological investigations would not include the full integration with interpretation and education programs. Implementation of Alternative B would still result in moderate long-term benefits to archeological resources through the new programs, partnerships, and opportunities that would enhance understanding of resources.

Alternative C calls for less development than Alternative B. Impacts to archeological resources from development or construction related activities would be similar to Alternative A.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative C would not contribute to adverse cumulative impacts.

Conclusion
Impacts from implementation of Alternative C would be similar to Alternative B and would result in moderate long-term benefits to archeological resource, even though this alternative does not include as extensive integration with interpretation and education opportunities. Cumulative impacts would be the same as Alternative A. Alternative C would

not contribute to adverse cumulative impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Historic Structures and Cultural Landscapes

Activities under Alternative C would be the same as Alternative A and would have minor to moderate benefits to historic structures and cultural landscapes.

Under Alternative C, impacts associated with the NPS acquiring Hollywood would be the same ~~through purchase or exchange would have similar benefits as well as potential adverse impacts~~ as Alternative B.

~~Implementation of Alternative C would result in a greater commitment to preserve the entire infrastructure in Hollywood, regardless of the National Register eligibility listing, in order to preserve the broader historic character of the area. All National Register eligible or listed properties would be protected. The mix of uses in Hollywood could enhance the long-term protection of historic properties by introducing a wide array of partners who could collectively have enough need to adaptively reuse all the properties on the site. This commitment could result in greater protection of cultural resources and historic properties, resulting in long-term benefits to those resources.~~

Providing public overnight access and increased recreational opportunities under Alternative C could result in long-term benefits similar to Alternative B by increasing support for historic preservation.

Cumulative Impacts
Cumulative impacts are the same as Alternative A and would be long-term, minor to moderate, adverse, and beneficial. Implementation of Alternative C would not contribute to long-term adverse impacts.

Conclusion
Alternative C would result in minor to moderate benefits similar to Alternative A. Impacts associated with the aAcquisition of Hollywood would be the same as Alternative B. Cumulative impacts are the same as Alternative A.~~with a commitment to long-term protection of historic properties for adaptive reuse could have additional moderate long-term benefits to historic preservation. The beneficial effects of Alternative C would contribute modestly to the overall beneficial cumulative effects.~~ There would be no impairment to this resource or value as a result of implementing this alternative.

Tribal Issues and Ethnohistory

Activities under Alternative C would be the same as Alternative A.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative C would also contribute a negligible to minor increment to the long-term adverse cumulative impacts.

Conclusion
Implementation of Alternative C would have moderate long-term benefits similar to Alternative A. Alternative C would also contribute a negligible to minor increment to the long-term adverse cumulative impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Museum Collections

Activities under Alternative C would be the same as Alternative A with associated long-term benefits plus: a) develop capacity to preserve and protect paleoecological and emerging collections and archives, such as storage and staffing; and develop exhibits related to paleoecological findings and emerging collections.

Actions under Alternative C would result in increased capacity to preserve new and emerging collections, contributing additional minor to moderate long-term beneficial impacts.

Cumulative Impacts
Cumulative impacts are the same as Alternative A and would result in major beneficial long-term impacts on the museum collections

Conclusion
The ongoing program has resulted in major beneficial impacts to the museum's collections. There would be long-term minor beneficial impacts on the collections. The planned cumulative activities would result in major beneficial long-term impacts. This alternative would add a small component not add to these impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Wilderness Character

Under Alternative C, a Minimum Requirement Analysis would still be used to determine if, when, and how actions would be implemented. The backcountry permit system would continue to be used to manage overnight use. Opportunities for visitors to experience wilderness character would still be abundant, and in some cases improved.

A number of actions that would help to protect or improve wilderness character under Alternative C are identical to those under the Preferred Alternative. These actions include implementation of a vegetation management plan, eradication of invasive non-native plants where feasible, allowing wildland fires to burn across the international boundary if conditions were appropriate, removal of the Thornton Lakes Road in wilderness, elimination of certain trails, and certain measures to protect natural soundscapes. These measures would include education about natural sounds, enforcement of noise standards on the North Cascades Highway, and boat restrictions.

As in the Preferred Alternative, the action of providing additional food storage boxes and/or requiring use of bear canisters would help to protect bears and people but would impact the undeveloped and unconfined aspects of wilderness character.

Several additional actions that would be taken to protect or improve natural soundscapes outside of wilderness would most benefit solitude in this alternative. Actions would include instituting a ban on seaplane landings, development of an air tour management plan, and a request to ban scenic overflights throughout Ross Lake NRA; no net increase in trails; and regulating snowmobile use on the closed portion of the North Cascades Highway.

Cumulative Impacts
Cumulative impacts to wilderness character would be the same as those identified in the Preferred Alternative. Impacts would range from minor to moderate and include fire suppression (under more limited instances under Alternative C), invasive non-native plant infestations that cannot be eradicated, fish stocking or removal, and climate change. Other impacts range from minor to moderate and are largely related to ongoing activities such as the existence and maintenance of infrastructure and facilities, installation of the Desolation Peak radio repeater, and other park administrative uses that might require helicopter use. In combination with the Alternative C, these cumulative impacts would result in minor to moderate impacts.

Conclusion
Actions under Alternative C would best protect or improve wilderness character. Although many actions would be taken that would benefit wilderness character, several past, present, or future activities will have cumulative impacts ranging from minor to moderate. Impacts would result from manipulation of wilderness by fish stocking or removal, fire suppression, other natural resource issues, development, motorized vehicle and equipment use, and management restrictions on unconfined recreation. Implementation of this alternative would not result in impairment.

Wild and Scenic River

This alternative focuses on resource protection and contains the most beneficial impacts related to natural and cultural resource protection and enhancement. This alternative has the same or similar actions affecting WSR segments related to the proposed two-lane bridge; motorized boating elimination; private non-motorized boating regulation; removal of facilities in floodplains; restoration of native fishery; creation of vegetation management plan; and recommendation to Congress to designate the Skagit River, Newhalem Creek, and Goodell Creek into the WSR system. In this alternative, the NPS would take additional protective actions and seek to lead restoration efforts, potentially providing additional beneficial impacts to river resources. Visitor experience efforts would focus on the wilderness experience. Actions related to bank protection would include removing facilities, implementing fish-friendly bank stabilization methods, and restoring banks that have been hardened.

The ~~As in the Preferred Alternative,~~ NPS would also encourage WSDOT to construct a longer bridge at Goodell Creek which could provide moderate beneficial impacts to free-flow and fishery values of Goodell Creek. No net new trails would be constructed and so the beneficial recreation impacts associated with additional trail opportunities along Goodell and Newhalem Creeks described in Alternative B would not be realized.

Cumulative Impacts
Similar to the No Action Alternative and Preferred Alternative, impacts would continue from the hydroelectric projects, roads, facilities, visitor use, and air borne pollutants. Resource protection will

dominate park managers' decisions and actions. NPS's leadership in natural resource protection and restoration of river banks would help mitigate any adverse impacts created by other entities. Actions related to increase in coordination and management efforts with SCL and WSDOT and designation of the Skagit River, Newhalem Creek, and Goodell Creek will provide moderate beneficial long-term impacts and improvements to river values.

Conclusion
With more regulated river access and visitor use and protections for natural resources and floodplains, eligible WSR segments would be more protected, ensuring the preservation of Outstandingly Remarkable Values (ORVs). This would result in moderate beneficial impacts over the long-term.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts to eligible WSR segments would generally be minor to moderate and beneficial over the long-term. NPS's leadership in natural resource protection and restoration of river banks would help mitigate any adverse impacts created by other entities.

There would be no impairment of WSR resources and values.

Visitation

As described in the other alternatives, visitation would be expected to increase proportionate to regional population growth. ~~Under Alternative C, the capacity of front country facilities would either be maintained or reduced, except in Diablo Townsite where some parts of the Hollywood District could be used for public overnight lodging.~~ In the backcountry, overnight visitation would still be limited by the number of campsites available and permits issued. The addition of an online permit ~~reservation~~ system for backcountry camps could slightly increase visitation by making it easier to plan camping trips. Removal of the portion of Thornton Lakes Road that is in wilderness and turning the old road into trail might make it a less appealing destination, thus reducing visitation. Overall, impacts to visitation would be minor to moderate because of the potential reduction of facilities.

Bans on seaplane use and scenic overflights would have ~~negligible~~ minor impacts on overall visitation to Ross Lake NRA, and motorboat restrictions, which could potentially affect a larger group of users, would have minor impacts. As in the other alternatives, wintertime and shoulder season use may slightly increase; however, little to no crowding or congestion would occur.

Cumulative Impacts
Cumulative impacts would be the same as those identified under Alternative A. Overall impacts to visitation due to these cumulative impacts would be negligible.

Conclusion
The impacts of Alternative C on visitation would range from negligible to moderate. Since there would be a potential reduction in facilities, crowding and congestion would be more likely to occur more often. Seasonal variations in visitation, as described in the other alternatives, would also occur under Alternative C.

Visitor Opportunities

General Recreational Opportunities

Recreational activities would continue to be characterized similar to Alternative B, with frontcountry experiences along scenic North Cascades Highway, lake and river recreation that includes both frontcountry and backcountry opportunities, and the ability to experience wilderness and use Ross Lake NRA as a gateway to explore the greater North Cascades. The NPS would seek to broaden connections between visitors and the greater North Cascades ecosystem and wilderness by providing opportunities that emphasized learning about wilderness values and interconnections while minimizing human impacts. Traditional, self-powered activities and learning would be emphasized, along with opportunities for solitude, challenge, and independent exploration. Additional moderate long-term benefits to the wilderness traveler and those visitors seeking independent exploration and solitude would result from this alternative.

Recreation along the North Cascades Highway and Hozomeen

Along the North Cascades Highway, a wide variety of recreational activities would continue to be available, including scenic driving, enjoying overlooks and wayside exhibits, picnicking and road biking. There would be opportunities to view the wilderness and experience a natural setting while accessing numerous amenities and services with benefits similar to Alternative B. Car camping opportunities with a range

of amenities would continue to be available at five campgrounds and three group camps. Campgrounds that are especially susceptible to changing stream flows and storm events, such as Colonial Creek Campground and Goodell Creek Campground (lower group camp and main sites), could be rebuilt in place if possible, or if this were not possible some sites or parts of these campgrounds would be abandoned, resulting in some net loss of camping opportunities, similar to the impacts in Alternative A.

Hozomeen would be reorganized to formalize its capacity, with impacts similar to Alternative B.

There would continue to be no stock facilities at car-campgrounds with impacts similar to Alternative A.

Should the NPS acquire Hollywood the effects would be the same as Alternative B.

~~New overnight lodging opportunities could be created in the Hollywood District with impacts similar to Alternative B.~~

Efforts would be made to improve the quality of corridor recreation by educating or enforcing noise ordinances.

Limited winter activities such as skiing, snow-shoeing, and bird-watching would continue as weather, road access, and plowing allow, similar to Alternative B. Snowmobiling use would be regulated along the closed portion of the North Cascades Highway, benefitting those using cross-country skis or snowshoes, but adversely impacting those preferring snowmobiles due to the change from unlimited use.

Land and trail-based opportunities

Impacts to land and trail-based opportunities would be similar to Alternative B. A number of short walks ranging in length from 100 yards to a few miles would continue to be available, as well as access to longer day hikes, backpacks, stock trails, and mountaineering routes in the wilderness and greater North Cascades. Some opportunities could be lost if a trail were closed for resource protection reasons, contributing minor short- or long-term adverse impacts depending on the duration of the closure. Hunting would be allowed within existing permitted areas. An effort would be made to improve visitor education about hunting and visitor safety, so as to reduce any potential conflicts between the small number of hunters and the majority of recreation visitors who are not hunting, and may be recreating (backpacking, camping, or hiking) in the same areas, some of which have high concentrations of use, including the Ross Lake Camps. These increased efforts would result in a moderate long-term benefit. Sport climbing in the Newhalem Gorge would continue in four designated areas under an Adopt-a-Crag program similar to Alternative B, and new and emerging uses such as canyoneering would be managed as any resource or visitor experience issues arose.

Similar to Alternative B and D, additional hiking opportunities and providing new trails in the future could be constrained by formal policies for maintaining core habitat for special status species such as grizzly bear, resulting in a negligible to minor long-term impact given the extent of the land base and likelihood of expanding trails beyond the highway corridor and into core area habitat.

Water-based opportunities

Visitors would continue to have access to a range of water-based recreation in both front and backcountry, as well as numerous associated day and overnight activities similar to Alternatives A and B. Impacts to water-based recreation opportunities for both motorized and non-motorized boats are similar to Alternative B.

Paddle craft would be encouraged; personal watercraft would continue to be banned.

Seaplanes would not be allowed on any lake or reservoir within Ross Lake NRA under Alternative C. Eliminating seaplane use would have minor to moderate adverse long-term impact on visitor experience because of the small overall numbers of current users that would be affected and numerous other seaplane opportunities that exist within the region. Impacts for those individual seaplane users who have historically visited Ross Lake via seaplane would be moderate to major and adverse.

Impacts from limiting motor boats on the Skagit River would be similar to Alternative B. On the Skagit River, regulations to limit party size or number of boats would also be considered, resulting in a moderate adverse impact to those who might be constrained by regulations but an overall long-term benefit to the majority of boaters on the Skagit by maintaining a quality experience. Fishing opportunities would remain unchanged, with the exception of prohibiting lead tackle, a minor adverse impact to fishermen who may need to acquire separate tackle.

Visitor and Information Centers

A range of visitor and information centers would continue to meet a variety of visitor needs similar to Alternative B. Impacts from these facilities and services would be similar to Alternative B.

Upgrades to the Wilderness Information Center in Marblemount would be similar to Alternative A, with the addition under Alternative C of the rehabilitation of the public side of this building in order to provide improved visitor services, a long-term moderate beneficial effect to most visitors. Wilderness rangers would also be added to the Newhalem North Cascades Visitor Center to increase awareness of the park's wilderness and improve services at this center, resulting in a moderate long-term benefit to visitors. The NPS would also seek to partner with BC Parks to build a new joint visitor and information center at Hozomeen in order to expand basic visitor services with moderate long-term benefits.

Most NPS information centers, with the exception of the information desk in Sedro-Woolley, would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information. However, improved signage and site design under Alternative C could mitigate the adverse impacts.

Those stations with increased or maintained staffing or services would provide a long-term moderate to major beneficial impact to most visitors. During certain seasons or at certain stations, where staffing or services are limited, there would be a moderate long-term adverse impact, especially for east side visitors.

Permits, Reservations, and Fees

Primary backcountry permitting services would continue similar to Alternative A and backcountry permits would still be required for all overnight backcountry stays in Ross Lake NRA, including all boat-in and hike-in camps. A backcountry reservation system could be developed and made available for a fee, with some sites held for walk-ins and fees would be evaluated for special services, reservations, and permits, creating impacts similar to Alternative B. The limited fee-based reservation service for commercial companies would continue.

Frontcountry reservations would be managed the same as Alternative A, while additional user fees for special services including reservations may be developed similar to Alternative B.

Campground facilities

Maintenance of campground facilities would continue similar to Alternative B. In the event that either Colonial Creek or Goodell Creek Campground is impacted by flooding, debris flow, or erosion, the campground would be repaired when possible and practicable, or if not then visitors would be re-directed to other existing campgrounds. An overall net loss of site could occur, creating adverse impacts to visitors similar to Alternative A.

The NPS would also rehabilitate Hozomeen Campground and Winnebago Flats to provide a more traditional camping experience with impacts similar to Alternative B.

There would be continue to be no hook-ups, showers, or overnight stock facilities at any campground and impacts would be similar to Alternative A.

Trails, Boat Launches, Picnic Facilities, etc.

The current number of trails and trail uses would be largely maintained at current levels, but some trails could be closed for resource protection, particularly if wildlife concerns arose. There would be no net increase of trails within Ross Lake NRA, a minor adverse impact to those seeking new opportunities or loop hikes. Some sections of trails could be lost if their adjoining trail segment in the national park is closed or abandoned, a minor to moderate adverse impact.

Existing facilities such as overlooks , waysides, picnic areas, and others would be maintained in a variety of locations along the highway corridor, and some recreation facilities such as new group picnic sites could be developed, resulting in a minor to moderate long-term benefit. Improved signage along the highway corridor, and at entrance points to Ross Lake NRA and North Cascades NPS Complex, would have long-term moderate benefits.

Current lake and river boat launches and boater facilities would be maintained at existing locations similar to Alternative A. There would be some threat that the main boat launch at Colonial Creek Campground will slowly silt in as debris washes from Rhode Creek into Diablo Lake, making this launch more difficult to use over time, especially for larger boats. Limited facilities and services specifically for

bicyclists would be maintained, a minor to moderate adverse impact.

Commercial Services And Facilities

The NPS would develop a commercial services plan to determine the optimal level of commercial services and facilities, and could consider establishing a user capacity or use limits with impacts similar to Alternative B. Commercial use guiding services would continue, but could be limited under a commercial services plan similar to Alternative B. Ross Lake Resort would be maintained at its existing capacity, with any replacement facilities following established NPS guidelines. The Resort would continue to operate portage service between Ross and Diablo lakes, as well as a single water taxi for shuttles on Ross Lake. Impacts would be similar to Alternative A.

~~The NPS would seek to acquire by exchange the Hollywood District of Diablo Townsite similar to Alternative B and would seek to preserve the area as a historical district, with appropriate public or NPS uses, including the potential for concession-run overnight lodging. Public overnight opportunities would be limited to those participating in specific programs; however, this action would still create an additional public overnight opportunity on an already developed site along the river, which is a rare opportunity. This action would have a moderate to major long-term benefit similar to Alternative B. Seattle City Light would continue to run additional facilities and services in Newhalem, creating similar benefits as Alternative B.~~

Cumulative Impacts
Cumulative effects would be similar to Alternative A and B. ~~The contribution of implementation to cumulative effects would be modest, resulting in overall long-term benefits to cumulative effects by increasing the potential for overnight lodging at Hollywood.~~ The prohibition on seaplanes from landing and taking off on all lakes in Ross Lake NRA would have a minor contribution to adverse cumulative effects given the availability of similar experiences throughout the region.

Conclusion
A range of visitor opportunities, facilities and services would continue to provide for visitor enjoyment and recreation activities, ~~and new opportunities would result from the acquisition of Diablo Townsite,~~ resulting in moderate ~~to major~~ long-term beneficial impacts on the visitor experiences; however, eliminating seaplane use throughout Ross Lake NRA could have moderate long-term adverse impacts. There would be moderate long-term beneficial cumulative impacts on visitors in the broader North Cascades. Implementation of this alternative would have a modest contribution to these cumulative impacts.

There would be overall moderate long-term beneficial cumulative impacts on visitors in the broader North Cascades. Implementation of this alternative would have a modest contribution to these cumulative impacts.

Information, Interpretation, and Educational Opportunities

Under Alternative C, Ross Lake NRA is used as a platform and classroom for education about the North Cascades, its history and resources, as well as civic engagement, stewardship, and public leadership. Opportunities in the park are primarily structured, but some opportunities for self-exploration and discovery could occur in the frontcountry zone primarily around existing centers of visitation. Enhanced off-site interpretation and education programs are provided through partners. NPS would develop and evaluate interpretive and educational messages and programs and increasingly rely on other partners to deliver the programming.

The improvement of traditional interpretive programming within existing facilities by developing, delivering, and evaluating priority resource management messages and the reaching of a broader audience through improved and more effective use of technology would have a major long-term beneficial impact to visitor experience.

Curriculum-based programs that focus on priority resource management messages related to preservation of the North Cascades ecosystem and that emphasize low-impact practices for hands-on activities that make learning relevant to students' lives would have a major long-term beneficial impact to visitor experience.

The expansion and emphasized participation in outreach programs to deliver Ross Lake NRA's priority resource management messages and build local and regional stewardship of the North Cascades ecosystem would have a major long-term beneficial impact to visitor experience.

Enhanced visitor orientation and informal education through improved signage, multi-media, and exhibits at existing waysides, contact stations, and along interpretive trails would have a major long-term beneficial impact to visitor experience. Improved signage would provide visitors a sense of approach and arrival as well as better orientation to the services and resources within Ross Lake NRA.

Partnerships programs that help enable visitors to have a lasting connection with the North Cascades and their park experience would have a major long-term beneficial impact to visitor experience.

Working with SCL to interpret the results of their research and how their research and operations connect with and influence NPS efforts to manage and preserve the North Cascades ecosystem would have a major long-term beneficial impact to visitor experience.

Newhalem

Updated exhibits, multi-media programs, and activities to provide visitors with more active and interactive opportunities that effectively use technology to provide engaging, fun, and educational activities that communicate priority resource management messages and cultivate stewards of the North Cascades ecosystem would have a major long-term beneficial impact to visitor experience.

Environmental Learning Center

The devotion of a moderate level of resources to Environmental Learning Center programs and operations, with the NPS developing and evaluating the interpretive and educational messages with NCI would have a major long-term beneficial impact to visitor experience.

Hozomeen

Increased partnership with British Columbia Parks to provide joint NPS/Canadian land- and water-based interpretive programs and expand basic visitor services, including providing backcountry permits would have a major long-term beneficial impact to visitor experience.

Cumulative Impacts
Cumulative impacts are the same as Alternatives A and B.

Conclusion
Overall, implementation of Alternative C would result in moderate to major long-term beneficial impacts to visitor experiences in the area of information, interpretation, and education. Expansion of partnerships with Seattle City Light, North Cascades Institute and British Columbia Parks would all contribute to beneficial impacts. Improvements to signage, media, displays, and mechanisms for outreach would also contribute long-term benefits. Focusing on priority resource management messages, enhancing curriculum-based programming, and other actions could help engage visitors and youth in hands-on stewardship and contribute long-term benefits. NPS information centers within Ross Lake NRA boundary along the North Cascades Highway would continue to be located a short drive off the main road, which could result in a minor to moderate adverse impact to those visitors who miss turn-offs to obtain information. Cumulative impacts would be the same as Alternative A and B.

Access and Transportation

Under Alternative C, access and capacity would either be maintained or reduced in most areas. As in the other alternatives, visitation would be expected to increase proportionate to regional population growth. Heaviest use would still occur along the North Cascades Highway, and since there are no proposed changes to roadway capacity, traffic congestion during peak summer weekends would continue, resulting in minor to moderate adverse impacts. If implemented, however, a shuttle system could potentially help to alleviate some of the congestion.

Access to the Ross Dam Trailhead parking lot will improve by constructing a turn lane at the entrance; however, the parking lot will be redesigned within its current footprint, resulting in a reduction of parking spaces and prohibition of the parking of RV and stock vehicles. Impacts to access would be adverse and moderate.

Removal of the portion of Thornton Lakes Road in wilderness would still allow access to the trailhead, and depending on the new trail location, the access route to the lakes could either be shortened or lengthened. The new parking area could potentially accommodate a larger number of vehicles than the current parking lot, thus improving access.

Other changes in access include ~~potential expanded overnight opportunities in the Hollywood District~~

~~and~~ reconfiguration of the Sourdough, Stetattle Creek, and Thunder Knob trailhead parking areas. ~~The existing one-way bridge that provides access to the North Cascades Visitor Center, Newhalem Creek Campground, and several trails, would be replaced with a two-lane bridge that accommodates two-way traffic, pedestrian access, and interpretive platforms. These slight increases in access would result in beneficial impacts.~~

Both seaplane landings throughout the NRA and motorboats along the Skagit would be restricted. Snowmobile use along the closed portion of the North Cascades Highway during the wintertime would be regulated. Although these restrictions would impact the visitor experience for these user groups, and impacts for individual users may be moderate to major and adverse, the overall impact to access and transportation would be negligible to minor based on numbers of users and beneficial for other forms of transportation, i.e., self-propelled boats on the Skagit and the reservoirs, motorboats on the reservoirs, and skiing and snowshoeing.

Cumulative Impacts
Cumulative impacts would be the same as those identified under Alternative A. Potential future actions, including general road, trail, or parking lot maintenance, and various types of work on the North Cascades Highway by WSDOT, could impact access; although delays may occur, visitors would not likely alter their travel destinations. Occasional road or trail closures also occur due to fire, avalanches, rockfalls, etc. Overall impacts to access due to these cumulative impacts would be negligible.

Conclusion
The impacts of the Alternative C on access and transportation would result in adverse, minor to moderate impacts during the peak season as well as beneficial impacts due to a few improvements in access and during non-peak times.

Socioeconomic Environment

Impacts to the socioeconomic environment due to implementing the actions in Alternative C would result from changes in operational spending, changes in visitor spending, and changes in visitor patterns. The impact of Alternative C is evaluated in comparison with the No Action Alternative.

Implementation of Alternative C, Preservation of the North Cascades ecosystem, would occur against the same backdrop of economic, demographic, and social changes across the influence area described under the No Action Alternative. The economic and social effects of Alternative C would add to those changes, but not fundamentally change the area's economic and demographic outlook.

Impacts to Demographics

Alternative C would have little direct impact on the influence area's population growth and impacts would be same as Alternative A. It is likely that many of the construction and related jobs would be filled by individuals already residing in the area. However, new staff proposed in Alternative C would likely come from outside as well as from within the influence area. Total increases in staff are proposed at 18 permanent full-time equivalent positions (FTEs). Beneficial and adverse impacts would be the same as Alternative A.

Population increases due to Alternative C would be minute compared with the total influence area population of about a half million people; therefore the impact would be negligible, long-term, and of indeterminate effect since there are both adverse and beneficial impacts to population growth. The addition of 18 new employees and their families would represent a small but detectable number. The impact of hiring all proposed new employees would be long-term, minor, and of indeterminate effect.

Economic Impacts to Influence Area

Increases in the recreation area's spending would have short-term impacts during construction of new facilities, and long-term impacts due to increases in annual budgets. Proposed construction projects include rehabilitation of the Hollywood district housing ~~and replacement of the bridge to Newhalem~~. Companies in the construction industry would see increased business if contracted to provide services. This, in turn, would strengthen construction employment and incomes. Construction workers frequenting the area would spend income on food and materials; increasing service businesses and government tax revenues. While construction spending would strengthen these areas of the economy, it would do so to a small degree in relation to the influence area's total economy. Short-term construction spending is estimated at $8.4 million ($8.3 million above that for the No Action Alternative). Construction spending would result in negligible, short-term, beneficial impacts to the influence area economy, since this amount would be likely spread over the 20-year planning timeframe.

Increases in the recreation area's annual spending also would have long-term effects related to employment of new staff similar to Alternative A. Annual operations spending in Alternative C is estimated at $8.5 million ($1.4 million more than the No Action Alternative), resulting in minor, long-term, beneficial impacts to the influence area economies.

Proposed actions that might increase visitation include establishment of a ranger station and orientation center near Hozomeen~~, construction of visitor lodging in the Hollywood district~~. Gateway communities would also be encouraged to develop visitor lodging. Some actions might encourage increased visitor spending. If facilities such as the Colonial Creek or Goodell Creek campgrounds are not replaced if they become severely damaged by weather events, visitors might stay in local area motels instead of campgrounds.

The following actions would possibly reduce visitation and visitor spending: prohibiting seaplane landings on all lakes in the recreation area, prohibiting scenic air tours over the recreation area; requiring special boat motors, prohibiting motor boats on the Skagit River, limiting concession authorizations if user capacity is exceeded, and not replacing damaged visitor facilities. Reduction in facilities could also result in fewer visitors.

Overall, the actions proposed by Alternative C could result in small changes in the number of visitors, length of visitor stays, and related visitor spending. Changes in visitation could affect employment, business sales, and incomes in the tourism industry, as well as government tax revenues. Changes in visitation and visitor spending could also change the number of unemployed in the tourism industries. Implementation of Alternative C might indirectly enhance economic development in the influence area's attractiveness because of enhanced recreational opportunities in the area. However, because the expected changes would be small, increased visitation would have negligible and long-term impacts to the influence area's economy.

Partnering with Seattle City Light to use excess housing for recreation area staff would make more housing available, perhaps resulting in higher vacancy rates and lower rental rates in surrounding communities. The impacts would be minor, long-term, and beneficial to renters and employees, but minor, long-term, and adverse to individuals leasing room space in the adjacent community.

Economic Impacts to Local Commercial Services and Neighboring Businesses

Operational spending related to new construction would strengthen those businesses providing food and materials, as construction workers would likely purchase these products. Businesses providing construction services would see increased business. Government revenues would also increase due to increased sales and associated taxes. Increases in construction spending would result in minor, short-term, beneficial impacts to commercial service providers and neighboring businesses.

The impact of wages for new staff and annual operational spending by the recreation area would be greater on the local area than in the entire influence area. Impacts to employment, incomes, and government revenues would be long-term, minor to moderate, and beneficial to the local communities.

Alternative C calls for a transportation study that would look at the feasibility of a shuttle system providing service to the recreation area. If a shuttle system were implemented, a concessioner would have the opportunity to provide the service. This would increase a concessioner's business or provide a new business opportunity. A shuttle service would result in a minor to moderate, long-term, beneficial impact to the operator.

The recreation area would prohibit seaplane landings on any lake within the recreation area; this would restrict seaplane operators to providing services elsewhere, and perhaps reduce business sales, employment, and incomes. This would have an adverse, long-term, negligible to minor impact to seaplane service providers given the estimated numbers using Ross Lake NRA.

The recreation area would request that the FAA prohibit scenic overflights of Ross Lake. This would restrict flight tour companies to areas other than Ross Lake, and perhaps diminish business sales, employment, and incomes. This would result in a negligible, long-term, adverse impact given the estimated numbers using Ross Lake NRA.

Prohibition of motor boats on the Skagit River would result in a negligible, long-term impact to outfitters given the estimated numbers using the Ross Lake NRA, however, it would be of indeterminate effect since nonmotorized boat rentals and tours might increase in place of motorized boat rentals and tours.

Changing the nature of the Hollywood district to concessioner-run lodging creates an opportunity for a concessioner to expand business, or for a new concessioner to start a business. This would have a minor, long-term, beneficial impact due to increased visitor spending and the resulting increase in incomes, as well as the potential increase in number of jobs.

Alternative C proposes the placement of limits on commercial use authorizations (CUAs) if user capacity limits are exceeded. CUAs are used by the National Park Service to authorize individuals or businesses to provide commercial services to recreation area visitors in limited circumstances. These limitations would limit visitors to capacity levels and therefore would limit sales, incomes, and employment; this would result in a long-term, negligible to minor adverse minor adverse impact to concessioners.

Impacts to Social Characteristics

This alternative also proposes to acquire the Hollywood district from Seattle City Light through exchange or purchase. The recreation area would preserve the buildings, structure, and landscape to preserve the historic character of the area. This land is within the recreation area boundaries, and the dam facilities would remain in operation by Seattle City Light. The result of this proposal would have beneficial impact to the social character of the influence area because the historic structures and character would be preserved. The impact to land use would be minor, long-term, and beneficial to the social character of the influence area.

Potential shuttle service in and around the recreation area would relieve some traffic in the service area. Local residents would have the opportunity to use this service, and therefore, it would provide a negligible, long-term, beneficial impact to the social character of the local area.

Construction activities would affect traffic, as construction vehicles may be moving slowly and turning in and out of construction areas; there also would be an increase in the level of traffic due to workers coming to the area and the presence of construction vehicles. Construction of a turn lane on the North Cascades Highway at the Ross Dam Trailhead parking lot would also disrupt traffic temporarily, but would relieve some congestion once built. Construction activities would result in a minor, short-term, adverse impact to traffic and long-term, minor beneficial impacts to traffic.

While there is a mix of beneficial and adverse impacts, implementation of Alternative C overall would result in short- and long-term, negligible to minor, beneficial impacts to the influence area's socioeconomic environment.

Cumulative Impacts

Projects that are not associated with this general management plan can interact with projects proposed in the GMP alternatives, resulting in a cumulative impact on the influence area's social and economic environment. Cumulative impacts are the same as Alternative A.

Impacts of Alternative C, in combination with short- and long-term minor beneficial effects on the influence area's economy described above would result in both short- and long-term, minor, beneficial cumulative impacts to the influence area's socioeconomic environment. Alternative C would have a modest contribution to the overall cumulative impact.

Conclusion

Alternative C would result in a negligible to minor, beneficial, impact to the influence area socioeconomics. The impact would be greater in the immediate areas surrounding the recreation area. The impacts of the actions proposed in Alternative C and impacts of other projects combine to have short- and long-term, minor, beneficial cumulative impacts to the influence area's social and economic environment.

Park Operations

Facilities and Sustainability

Under Alternative C, major visitor and operational buildings and infrastructure, including headquarters, staff offices, and visitor centers, would continue to be concentrated in the same general areas of Ross Lake NRA as Alternative A. Similar to Alternative B, some facilities would be replaced, others would be expanded in size or services and utilities offered, and new facilities could be added. Alternative C proposes a smaller expansion of buildings and infrastructure than Alternative B, notably at Hozomeen ranger/orientation station and Ross Dam Trailhead parking. No additional housing facilities would be added in Marblemount, creating similar facility maintenance needs as Alternative A. The land exchange in Diablo Townsite and effort to preserve the structures regardless of National Register eligibility could result in an increase to the number of facilities NPS staff may need to maintain. Activities associated with the

construction and maintenance of these new facilities could result in short-term minor impacts by focusing staff efforts on these projects and potentially long-term minor ~~to moderate~~ adverse impacts by increasing the facilities that need to be maintained.

Facilities that were not deemed to be sustainable would actively be relocated under Alternative C. Relocating facilities or portions of facilities that require substantial efforts to retain them in the event of severe weather such as flooding would have a moderate to major long-term benefits by locating facilities in areas that require less intensive effort to sustain them.

While new trails could also be constructed under Alternative C, trails that are not used could also be decommissioned, resulting in minor long-term benefits by reducing the needs for trail maintenance in seldom used areas of Ross Lake NRA, similar to Alternative B.

Incremental changes in green facility design would be similar to Alternative A and additional changes to reduce carbon emissions and increase energy and fuel efficiency whenever and wherever possible would be the same as Alternative B and also result in long-term moderate benefits to park operations by creating a more sustainable infrastructure.

Operational Efficiency

Impacts to operational efficiency are similar to Alternative B. The replacement and reconstruction of facilities that are declining would have long-term minor to moderate benefits on operational efficiency by reducing the needs for maintenance. Creating opportunities for housing in Hollywood would result in minor long-term benefits to operations by locating staff closer to their work locations, however, the lack of housing for short-term seasonal use in Marblemount would create minor to moderate long-term adverse impacts for some divisions whose work is centered in Marblemount.

Making better use of the existing facilities along the North Cascades Highway, and increasing collaboration with partners in utilizing these facilities, would have moderate long-term benefits to operational efficiency.

Staffing

Impacts to staffing are similar to Alternative B, although the distribution of future staffing increases varies. In the short term, impacts from staffing are the same as Alternative A with funding for staffing levels to continue to be inadequate to meet the increased needs of Ross Lake NRA, resulting in long-term minor adverse impacts to NRA operations. In the long-term, staffing increases in resource management, interpretation, visitor protection, facilities and maintenance, and administration coupled with expanded emphasis on partnerships could have long-term moderate benefits to operations by increasing the capacity of Ross Lake NRA to meet the needs of the operation and visitors.

Cumulative Impacts
Cumulative impacts are similar to Alternative A. Past and ongoing projects, including road, trail, and facility maintenance and repairs have had long-term moderate beneficial impacts on park operations. Aging facilities and infrastructure, including utilities and systems, would continue to be repaired, upgraded or replaced as needed on a case-by-case basis, subject to available funding. Over time, more sustainable and efficient facilities and infrastructure would replace those that are aging or no longer meet the needs of Ross Lake NRA, resulting in moderate, long-term benefits to the recreation area by reducing maintenance needs.

Conclusion
Under Alternative C, there would be noticeable changes to facilities as some facilities would be replaced, others would be expanded in size or services and utilities offered, and new facilities could be added, resulting in both moderate benefits and adverse effects. ~~However, greater effort would be taken to maintain the structures in the Hollywood District, resulting in an increase to the number of facilities that would need to be maintained but also greater flexibility for Ross Lake NRA in terms of housing staff and providing overnight accommodations for visitors.~~

Additional changes to improve the environmental sustainability in all aspects of facility and infrastructure management could have long-term moderate benefits to park operations. Changes in staffing and operational efficiency would have long-term moderate benefits to park operations. As more projects are completed that repair, upgrade, and replace aging facilities and infrastructure, and more sustainable systems are installed, maintenance needs would be reduced, resulting in moderate, long-term benefits. However, until those facilities are replaced, periodic and extensive maintenance would be required. The overall effects of implementing Alternative C on park operations would be long-term, moderate and beneficial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are defined as moderate to major impacts that cannot be fully mitigated or avoided.

Under Alternative C, there would be a negligible potential for unavoidable adverse impacts on natural resources because there would be little new development, although there could be some new or renovated facilities, such as the Ross Dam Trailhead parking lot, the potential relocation of some campsites from Colonial Creek in the event of a catastrophic flood event, and the changes to the Wilderness Information Center.

There would be little to no unavoidable adverse impacts on cultural resources because the NPS would strive to preserve and adaptively use buildings, structures, and landscape features that are eligible for the National Register~~, notably in the Hollywood District should the land be acquired by the NPS~~.

Some existing conditions have resulted in unavoidable adverse impacts. The location of park facilities, the Skagit Hydroelectric Project, and roads, including the North Cascades Highway, in floodplains, and the maintenance of this infrastructure has resulted in adverse impacts to floodplains and riparian areas. Most of the infrastructure would remain in these locations. Additional unavoidable impacts would likely occur on vegetation and soils, primarily in the existing developed areas where visitor use is concentrated.

Relationship between Local Short-Term Uses and Long-Term Productivity

Under all of the alternatives, most of Ross Lake NRA would be protected in a natural state and would continue to be used by the public. Under all the alternatives, the National Park Service would continue to manage Ross Lake NRA to maintain ecological processes and native and biological communities, and to provide for appropriate recreational activities consistent with the preservation of natural and cultural resources.

Some previously disturbed areas would be rehabilitated to return these areas to productivity. Any actions the National Park Service takes in Ross Lake NRA would be taken with consideration to ensure that uses do not adversely affect the productivity of biotic communities. Under Alternative C, there would be no appreciable loss of ecological productivity because there would be little new development. Existing developed areas and infrastructure within Ross Lake NRA, including the Skagit Hydroelectric Project and the North Cascades Highway, would remain.

Irreversible or Irretrievable Commitments of Resources

Irreversible commitments of resources are actions that result in the loss of resources that cannot be reversed. Irretrievable commitments are actions that result in the loss of resources, but only for a period of time.

No actions would be taken as a result of the Alternative C that would result in the consumption of nonrenewable resources that would preclude other uses for a period of time. Thus, there would be no irreversible or irretrievable commitments of resources in Ross Lake NRA by the National Park Service.

No actions would be taken that would result in irreversible or irretrievable effects on historic properties. NPS staff would continue to conduct appropriate cultural resource management in accordance with the Secretary of the Interior's Standards and NPS policies.

Impacts from Alternative D

Natural Resources

Air Resources

Air Pollution

Emissions of various air pollutants as a result of visitor use, and park operations including wild land fire management would be similar to Alternative B. The impacts of these activities on air pollution would generally be negligible to minor, except for large wildfires which could be major and adverse.

Greenhouse Gas Emissions

Greenhouse gas emissions would generally be similar to Alternative B. The impact of these emissions on human-forced climate change would be adverse but negligible.

Visibility (Regional Haze)

Impacts to visibility would generally be similar to Alternative B. Impacts would primarily result from wildfires, and would be negligible to possibly major depending upon the severity and location of the fire in relation to Ross Lake NRA.

Cumulative Impacts
Cumulative Impacts to Air Resources would generally be similar to Alternatives A and B. These cumulative impacts would overwhelmingly result from various activities outside the boundaries of Ross Lake NRA

Conclusion
Similar to Alternative B, direct and indirect impacts to air quality would generally be negligible to minor and adverse. Cumulative impacts to air quality would remain negligible to minor, because the air quality within Ross Lake NRA is predominately influenced by human activities outside of Ross Lake NRA, including regional and global sources of pollution. The management actions proposed under Alternative D would generally be negligible to minor and adverse. Impacts from wildland fire could be adverse and major, but would not endure. There would be no impairment of air resources within Ross Lake NRA.

Natural Soundscapes

Under Alternative D, several impacts would be the same as those identified under the Preferred Alternative. Actions would include an expansion of the soundscape monitoring program, identification of unacceptable sounds and sound levels, and active management of soundscapes; enhanced visitor education and orientation; reconfiguring camping at Hozomeen; potentially expanding camping facilities at Newhalem and Goodell group sites; alternative transportation opportunities; requiring four-stroke motorboat engines (or equivalent); additional boat transportation services; limited use of explosives to manage avalanches along the North Cascades Highway; and closure of the portion of Thornton Lakes Road that is in wilderness. All of these actions would result in a beneficial impact to the natural soundscape, except for the expansion of camping facilities at Newhalem and Goodell group sites and adding more boat transportation services, which would both result in minor adverse impacts.

Other actions that are similar to those found in the Preferred Alternative but have slight variation include providing a broad range of visitor activities (day use and overnight) throughout Ross Lake NRA; speed, size, and horsepower boat restrictions would only occur on Ross Lake and in Diablo Canyon; and development of an air tour management plan, establishment of use levels, and required permit to land seaplanes within the Frontcountry Zone ~~designated landing zones~~. Although some of these actions would benefit the natural soundscape, they are more limited in their benefit than the Preferred Alternative. Providing a broad range of visitor opportunities would result in negligible to minor adverse impacts by increasing use in certain areas.

Two actions under Alternative D are the same as Alternative A and will continue to have minor adverse impacts on the natural soundscape: unlimited motorboat use on the Skagit River and unrestricted wintertime use of the closed portion of the North Cascades Highway by snowmobiles.

Although there are some actions under Alternative D that would benefit the natural soundscape, several factors would still have adverse impacts. In addition, expanding visitor facilities or adaptively reusing current buildings could result in short-term adverse impacts to soundscapes from construction activities, similar to the Preferred Alternative. Expanding or adding facilities could also result in long-term impacts to soundscapes. The expansion of parking lots such as the Ross Dam Trailhead parking would not only allow for an increase in visitors, but an increase in the vehicles, both numbers and types (such as passenger

vehicles, RVs, and oversized vehicles) that could result in greater impacts to soundscapes from increased noise. In addition, expanded or new construction, and increased services at existing facilities could result in a new or larger noise footprint to an area. Proposing new services such as electrical hookups and showers in campgrounds could result in additional noise from increased people using a facility or the associated infrastructure such as HVAC systems, water and electrical systems, and potential minor to moderate long-term impacts.

As in the other alternatives, the largest impact would continue to be noise generated along the North Cascades Highway. Although education and enforcement would help to mitigate the highest levels of noise, impacts would still be moderate during the peak summer season due to high traffic volumes. Impacts along the reservoirs due to boat noise would be minor to moderate.

Cumulative Impacts
Cumulative impacts would be similar to those already identified in the other alternatives, except that impacts on natural soundscapes due to ongoing public automobile traffic and motorboat use may be somewhat reduced. Impacts from NPS administrative uses, Seattle City Light, and Ross Lake Resort would be the same as Alternative A. Depending on the action and time of year, these actions could result in minor to moderate adverse impacts, and some beneficial impacts. In combination with Alternative D, these cumulative impacts would result in minor to moderate impacts on the natural soundscape; however, some actions would be beneficial and would help to preserve the natural soundscape.

Conclusion
Under Alternative D, some actions would be taken that would result in protection or improvement in the natural soundscape compared to current conditions. Impacts would vary based on the time of year and location and would range from minor to moderate. Minor impacts would occur along the highway during the wintertime, as a result of expansion of activities and facilities, and due to an expansion in boat transportation opportunities. Minor to moderate impacts would occur during peak use times along the highway. Cumulative impacts would range from minor to moderate. Implementation of this alternative would not result in impairment.

Water Resources

Water Quality

Impacts to water quality from primarily non-point sources of pollution would generally be similar to Alternative A. These impacts would primarily be associated with runoff from impermeable surfaces in Ross Lake NRA. Impacts would be minor to moderate, long-term and adverse.

Hydrologic Processes

The hydrologic processes of the Skagit River watershed within Ross Lake NRA would generally be minimally affected by continued management activities proposed for Alternative D. As with Alternative A, the scale of potential management actions would simply be too small to have any measurable effect on the broad patterns and processes of weather, climate and precipitation that substantially govern the hydrology and hydrologic processes of the Skagit River Watershed in Ross Lake NRA.

Hydraulic processes

The hydraulic processes of surface streams, creeks and the Skagit River could be affected to varying degrees by the management actions proposed for Alternative D. Broadly speaking, management actions intended to reduce erosion would continue to adversely impact the hydraulic processes of running waters to varying degrees as described in the following sections.

As with Alternative A, the NPS would continue to maintain and repair the transportation infrastructure, including roads, bridges, culverts, trails and transportation facilities. However, one substantive difference would involve a commitment to protect key facilities and recreational access points via bank hardening and channelization. The NPS would follow the Washington Department of Fish and Wildlife's "integrated streambank protection guidelines" whenever possible, and avoid habitat-harmful practices such as bank armoring with rip-rap (WDFW, 2003). Bank protection techniques would include rock barbs, engineered log jams, and bioengineering; each measure would be tailored to the site. When possible, the NPS would seek to address the underlying causes of damage (such as undersized culverts) and seek improved engineering solutions to reduce the risk of further damage to facilities and the environment. Areas that would most likely be adversely affected by bank protection measures include Goodell Creek Campground, Colonial Creek Campground, and

various bridge crossings at Rhode Creek, Sourdough Creek, Damnation Creek, Thornton Creek and Pyramid Creek.

The North Cascades Highway would continue to adversely influence hydraulic processes in the vicinity of running waters along its alignment within Ross Lake NRA. Similar to Alternative B, Management Alternative D commits the NPS to working more proactively with WSDOT to encourage habitat-friendly streambank protection measures and other habitat-friendly techniques whenever possible. However, WSDOT has the legal jurisdiction and authority to operate and maintain the North Cascades Highway ~~SR20~~, so the NPS' ability to proactively influence the manner in which WSDOT responds to flood damage would remain limited. In most circumstances, it is assumed that due to limitations on funding and higher priorities elsewhere in the state, WSDOT would continue to respond in a reactive (and most likely emergency) capacity to harden and dredge stream channels in the vicinity of bridge crossings and culverts. It is also assumed that WSDOT would also seek to dredge or otherwise modify the streambed to ensure waters continue to flow under—not around—bridges. These actions would continue to result in localized, long-term adverse impacts to hydraulic processes of running waters in Ross Lake NRA. However, should such action require the dredging of lacustrine wetlands, a Wetland Statement of Findings would be considered at that time.

Cumulative Impacts
Management actions associated with Alternative D would have negligible cumulative impacts compared with Alternative A. These additional impacts would be associated with modest expansion of some facilities and the slightly increased overall footprint of impermeable surfaces within Ross Lake NRA. Otherwise, most cumulative impacts to water resources would result from activities within Ross Lake NRA associated with management of North Cascades Highway ~~SR20~~, and with hydroelectric operations. Outside of Ross Lake NRA, cumulative impacts to water resources would remain similar to Alternatives A and B.

Conclusion
Impacts to water quality would range from negligible to minor and adverse. Impacts would be associated with NPS operations and maintenance related activities, including road and facility maintenance, and boating operations. There would also be impacts stemming from the industrial uses associated with Seattle City Light, with motor vehicle use, and with maintenance of the North Cascades Highway ~~SR20~~ corridor. There would be negligible impacts to hydrology. Impacts to hydraulics would be localized, long-term, adverse and of negligible to moderate intensity. These impacts would be primarily associated with local manipulation of hydraulics to protect roads, campground and facilities from erosion. Cumulative impacts to water resources would be negligible to minor, long-term and adverse because there would be no substantive changes to existing park operations or operations associated with the Skagit River Hydroelectric Project. Moreover, the impacts from climate change on water resources (water quantity, quality and hydrology) are expected to gradually increase within the 15-20 year lifespan of this plan, but then accelerate rapidly beyond the planning horizon (University of Washington Climate Impacts Group, 2009). Direct, indirect and cumulative adverse impacts to water resources would remain negligible to moderate because there would be no substantial changes to current management. Therefore, there would be no impairment of water resources under Alternative D.

Geologic Resources, including Soils

The impacts of Alternative D would be similar to Alternative B in regard to:

- maintenance of trails and associated facilities, including minor relocations
- flood-damage repairs to facilities and the transportation network
- construction of several new trails in various locations, mainly in frontcountry areas
- expansion and/or relocation of new trailhead facilities (such as expansion of Ross Dam Trailhead parking lot)

Alternative D, however, would have slightly increased adverse impacts in areas surrounding certain facilities and recreational access points because measures such as bank hardening and channelization would be taken to protect facilities. However, protecting some key facilities would reduce the need to relocate facilities elsewhere, and possibly offset some of the impacts of staying in place.

Impacts from recreation-related management activities would be similar to Alternative B. These impacts would locally affect soils and surficial geologic resources as a result of additional social trail formation and expansion. These impacts would occur in a relatively small portion of Ross Lake NRA, primarily in areas of high recreational use such as popular frontcountry areas such as trailheads, sport climbing

areas, and campgrounds. Similar impacts would also continue to occur in backcountry camps and along informal trails such as mountaineering routes. These adverse impacts to soils would be long-term, negligible to minor and adverse.

Impacts from road management practices associated with Alternative D would continue to adversely impact surficial geologic processes and soils in the vicinity of road prisms, including NPS-managed roads and the North Cascades Highway ~~SR20~~ corridor. Expansion of Ross Dam trailhead would require blasting and removal of several thousand cubic yards of soil and bedrock over an approximately 2-acre area. The impacts to geologic resources and soils would be long-term, moderate to major and adverse.

Cumulative Impacts
Cumulative impacts to geologic resources would generally be similar to Alternative B, although there would be slightly increased ground disturbance from protecting key facilities, or relocating facilities, to ensure no net loss of visitor opportunities. Otherwise, cumulative impacts associated with non-NPS management actions within Ross Lake NRA (such as hydroelectric operations, North Cascades Highway ~~SR20~~ maintenance) and outside Ross Lake NRA would be similar to Alternatives A and B.

Conclusion
Direct and indirect impacts to soils and geologic resources from recreation-related activities would be negligible to minor, long-term and adverse. Impacts from management of facilities and the transportation infrastructure associated with the North Cascades Highway and Skagit Hydroelectric Project would be long-term, moderate to major and adverse. Cumulative impacts from past and reasonably foreseeable management actions would be long-term and major. There would be no impairment of soils and geologic resources as a result of implementing this alternative.

Vegetation (including special status species)

Impacts to vegetation under Alternative D would be generally similar to Alternative B with respect to vegetation management and fire management programs. These impacts would be minor to moderate, long-term and both beneficial and adverse. Adverse impacts would primarily be associated with fire suppression; impacts could range from minor or even major depending upon the extent of fire suppression. Beneficial impacts would be associated with restoration of previously disturbed areas, and with non-native plant management.

The limit-net-loss provisions for maintenance of visitor facilities such as campgrounds would cause minor to moderate, adverse impacts to vegetation in order to protect and maintain facilities in response to threats such as hazard trees, flooding, or other natural events. These impacts would generally be similar to current management (Alternative A), but slightly greater in magnitude compared to management Alternative B because additional management actions would need to be taken.

Various recreation and visitor uses could adversely affect vegetation via direct harm such as trampling and social trail development, and via indirect means such as importation and spread of invasive, non-native weeds, or human caused wildfire. The NPS would continue to mitigate the adverse impacts of recreation on vegetation through visitor education (such as Leave No Trace principles), permit systems, and enforcement of regulations when necessary. Certain emerging activities, such as sport climbing and bouldering, would be limited to existing areas and not allowed to expand into new or undisturbed locations unless resource surveys indicated no sensitive species would be harmed. Taken together, recreational impacts to vegetation, including special status plant species, would be similar to Alternative B: localized in scale, adverse, and negligible to minor in intensity.

Cumulative Impacts
NPS Management activities such as operation and maintenance of Ross Lake NRA's administrative and visitor service infrastructure would result in slightly increased cumulative impacts compared to management Alternative B, but similar to Alternative A. These impacts would result from the limit-net-loss policy of facility replacement. Otherwise, cumulative impacts to vegetation-related resources would be similar to Alternatives A and B, as most cumulative impacts would result from activities outside of NPS control. The degree to which these external, adverse impacts may cumulatively threaten vegetation within the boundaries of Ross Lake NRA is uncertain, but likely to be adverse and to increase in severity in the future as development outside of Ross Lake NRA places greater pressure on park resources.

Conclusion
Alternative D would have negligible to moderate, adverse impacts on vegetation in regard to management of the transportation and administrative infrastructure. Recreation-related impacts would be negligible to minor, and adverse. Suppression of natural wildfires would have long-term, adverse and

moderate to major impacts on vegetation. Cumulative impacts to vegetation would be adverse for areas affected by continued development and visitor use, and beneficial for areas that would be restored and revegetated. Impacts to vegetation would generally remain negligible to moderate. Impacts to special status plant species would be similar to Alternative A, B, and C. There would be no impairment of vegetation resources as a result of implementing this alternative.

Fish and Wildlife (including special status species)

Impacts from Hunting and Fishing

Hunting and fishing would continue at levels similar to that of Alternatives A and B. Impacts to game populations would be negligible to minor and adverse. Impacts to fish populations from fishing-related activities would generally be negligible to minor and adverse.

Human Disturbance

Alternative D would continue to cause various forms of human disturbance as a result of recreation and visitor use. This alternative would result in a greater number of trails and climbing routes compared to Alternatives A and B. Recreational use of these additional areas would cause a negligible to minor increase in adverse impacts to wildlife.

Noise from vehicles traveling along the North Cascades Highway, especially extremely loud vehicles such as motorcycles, would continue to cause disturbance to wildlife, prompting avoidance of certain areas and other behavioral effects such as flushing (such as noise can flush birds from nests). In contrast to Alternative A, but similar to Alternative B, the NPS would seek to reduce noise from motor vehicles by taking action to enforce existing motor vehicle noise standards and this could result in negligible to minor benefits to wildlife in the vicinity of the highway.

Similar to Alternatives A and B, wildlife would continue to be harmed or killed by motor vehicles traveling along the highway corridor. There is no indication that overall visitor use of the area would differ compared to Alternative A, so impacts from motor vehicle related activities would generally be negligible to minor adverse minor adverse and long-term.

Similar to Alternatives B and C, under Alternative D the NPS would provide additional food storage options, such as food storage canisters or boxes, in order to prevent bears and other wildlife from becoming habituated. Expansion of existing provisions for backcountry food storage would afford minor, beneficial impacts to wildlife, especially species such as bears.

Park Operations

Impacts from park operations under Alternative D would generally be similar to Alternative B, although there could be a slightly higher adverse impact to certain wildlife species as a result of maintaining and repairing facilities to adhere to a limit-net-loss policy for the visitor service infrastructure and there could be a slightly higher adverse impact to certain wildlife species as a result of several additional trails not contemplated under Alternatives A and B.

Special Status Species

Impacts to Special Status fish and wildlife species would be similar to Alternatives A, B and C.

Cumulative Impacts
Alternative D could result in slightly greater cumulative impacts to wildlife habitat compared with Alternative B in light of the limit-net-loss provision for the visitor service infrastructure. Nonetheless, there are no substantial expansions of roads, campgrounds or other facilities that could cumulatively and adversely affect fish and wildlife habitat. Therefore, cumulative impacts within Ross Lake NRA would be negligible to minor over the planning horizon.

Similar to Alternative A, the impacts of human-forced climate change would be cause adverse cumulative impacts of uncertain magnitude.

Similar to Alternative A, the impacts of human development and associated habitat loss and modification outside the boundary of Ross Lake NRA would have adverse effects on populations of terrestrial species with large home ranges, anadromous aquatic species such as salmon, and certain migratory bird species that rely on unprotected habitat outside the park boundary. The degree of impact to these species would be uncertain to predict as it would be substantially related to the relative success—or failure—of various large scale efforts currently underway to protect and restore the greater North Cascades ecosystem.

Conclusion
Direct and indirect impacts to fish and wildlife would be negligible to moderate in regard to impacts from hunting and fishing (a consumptive uses) and for general recreation use of the area. NPS management and operations would cause negligible to moderate impacts to fish and wildlife in limited areas, primarily those areas associated with the park's visitor service infrastructure. Cumulative impacts from NPS management actions would be negligible to minor. Most cumulative adverse impacts would result from management activities outside the boundary of Ross Lake NRA, or associated with the hydroelectric facilities. The cumulative effect of human-forced climate change would be uncertain, but likely to be adverse. Impacts to Special Status fish and wildlife species would be similar to Alternatives A, B and C. There would be no impairment to this resource or value as a result of implementing this alternative.

Cultural Resources

Archeological Resources

Actions under Alternative D would be the same as Alternative A with similar impacts, but would include better integration of current archeological programs with interpretation and education programs through development of additional interpretive materials and additional opportunities for visitors to participate in archeological excavations. These actions would contribute moderate long-term benefits to archeological resource preservation through increased awareness and understanding.

Alternative D has the greatest amount of construction and ground disturbing activity associated primarily with new trails and the expansion of the Ross Dam trailhead parking lot. Known archeological resources would be avoided to the greatest extent possible whenever ground disturbing activities such as road and trail maintenance or construction of new facilities was needed and archeological surveys and/or monitoring would precede any federal undertaking, consistent with the mitigation measures outlined in this plan. If National Register-eligible or listed archeological resources could not be avoided, impacts on such resources could be minor to major and adverse, and an appropriate mitigation strategy would be developed in consultation with affiliated tribes and the Washington State Historic Preservation Officer.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A and implementation of Alternative D would have a negligible contribution to the overall adverse cumulative effects on archeological resources.

Conclusion
Implementing Alternative D would result in moderate long-term benefits from enhanced preservation activities and increased understanding and awareness of resources. For the purposes of the National Historic Preservation Act section 106, the determination would be no adverse effect on archeological resources. Implementation of Alternative D would have a negligible contribution to overall adverse cumulative effects on archeological resources. There would be no impairment to this resource or value as a result of implementing this alternative.

Historic Structures and Cultural Landscapes

Actions under Alternative D would be the same as under Alternative B.

Under Alternative D, impacts associated with the NPS acquiring Hollywood ~~through purchase or exchange~~ would have similar benefits as well as potential adverse impacts as Alternative B.

All National Register listed resources and properties would be preserved and adaptively used and/or interpreted for the public, providing long-term benefits to those historic properties. All other properties not listed on the National Register would be removed and new facilities could be constructed to provide for a range of public camping and overnight opportunities. Depending on the types of new recreation facilities that could be constructed, introducing a mix of new recreation facilities around the historic properties could alter the context surrounding the National Register listed properties. Impacts would vary depending on the setting; however it is likely that new construction would not be permitted without appropriate mitigation if it had an adverse impact on National Register properties. Removing elements including buildings in Hollywood that were not eligible for the National Register could be considered a long-term benefit by enhancing better planning and preservation to Register-eligible properties through improved site design.

Providing public overnight access and increased recreational opportunities under Alternative D could result in long-term benefits similar to Alternative B by increasing support for historic preservation.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Alternative D would not contribute to the overall adverse cumulative effects.

Conclusion
The implementation of Alternative D would result in long-term moderate benefits to historic buildings and cultural landscapes. Alternative D would have no adverse effects and would not contribute to the adverse cumulative effects. There would be no impairment to this resource or value as a result of implementing this alternative.

Tribal Issues and Ethnohistory

Actions under Alternative D would be the same as under Alternative A and B and would result in moderate long-term benefits from ongoing consultation with Skagit Tribes and any adverse effects to ethnographic resources would be mitigated to negligible through a cooperative agreement.

Cumulative Impacts
Cumulative impacts would be the same as Alternative A. Implementation of Alternative D would have a negligible contribution to cumulative adverse impacts.

Conclusion
Implementing Alternative D would have moderate long-term benefits from ongoing consultation with Skagit Tribes and mitigation of any adverse effects to ethnographic resources. Cumulative impacts would be the same as Alternative A and implementation of Alternative D would have a negligible contribution to cumulative adverse impacts. There would be no impairment to this resource or value as a result of implementing this alternative.

Museum Collections

Actions under Alternative D would be the same as under Alternative A plus provide additional public access to collections items both online and on-site and increase the number and scope of exhibits, exhibit areas, and travelling exhibits to provide open display of collection objects and archives.

Impacts would be similar to Alternative A with long-term benefits to museum collections from ongoing preservation. Additional moderate long-term benefits would be similar to Alternative B from greater awareness, access to and public understanding of museum collections through new exhibits and displays

Cumulative Impacts
Cumulative impacts are the same as Alternative A and would result in major beneficial long-term impacts on the museum collections. Alternative D would contribute additional minor long-term benefits.

Conclusion
Impacts would be similar to Alternative A, with major beneficial impacts to the museum collections from ongoing management programs, facilities, and increased public appreciation from better access to museum collections in visitor center displays. Cumulative impacts are the same as Alternative A and would result in major beneficial long-term impacts on the museum collections. Alternative D would contribute additional minor long-term benefits. There would be no impairment to this resource or value as a result of implementing this alternative.

Wilderness Character

Under Alternative D, a Minimum Requirement Analysis would still be used to determine if, when, and how actions would be implemented. The backcountry permit system would continue to be used to manage overnight use. Opportunities for visitors to experience wilderness character would still be abundant, and in some cases improved.

Most actions under Alternative D are identical to those under the Preferred Alternative. Impacts to wilderness character under Alternative D differ from the Preferred Alternative in the following cases: existing invasive non-native species would be contained and eradication efforts would focus on new populations, and habitat fragmentation would only be considered when planning for new developments. Both of these actions provide weaker protection for wilderness character than the Preferred Alternative, and could result in minor adverse impacts.

Cumulative Impacts
Cumulative impacts on natural qualities would range from minor to moderate and include fire suppression (under more limited instances under Alternative D), invasive non-native plant infestations that cannot be eradicated, fish stocking or removal, and climate change. Other impacts range from minor to moderate and are largely related to ongoing activities such as the existence and maintenance of infrastructure and facilities, installation of the Desolation Peak radio repeater, and other park administrative uses that might require helicopter use. In combination with Alternative D, these cumulative impacts would result in minor to moderate impacts.

Conclusion
Under Alternative D, very few actions that would impact wilderness character differ from those under the Preferred Alternative. Those few actions, identified above, would have minor adverse impacts. As in the Preferred Alternative, a number of actions would be taken that would benefit wilderness character, but several past, present, or future activities will have cumulative impacts ranging from minor to moderate. Impacts would result from manipulation of wilderness by fish stocking or removal, fire suppression, other natural resource issues, development, motorized vehicle and equipment use, and management restrictions on unconfined recreation. Implementation of this alternative would not result in impairment.

Wild and Scenic River

This alternative focuses on expanding visitor recreation opportunities and experiences while also protecting natural and cultural resources. In terms of actions that would impact WSR values, this alternative is very similar to the Preferred Alternative. The three main different actions in terms of effects to eligible WSRs are (1) motorized boating would be allowed on the Skagit River (2) bank hardening and channelization would also be allowed to protect key facilities in response to flood events, and (3) wildlife habitat fragmentation would be allowed in certain situations to optimize recreation facility development. All of these measures would provide minor to moderate adverse impacts on WSR values and free-flowing characteristics. However, other measures as described in the Preferred Alternative analysis would provide minor to moderate beneficial impacts on WSR values. Overall, this alternative would provide minor beneficial impacts to eligible WSR segments.

Cumulative Impacts
Similar to the other alternatives, some adverse impacts would continue from the hydroelectric projects, roads, facilities, visitor use, and air-borne pollutants. Actions related to increase in coordination and management efforts with Seattle City Light and the Washington State Department of Transportation and designation of the Skagit River, Newhalem Creek, and Goodell Creek will provide moderate beneficial long-term impacts and improvements to river values.

Conclusion
With more regulated river access, improved facilities, and water resource protections; eligible WSR segments would be more protected, ensuring the preservation of Outstandingly Remarkable Values (ORVs). This would result in minor beneficial impacts over the long-term.

In conjunction with past, present, and reasonably foreseeable actions, cumulative impacts to eligible WSR segments would generally be minor and beneficial over the long-term.

There would be no impairment of WSR resources and values.

Visitation

As described in the other alternatives, visitation would be expected to increase proportionate to regional population growth. The capacity of front country facilities would either be maintained or expanded. In addition to those actions identified in the Preferred Alternative, there could be additional trails designated for stock use, and the Ross Dam Trailhead parking lot would be expanded to accommodate more vehicles. These additional actions would result in a negligible change in visitation. Thus, the impacts of Alternative D would be similar to those identified under the Preferred Alternative, ranging from negligible to minor during the peak summer season and negligible during the winter and shoulder seasons.

Cumulative Impacts
Cumulative impacts would be the same as those identified under Alternative A. Overall impacts to visitation due to these cumulative impacts would be negligible.

Conclusion
The impacts of Alternative D on visitation would range from negligible to minor during the peak summer season, and negligible during the rest of the year. Maintenance or expansion of facilities would help to mitigate the impacts of growing visitation.

Visitor Opportunities

General Recreational Opportunities

Recreational activities would continue to be characterized similar to Alternatives A. It would be a high priority for the NPS to develop or improve a variety of recreational activities for a wide range of abilities and interests, including guided or group activities, increased day and overnight opportunities, and the chance to become hands-on stewards of the park. A remote wilderness experience would still be available.

North Cascades Highway based opportunities

Along the North Cascades Highway, a wide variety of recreational activities would continue to be available and some opportunities would be expanded, including the potential for new overlooks or waysides, new and group picnic sites, and improved opportunities for winter activities via improved snowplowing and access providing a moderate long-term benefit. There would still be a variety of opportunities to view the wilderness and experience a natural setting while accessing numerous amenities and services.

Car camping opportunities with a range of potentially expanded amenities would be available resulting in a moderate beneficial impact. The NPS would strive to preserve camping opportunities in popular areas such as Colonial Creek, but if this were not possible due to flood events, sites would be rebuilt or other campgrounds expanded to limit net loss of camping, a moderate long-term beneficial impact. Camping opportunities could be expanded, and new opportunities such tent cabins or yurts, additional RV camping sites, and car camping for stock parties could be provided. These actions could result in a moderate to major beneficial impact by limiting net loss of opportunity as well as creating new opportunities that could attract visitors of new or changing demographics.

Hozomeen would be reorganized with impacts similar to Alternative B.

The Hollywood District, once acquired, would be redesigned and geared towards providing new camping and a range of overnight options for the public resulting in moderate to major long-term benefits by creating new overnight opportunities within Ross Lake NRA at a desirable location along the river.

Efforts would be made to improve the quality of corridor recreation through education or enforcing noise ordinances.

Land/trail-based opportunities

Opportunities would continue to allow visitors to move beyond the road corridor for short or long distances and times for a variety of activities, and to launch deeper wilderness explorations via existing short walks and access to longer day hikes, backpacks, stock trails, and mountaineering routes. Additional day hiking opportunities within Ross Lake NRA would be provided, including new short or loop hikes, a new portage trail for boaters along the Skagit, or new links with trails in Canada in the Hozomeen area resulting in a moderate long-term benefit. Some sections of trails in Ross Lake NRA could be lost if their adjoining trail segment in the national park were closed or abandoned, slightly reducing hiking opportunities and creating a minor adverse impact.

Hunting would be allowed within most existing permitted areas, but under Alternative D the NPS would seek to work with WDFW to expand safety zones for hunting, and reduce potential conflicts during peak visitation months between hunters and other recreationists, as well as expanding educational efforts to make non-hunters more aware of hunting activities. Sport climbing in the Newhalem Gorge would continue, but would be formalized under "Climbing Management Areas" with a resource plan and defined boundaries.

Similar to Alternative B and C, additional hiking opportunities and providing new trails in the future could be constrained by formal policies for maintaining core habitat for special status species such as grizzly bear, resulting in a negligible to minor long-term impact given the extent of the land base and likelihood of expanding trails beyond the highway corridor and into core area habitat.

Overall, impacts under Alternative D would be negligible to moderate, beneficial and adverse, and largely long-term. There would be a moderate benefit for some from increased day hiking opportunities, and spreading the use to more trails could reduce crowding, but there would be a negligible to minor negative impact on those who feel the intrusion of more trails in Ross Lake NRA, with fewer opportunities for solitude. There would be a negligible adverse impact from closing a small number of lesser used trails or segments, but this effect would be outweighed by the benefits of new trails in more attractive locations. Climbing use continues and the quality of experience is protected. There would be a negligible loss of hunting opportunities but most would be maintained and the majority of non-hunters would benefit.

Water-based opportunities

Overnight boat-in camping on Ross and Diablo lakes would remain accessible by all watercraft (motorboat, seaplane, non-motorized craft), with use limits set by the capacity of the current docks and campsites, as administered by the backcountry permit system. Day use opportunities would also be available on all

three reservoirs for all boat types, and on Ross and Diablo lakes for seaplanes. Motor boat use would be managed to protect water quality, soundscape, and visitor experience by establishing a no-wake zone near other boaters or sensitive shorelines on all lakes, and applying limits to size, horsepower, or speed limits on Ross Lake and in Diablo Canyon. Four-stroke or direct injection 2-stroke would be required for all motor boats on Ross Lake, by 2015.

Recreational towing would be allowed on Diablo and Gorge lakes, and on the northern and southern ends of Ross Lake. Paddle craft would be encouraged, possibly via a boat rental option on Diablo Lake. Personal watercraft would remain prohibited. Seaplane use would be regulated under a permit system to protect the soundscape and other visitors' experiences. Seaplane use would also be restricted to designated frontcountry zones. In addition the NPS would work with the FAA to establish use levels and patterns for scenic overflights.

On the Skagit River, regulations to limit party size or number of boats would be considered. Self-powered watercraft (and motor boats, where feasible) would continue to have day use opportunities on the Skagit River, with the potential for occasional conflict between user groups. Fishing opportunities would remain unchanged, with the exception of prohibiting lead tackle.

Most impacts would be minor to moderate and beneficial as most uses continue, there would be better quality of boating experience for most boaters due to limits on seaplanes and motorboats, and increased opportunities for boating via rentals. Adverse impacts would be negligible to minor, and short term to motor boaters to upgrade gear and change use patterns at times, ~~negligible long-term adverse impact on seaplanes as use is limited and would stay low but would still be allowed,~~ and some adverse impact if boat rentals increase demand and crowding at backcountry sites. Management of seaplane use would have an overall minor adverse impact because of the relatively small numbers of seaplanes that would be affected and other seaplane opportunities exist within the region; however, impacts to individual users would be moderate and may be major.

Impacts on Skagit River users would be negligible to minor, and mostly beneficial due to maintaining opportunities, and setting use limits to maintain a quality experience, but some negligible adverse impacts due to potential user conflicts and some reduced quality.

Visitor and Information Centers

A range of facilities and services would continue to meet a variety of visitor needs similar to Alternative B. The park would also seek to increase partnerships with the USFS to provide NPS staffing at east side locations to provide basic services throughout the visitor season for visitors entering Ross Lake NRA from the east. Adding information capacity on the east side could result in moderate long-term benefits to visitors seeking information.

The Wilderness Information Center in Marblemount was recently upgraded to include expanded staff work areas, including wilderness equipment and search and rescue storage and a staging area. Under Alternative D, the public contact station would be moved to a location in Marblemount along the North Cascades Highway, to provide easier public access or a moderate-long-term benefit by locating information along the highway. The NPS would also seek to partner with BC Parks to build a new joint visitor contact and ranger station ~~and information center~~ at Hozomeen in order to expand basic visitor services and provide interpretative programs similar to Alternative B.

Maintaining or increasing staffing levels and adding staff locations would provide a long-term moderate to major beneficial impact because most visitors would benefit. During certain seasons or at certain stations, where staffing or services are limited, there would be a moderate long-term adverse impact to visitors seeking orientation and information to Ross Lake NRA. Moving the Wilderness Information Center would have a negligible, beneficial and adverse, long-term impact as access would slightly improve but there would be fewer available resources at an isolated station and thus a reduction in quality of service.

Permits, Reservations, and Fees

Management of permits, reservations and fees and associated benefits and adverse impacts would be the same as Alternative B.

Campground facilities

Under Alternative D, maintenance would continue on the five campground facilities and three group camps, some of which are very susceptible to damage from storm events—particularly Colonial Creek and parts of Goodell group and main sites. The NPS would strive to preserve camping facilities in popular areas such as Colonial Creek, but if this is not possible due to flood events, sites would be rebuilt or other

campgrounds expanded to ensure no net loss of campground capacity, a long-term moderate benefit. Some new lodging types could be developed within some campgrounds, such as tent cabins or yurts. These additions could attract a wider range of visitors and provide additional overnight options for those visitors who want to stay within Ross Lake NRA, but who have neither the desire nor the equipment for overnight tent or car camping.

The NPS would also consider providing additional services such as showers and electrical hookups at some or portions of campgrounds, as well as developing new group camps or new Diablo Lake camps. Overnight stock camping and other facilities would be considered for some areas with trail riding opportunities nearby. These actions could contribute long-term moderate benefits to visitor opportunities related to campground facilities.

The NPS would also reconfigure the campground at Hozomeen similar to Alternative B with similar impacts. Under Alternative D, the NPS would also partner with BC Parks to provide a joint campground host to provide additional visitor services, a moderate benefit.

Trails, Boat Launches, Picnic Facilities, etc.

Under Alternative D, the NPS would maintain the majority of the current trail system at current levels similar to Alternative A. New trails could be developed throughout Ross Lake NRA under Alternative D, including short or loop trails, a portage trail along the Skagit S curves, interpretative and historical trails, or links to trails in Canada. Some sections of trails could be lost if their adjoining trail segment in the national park is closed or abandoned. A variety of recreation facilities could be developed under Alternative D: improved or new boat launches on Diablo Lake or river access points, facilities for bicyclists, group or new picnic areas, improved signage and interpretative opportunities at the North Cascades Highway entrance points as well as at overlooks or waysides, and improved snow plowing to allow better access in wintertime.

Impacts from this alternative would be minor to moderate, beneficial and adverse, and long-term. Benefits would come from increased and improved facilities for popular activities for a majority of visitors. There would be a negligible adverse impact on some of visitors who highly value solitude due to the impact of new trails and other new facilities, or from increases in users drawn in by new facilities.

Parking for climbers in the Newhalem Gorge would be evaluated and could be formalized to provide safe access to climbing routes.

Commercial Services And Facilities

Commercial services and facilities would be managed similar to Alternative B and would have similar associated impacts. The NPS would develop a commercial services plan to determine the optimal level of commercial services and facilities, and could consider establishing a user capacity or use limits. Commercial use guiding services would continue, but could be limited under a commercial services plan. Some concessions services could be expanded, such as boat rentals, a second water taxi or boat ferry on Ross Lake, or a concession-operated store in Newhalem (if SCL ceased store operations).

Ross Lake Resort could be expanded up to 10 percent, guided by NPS design standards, with impacts similar to Alternative B.

~~The NPS would seek a land exchange for the Hollywood District of Diablo Townsite from Seattle City Light, and would re-develop this area for new camping and overnight lodging facilities, potentially concession-run. Providing public overnight lodging facilities in Hollywood would have similar long-term benefits as Alternative B.~~

Cumulative Impacts
Cumulative effects would be the same as Alternatives B and C. This alternative would contribute additional long-term benefits to cumulative effects by providing increased opportunities for visitors seeking information with the location of a Wilderness Information Center on the main road in Marblemount as well as partnering with the Forest Service to increase staffing on the east side. ~~New overnight opportunities in both existing campgrounds and in the Hollywood District would also contribute to cumulative long-term benefits to the visitor experience.~~

Conclusion
The full spectrum of visitor opportunities would continue to provide for visitor enjoyment and recreation activities. The full array of recreational opportunities would continue to be available under Alternative D. Impacts would be negligible to moderate, long-term, and both beneficial and adverse. Beneficial impacts would be moderate to major from the contributions related to sustaining the full range of recreation opportunities, assuring no net

loss in camping opportunities, increasing access to information through both staff and permitting systems~~, and providing new overnight camping and lodging opportunities in both in existing campgrounds and in Hollywood~~. Adverse impacts could occur from those associated with reservations and fees, some conflicting uses.

There would be moderate long-term beneficial cumulative impacts on visitors in the broader North Cascades. Implementation of this alternative would have a modest contribution to these cumulative impacts

Information, Interpretation and Education Opportunities

Under Alternative D, Ross Lake NRA is used as a platform and classroom for education about the North Cascades, its history and resources, as well as civic engagement, stewardship, and public leadership. There would be opportunities for both structured and unstructured activities, including self-exploration and discovery. Activities would focus in the frontcountry zone and some would expand into the parts of the backcountry zone. Some activities could also be appropriate in limited areas of the wilderness zone. The NPS would lead efforts to develop, conduct and evaluate interpretive and educational programs. The NPS would consult and collaborate with partners when appropriate, and partners would assist the NPS in delivering educational messages and programs.

Interpretive programs and materials that use the most current and dynamic methods to generate curiosity, passion, enthusiasm and respect for park resources to build a sense of stewardship, and provide extensive opportunities for immersion and contact with park staff and resources would have a major beneficial impact to visitor experience. The improvement of traditional interpretive programming within existing facilities, possible new facilities, and throughout Ross Lake NRA and the development, delivery, and evaluation of programs so that they convey the full spectrum of interpretive themes would have a major beneficial impact to visitor experience.

Curriculum-based programs that focus on the full spectrum of interpretive and educational themes and objectives, and which emphasize low impact practices for hands-on activities that make learning relevant to students' lives will have a major benefit to visitor experience by engaging learners directly with the resource.

Expanded participation in outreach programs as one of many mechanisms to deliver Ross Lake NRA's full spectrum of interpretive themes and build local and regional stewardship of the North Cascades ecosystem will have a moderate beneficial impact to visitor experience.

The enhancement of visitor orientation and informal education through improved signage, multi-media, and exhibits at existing waysides, contact stations, and along interpretive trails would provide major beneficial impacts to visitor experience. Improved signage would provide visitors a sense of approach and arrival as well as better orientation to the services and resources within Ross Lake NRA.

The expansion of partnerships to attract a broader audience of visitors would have a major beneficial impact on visitor experience by connecting an increased number of people to the outdoors and the North Cascades in meaningful ways. Interpretive rangers co-located at other visitor contact stations, such as the Skagit Tours Information Center, the Environmental Learning Center, and at eastside entry points will have a major beneficial impact to visitor experience by making park staff more available to foster such connections.

Working with Seattle City Light to develop a more collaborative relationship that could involve additional programming and exhibits that tell the history and operations of the Skagit Hydroelectric Project and enhanced collaboration with concessionaires and the U.S. Forest Service in order to share best practices and standards in order to disseminate information have a major beneficial impact on visitor experience by reaching a broader audience.

Newhalem

Updated exhibits, multi-media programs, and activities at the North Cascades Visitor Center would have a major beneficial impact on visitor experience as visitors would be provided with more active and interactive opportunities for fun and engaging educational activities that communicate the full spectrum of interpretive and educational messages and cultivate stewards of the North Cascades ecosystem. The North Cascades Visitor Center would serve as a hub of activity and provide the starting point to a network of ranger-led and self-directed resource immersion activities. Partners would also be encouraged to use the North Cascades Visitor Center as a point of origin for their programs and activities.

Environmental Learning Center

The devotion of additional interpretive staffing to Environmental Learning Center programs and operations with the NPS developing and evaluating the interpretive and educational messages with NCI, setting a standard of excellence, and increasingly collaborating with NCI at the ELC to distribute and deliver relevant interpretive and educational messages would have a major beneficial impact to visitor experience.

Hozomeen

An increased partnership with British Columbia Parks to provide joint NPS/Canadian land- and water-based interpretive programs would have a moderate beneficial impact to visitor experience by enhancing learning opportunities related to preservation of the greater North Cascades ecosystem.

Cumulative Impacts
Cumulative impacts are the same as Alternatives A, B, and C. Actions proposed in Alternative D would have a modest contribution to long-term benefits.

Conclusion
Overall, implementation of Alternative D would result in moderate to major long-term beneficial impacts to visitor experiences in the area of information, interpretation, and education. Using Ross Lake NRA as a platform and classroom for education about the North Cascades, its history and resources, as well as civic engagement, stewardship, and public leadership providing additional opportunities for both structured and unstructured activities that focus in the frontcountry zone but extend into the parts of the backcountry zone would have major long-term benefits.

Interpretive programs and materials that use the most current and dynamic methods to generate curiosity, passion, enthusiasm and respect for park resources to build a sense of stewardship, and provide extensive opportunities for immersion and contact with park staff and resources would have a major beneficial impact to visitor experience. New facilities, increased staff at existing facilities and expanded partnerships would all contribute moderate to major long-term benefits. Cumulative impacts would be the same as Alternatives A, B and C and Alternative D would have a modest contribution to long-term cumulative benefits.

Access and Transportation

Under Alternative D, several small changes similar to those found under the Preferred Alternative would occur that would impact access. Improvements to waysides, pull-outs and several parking areas will have a beneficial impact on access. However, as in the other alternatives, visitation would be expected to increase proportionate to regional population growth. Heaviest use would still occur along the North Cascades Highway, and since there are no proposed changes to roadway capacity, traffic congestion during peak summer weekends would continue, resulting in minor to moderate adverse impacts. If implemented, however, a shuttle system could potentially help to alleviate some of the congestion.

Access will be improved at the Ross Dam Trailhead parking lot by constructing a turn lane at the entrance and redesigning the parking lot. Parking lot capacity will increase under Alternative D to accommodate more passenger and oversized vehicles. Clearly defined parking spaces will reduce confusion and some of the congestion related to drivers trying to find an adequate parking space. Other parking areas, such as Diablo Ferry dock, Upper Goodell group campsite, Goodell Creek raft area, and the Sourdough, Stetattle Creek, and Thunder Knob trailhead parking areas will be reconfigured, formalized, or developed. Parking and access to climbing routes in the Gorge could be formalized. Some overlooks and trailheads could be plowed to provide wintertime access. The existing one-way bridge that provides access to the North Cascades Visitor Center, Newhalem Creek Campground, and several trails, would be replaced with a two-lane bridge that accommodates two-way traffic, pedestrian access, and interpretive platforms. Impacts to access would be beneficial and minor to moderate.

Removal of the portion of Thornton Lakes Road in wilderness would still allow access to the trailhead, and depending on the new trail location, the access route to the lakes could either be shortened or lengthened. The new parking area could potentially accommodate a larger number of vehicles than the current parking lot, thus improving access.

Other changes in access include the potential expanded overnight opportunities near the Environmental Learning Center (additional camping), at Hollywood, and at Ross Lake Resort, which would increase access to more people in these areas; the addition of stock-accessible front country camps,

which could bring more stock users to Ross Lake NRA; the addition of day use trails; and improvements to river access and take-out at the Portage. These slight increases in access would result in beneficial impacts.

The relocation of the Colonial Creek Campground boat launch to the north side of the North Cascades Highway could decrease access by creating more congestion at the Thunder Knob Trailhead parking lot, resulting in minor adverse impacts.

Cumulative Impacts
Cumulative impacts would be the same as those identified under the other alternatives. Potential future actions, including general road, trail, or parking lot maintenance, and various types of work on the North Cascades Highway by WSDOT, could impact access; although delays may occur, visitors would not likely alter their travel destinations. Occasional road or trail closures also occur due to fire, avalanches, rockfalls, etc. Overall impacts to access due to these cumulative impacts would be negligible.

Conclusion
The impacts of the Alternative D on access and transportation would result in adverse, minor to moderate impacts during the peak season as well as minor to moderate beneficial impacts due to improvements in access and during non-peak times.

Socioeconomic Environment

Impacts to the socioeconomic environment due to implementing the actions in Alternative D would be caused by changes in operational spending, changes in visitor spending, and changes in visitor patterns. The impact of Alternative D is evaluated in comparison with the No Action Alternative.

Implementation of Alternative D would occur against the same backdrop of economic, demographic, and social changes across the influence area described under the No Action Alternative. The economic and social effects of Alternative D would add to those changes, but not fundamentally change the area's economic and demographic outlook.

Impacts to Demographics

Alternative D would have little direct impact on the influence area's population growth. It is likely that many of the construction and related jobs would be filled by individuals already residing in the area. However, new staff proposed in Alternative D would likely come from outside as well as from within the influence area. Total staff increases are expected to be 22 permanent FTEs. Beneficial impacts of population increases include increased demand for housing, which can cause an increase in home values and rental rates; and increased government tax revenues. Adverse socioeconomic impacts of population increases include potential for more crowding on roads and in public areas and greater demands on government services, including schools, sanitation, and water.

The population increase due to Alternative D would be minute compared with the total influence area population of about a half million people; therefore the impact would be negligible, long-term, and of indeterminate effect since there are both adverse and beneficial impacts to population growth. The local area has a much smaller population. The combined population of Sedro-Woolley, Concrete, Rockport, and Marblemount is approximately 12,000, with the majority of those living in Sedro-Woolley (US Census 2007). Even so, the addition of 22 new employees and their families would represent a small but detectible number. The impact of hiring all proposed new employees would be long-term, minor, and of indeterminate effect.

Economic Impacts to Influence Area

Increases in the recreation area's spending would have short-term impacts during construction of new facilities, and long-term impacts due to increases in yearly budgets. Proposed construction projects include rebuilding of the Wilderness Information Center in Marblemount and replacement of the bridge to Newhalem.

Companies in the construction industry would see increased business if contracted to provide services. This in turn would strengthen construction employment and incomes. Construction workers frequenting the area would spend income on food and materials, thus increasing service businesses and government tax revenues. While construction spending would strengthen these areas of the economy, it would occur to only a small degree in relation to the influence area's total economy. Short-term construction spending in this alternative is estimated at $18.3 million ($18.2 million above that for the No Action Alternative). Construction spending would result in negligible, short-term, beneficial impacts to the influence area economy, since this amount likely would be spread over the 20-year planning timeframe.

Increases in the recreation area's annual spending also would have long-term effects. The addition of new NPS staff would add jobs to the influence area and generate more personal income. New staff would spend a percentage of income on housing, food, entertainment, and other services; this would increase influence area incomes and government tax revenues, and reduce housing vacancy. However, new staff would put additional demand on local government services such as schools. Operations spending by the National Park Service would have long-term, positive impacts on employment and incomes. Annual NPS operations spending in this alternative is estimated at $8.5 million ($1.4 million more than the No Action Alternative). Once again, this amount is very small in terms of the total influence area economy. Annual operations spending would result in minor, long-term, beneficial impacts to the influence area economies.

Actions proposed in Alternative D might encourage increased visitation, longer visitor stays, or higher visitor spending. Alternative D proposes to provide a broader range of visitor activities and to expand accessible recreation opportunities, including development of new interpretive programs and establishment of partnerships to attract broader audiences. Opportunities to allow concessioners to expand services would be pursued, including water taxi, ferry, and rental services.

Construction actions that would generate new interest from visitors and allow for greater visitor capacity include establishment of a ranger station and orientation center near Hozomeen, new campgrounds, and additional outdoor learning shelters.

The following actions would possibly reduce visitation and visitor spending: developing a permit system for seaplane use, setting use limits on scenic overflights of the national recreation area, requiring special boat motors, not replacing damaged visitor facilities, and limiting concession authorizations if user capacity is exceeded.

Overall, the actions proposed by Alternative D could result in small increases in the number of visitors, length of visitor stays, and related visitor spending. Increased visitation would increase employment, business sales, and incomes in the tourism industry, as well as government tax revenues. Increased visitation and visitor spending could also reduce unemployment in the tourism industries. Implementation of Alternative D might indirectly enhance the influence area's attractiveness for economic development because of enhanced recreational opportunities. However, the possible changes would be small; increased visitation would have negligible, long-term, beneficial impacts to the influence area's economy.

Partnering with Seattle City Light to use excess housing at the Hollywood site to house recreation area staff would make more housing available, perhaps resulting in slightly higher vacancy rates and lower rental rates in surrounding communities. Additionally, Alternative D proposes to look for opportunities to develop more employee housing in Newhalem and Marblemount. This would slightly increase housing availability and vacancy, and reduce rents; therefore, impacts would be minor, long-term, and beneficial to renters and employees, but minor, long-term, and adverse to lessors.

Economic Impacts to Local Commercial Services and Neighboring Businesses

NPS spending on new construction would strengthen businesses that provide construction services. In turn, construction worker spending on food and materials would strengthen local services. Government revenues would also see increases due to increased sales and associated taxes. Increases in construction spending would result in minor to moderate, short-term, beneficial impacts to commercial service providers and neighboring businesses.

The impact of wages for new staff and annual operational spending by the recreation area would be greater on the local area than in the entire influence area. Impacts to employment, incomes, and government revenues would be long-term, minor to moderate, and beneficial to the local communities.

With small increases in visitation, visitor spending, and the length of visitor stays, local businesses providing services to tourists would benefit from increased business. More visitors might allow for businesses to provide expanded visitor services. However, the expected increases in visitation would be small, resulting in negligible to minor, long-term, beneficial impacts to commercial service providers and outfitters.

Alternative D calls for a transportation study that would look at the feasibility of a shuttle system providing service to the recreation area. If a shuttle system were implemented, a concessioner would have the opportunity to provide the service. This would increase a concessioner's business or provide a new

business opportunity. A shuttle service would result in a minor to moderate, long-term, beneficial impact to the operator.

The recreation area would establish a permit system to establish use levels for seaplanes, which may limit the frequency of seaplane service to the recreation area, and perhaps reduce business sales, employment, and incomes. This would have an adverse, long-term, negligible to minor impact to seaplane service providers.

The recreation area would request that the FAA set use limits on scenic overflights of Ross Lake. This would limit the number of customers that flight tour operators could take to Ross Lake, and could perhaps diminish business sales, employment, and incomes. This would result in a negligible to minor, long-term, adverse impact.

Alternative D proposes that limits on commercial use authorizations (CUAs) may be enacted if user capacity limits are exceeded. CUAs are used by the National Park Service to authorize individuals or businesses to provide commercial services to recreation area visitors in limited circumstances. This would limit visitors and therefore limit sales, incomes, and employment, resulting in a long-term, negligible to minor adverse impact to concessioners.

Alternative D also proposes exploring expanding concessioner opportunities, such as water taxi, ferry, lodging, and rentals. If found feasible, additional services would expand concessioner business and result in a minor, long-term, beneficial impact, if not, no impact would occur.

Impacts to Social Characteristics

~~This alternative also proposes to acquire the Hollywood district from Seattle City Light through exchange or purchase, demolish existing vacant buildings, rehabilitate some buildings, and build new camping and overnight facilities. This land is within the recreation area boundaries, and the dam facilities would remain in operation by Seattle City Light. The result of this proposal would have beneficial impact to the social character of the influence area because buildings in poor condition would be demolished or rehabilitated and new visitor camping facilities would be constructed. The impact to land use would be minor, long-term, and beneficial to the social character of the influence area.~~

Increases in number of visitors and length of visitor stays would affect traffic in the local area. The placement of the Marblemount Wilderness Information Center near the North Cascades Highway ~~State Route 20~~ would also change traffic patterns; these changes would result in a negligible, long-term, adverse impact.

Potential shuttle service in and around the recreation area would relieve some traffic in the service area. Local residents would have the opportunity to use this service, and therefore, it would provide a negligible, long-term, beneficial impact to the social character of the local area.

Construction activities would affect traffic, as construction vehicles may be moving slowly and turning in and out of construction areas. There also would be an increase in the level of traffic due to workers coming to the area. Construction of the Wilderness Information Center in Marblemount near the highway would disrupt the flow of traffic temporarily, as would construction of a turn lane on the North Cascades Highway at the Ross Dam Trailhead parking lot. However the turn lane would relieve some congestion once built. Construction activities would result in a minor, short-term, adverse impact to traffic and long-term, minor beneficial impacts to traffic.

While there is a mix of beneficial and adverse impacts, the overall impact of Alternative D to the influence area socioeconomics would be both short- and long-term, negligible to minor, and beneficial.

Cumulative Impacts

Projects that are not associated with this general management plan can interact with projects proposed in the GMP alternatives, resulting in a cumulative impact on the influence area's social and economic environment. Cumulative impacts would be the same as Alternative A.

Impacts of Alternative D, in combination with short- and long-term minor beneficial effects on the influence area's economy described above would result in both short- and long-term, minor, beneficial cumulative impacts to the influence area's socioeconomic environment. Alternative D would have a modest contribution to the overall cumulative impact.

Conclusion

Alternative D would result in a negligible to minor, beneficial impact to the influence area

socioeconomics. The impact would be greater in the immediate areas surrounding the recreation area. The impacts of the actions proposed in Alternative D and impacts of other projects combine to have short- and long-term, minor, beneficial cumulative impacts to the influence area's social and economic environment.

Park Operations

Facilities and Sustainability

Under Alternative D, major visitor and operational buildings and infrastructure, including headquarters, staff offices, and visitor centers, would continue to be concentrated in the same general areas of Ross Lake NRA as Alternative A. Similar to Alternative B, some facilities would be replaced, others would be expanded in size or services and utilities offered, and new facilities could be added. Alternative D proposes to relocate the public function of the Wilderness Information Center to a location in the town of Marblemount along the North Cascades Highway. Alternative D also proposes constructing housing for approximately 20-30 additional bed spaces on the Marblemount Ranger Station. ~~Alternative D also proposes a land exchange with Seattle City Light at Diablo Townsite similar to Alternative B. The Hollywood District would be geared to overnight opportunities for the public and some buildings and structures could be demolished and replaced with alternative overnight facilities. Activities associated with the construction and maintenance of these new facilities could result in short-term minor impacts by focusing staff efforts on these projects and potentially long-term minor to moderate adverse impacts by increasing the facilities that need to be maintained.~~

Facilities that were not deemed to be sustainable could be closed, abandoned, and sites rehabilitated under Alternative D. Closing facilities or portions of facilities that require substantial efforts to retain them in the event of severe weather such as flooding would have a moderate to major long-term benefits by locating facilities in areas that require less intensive effort to sustain them. While new trails could also be constructed under Alternative D, trails that are not used could also be decommissioned, resulting in minor long-term benefits by reducing the needs for trail maintenance in seldom used areas of Ross Lake NRA, similar to Alternative B.

Incremental changes in green facility design would be similar to Alternative A and additional changes to reduce carbon emissions and increase energy and fuel efficiency whenever and wherever possible would be the same as Alternative B and also result in long-term moderate benefits to park operations by creating a more sustainable infrastructure.

Operational Efficiency

Impacts to operational efficiency are similar to Alternative B. The replacement and reconstruction of facilities that are declining would have long-term minor to moderate benefits on operational efficiency by reducing the needs for maintenance. Creating opportunities for housing in Marblemount would give Ross Lake NRA housing options for seasonal staff. Given the short summer season for temporary employees, which can be as short as three months, locating housing in the surrounding community is frequently infeasible. In addition, many temporary hires do not have personal transportation to get to and from their duty locations. Providing housing in Marblemount could result in moderate to major long-term benefits to operations by locating staff closer to their work locations and having the flexibility to house seasonal staff for the length of season actually needed, benefitting the overall efficiency of park operations.

Relocating the public function of the Wilderness Information Center off the Marblemount Ranger Station area to Marblemount along the highway could result in some loss of operational efficiency. Separating the public function from the remainder of the operation could have a minor to moderate adverse effect to operational efficiency.

Making better use of the existing facilities along the North Cascades Highway, and increasing collaboration with partners in utilizing these facilities, would have moderate long-term benefits to operational efficiency.

Staffing

Impacts to staffing are similar to Alternative B, although the distribution of future staffing increases varies. In the short term, impacts from staffing are the same as Alternative A with funding for staffing levels continuing to be inadequate to meet the increased needs of Ross Lake NRA, resulting in long-term minor adverse impacts to NRA operations. In the long-term, staffing increases in resource management, interpretation, visitor protection, facilities and maintenance, and administration coupled with expanded emphasis on partnerships could have long-term moderate benefits to operations by increasing the capacity of Ross Lake NRA to meet the needs of the operation and visitors.

Cumulative Impacts
Cumulative impacts are similar to Alternative A. Past and ongoing projects, including road, trail, and facility maintenance and repairs have had long-term moderate beneficial impacts on park operations. Aging facilities and infrastructure, including utilities and systems, would continue to be repaired, upgraded or replaced as needed on a case-by-case basis, subject to available funding. Over time, more sustainable and efficient facilities and infrastructure would replace those that are aging or no longer meet the needs of Ross Lake NRA, resulting in moderate, long-term benefits to the recreation area by reducing maintenance needs.

Conclusion
Under Alternative D, there would be noticeable changes to facilities as some facilities would be closed while others could be expanded in size ~~or reconfigured for new uses such as the Hollywood District~~. New facilities could also be added, resulting in both moderate benefits and adverse effects to park operations.

Additional changes to improve the environmental sustainability in all aspects of facility and infrastructure management could have long-term moderate benefits to park operations. Changes in staffing and operational efficiency would have long-term moderate benefits to park operations. As more projects are completed that repair, upgrade, and replace aging facilities and infrastructure, and more sustainable systems are installed, maintenance needs would be reduced, resulting in moderate, long-term benefits. However, until those facilities are replaced, periodic and extensive maintenance would be required. The overall effects of implementing Alternative D on park operations would be long-term, moderate and beneficial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are defined as moderate to major impacts that cannot be fully mitigated or avoided.

Under Alternative D, there would be a negligible potential for unavoidable adverse impacts on natural resources because there would be little new development, although there could be some new or renovated facilities, such as the Ross Dam Trailhead parking lot, the potential closure of some campsites from Colonial Creek in the event of a catastrophic flood event, and the changes to the Wilderness Information Center.

There would be little to no unavoidable adverse impacts on cultural resources because the NPS would strive to preserve and adaptively use buildings, structures, and landscape features that are eligible for the National Register~~, notably in the Hollywood District should the land be acquired by the NPS~~.

Some existing conditions have resulted in unavoidable adverse impacts. The location of park facilities, the Skagit Hydroelectric Project, and roads, including the North Cascades Highway, in floodplains, and the maintenance of this infrastructure has resulted in adverse impacts to floodplains and riparian areas. Most of the infrastructure would remain in these locations. Additional unavoidable impacts would likely occur on vegetation and soils, primarily in the existing developed areas where visitor use is concentrated.

Relationship between Local Short-Term Uses and Long-Term Productivity

Under all of the alternatives, most of Ross Lake NRA would be protected in a natural state and would continue to be used by the public. Under all the alternatives, the National Park Service would continue to manage Ross Lake NRA to maintain ecological processes and native and biological communities, and to provide for appropriate recreational activities consistent with the preservation of natural and cultural resources.

Some previously disturbed areas would be rehabilitated to return these areas to productivity. Any actions the National Park Service takes in Ross Lake NRA would be taken with consideration to ensure that uses do not adversely affect the productivity of biotic communities. Under Alternative D, there would be no appreciable loss of ecological productivity because there would be little new development. Existing developed areas and infrastructure within Ross Lake NRA, including the Skagit Hydroelectric Project and the North Cascades Highway, would remain.

Irreversible or Irretrievable Commitments of Resources

Irreversible commitments of resources are actions that result in the loss of resources that cannot be reversed. Irretrievable commitments are actions that result in the loss of resources, but only for a period of time.

No actions would be taken as a result of the Alternative D that would result in the consumption of nonrenewable resources that would preclude other

uses for a period of time. Thus, there would be no irreversible or irretrievable commitments of resources in Ross Lake NRA by the National Park Service.

No actions would be taken that would result in irreversible or irretrievable effects on historic properties. NPS staff would continue to conduct appropriate cultural resource management in accordance with the *Secretary of the Interior's Standards* and NPS policies.

A ranger shows pictures of birds to visiting children during an early morning bird walk near the North Cascades Visitor Center.

WELCOME

You are now in the Public Involvement Chapter. Here are the topics you can read about:

Public Scoping

Public Review of the Draft Alternatives

Skagit Wild and Scenic River Eligibility and Suitability Studies Public Process

Agency Consultation and Coordination

List of Draft GMP/EIS Recipients

Public Review of the Draft GMP/EIS

Substantive Comments and Responses on the Draft General Management Plan and Environmental Impact Statement

Comment Letters

Chapter 7: Public Involvement

Public involvement and consultation efforts were ongoing throughout the process of preparing this draft GMP/EIS. Public involvement methods included Federal Register notices, news releases, public meetings and workshops, invited presentations at partner and special interest group meetings, newsletter mailings, and website posting. This chapter provides information about each public involvement period and summarizes public comments received by the NPS during each phase.

Public Scoping

The Ross Lake National Recreation Area general management planning team launched the planning process in late September 2006. The official public scoping period was initiated on September 29, 2006 and closed on December 30, 2006. A comprehensive scoping outreach effort was planned to elicit early public comment regarding issues and concerns, the nature and extent of potential environmental impacts, and possible alternatives that should be addressed in the preparation of the GMP. Through various scoping outreach activities, the NPS welcomed information and suggestions from the public regarding resource protection, visitor use, and land management.

The NPS formally announced the public scoping period and invited public comment through newsletters, correspondence, press releases, public workshops, informal meetings, the NPS Planning, Environment, and Public Comment (PEPC) website, and a *Federal Register* notice. NPS staff produced and mailed Newsletter Number 1 to approximately 350 individuals and entities on the mailing list. Agencies, organizations, governmental representatives, and tribal governments were sent letters of invitation to attend the public workshops or individual meetings. Press releases were distributed to local and regional news media. The project was launched on the NPS Planning, Environment, and Public Comment (PEPC) website: http://parkplanning.nps.gov/rola, providing access to information about the Ross Lake NRA GMP and a method for taking public comments. A notice of intent to prepare a general management plan and environmental impact statement for Ross Lake National Recreation Area was published in the *Federal Register* on October 30, 2006 (Vol. 71, No. 209, pp. 63351-63352). The public was invited to submit comments by regular mail, e-mail, fax, online, and at public workshops and individual meetings.

News articles featuring the public workshops were written in the local Courier Times and East Skagit Community News and announced on private and public radio stations.

Public Workshops and Written Comments

The NPS held seven public workshops in western Washington and British Columbia in October 2006 to provide the public with an opportunity to learn about the general management planning project and to offer comments. The meetings began with a presentation of Ross Lake National Recreation Area and the GMP planning process. The meeting then transitioned into a facilitated group discussion format. Meetings were held in Washington State in Concrete, Marblemount, Sedro-Woolley, Seattle and Bellingham; and in Surrey and Chilliwack, British Columbia. 63 people attended the meetings overall. The following table lists the locations, dates, and number of people who attended each meeting:

Table 7.1 Public Scoping Workshops, 2006

Location	Date	Attendance
Concrete, WA	October 17, 2006	8
Marblemount, WA	October 18, 2006	4
Sedro-Woolley, WA	October 19, 2006	14
Bellingham, WA	October 23, 2006	12
Surrey, BC	October 24, 2006	0
Chilliwack, BC	October 25, 2006	9
Seattle, WA	October 26, 2006	16
TOTAL		63

During the public comment period, the NPS received a total of 19 written responses in the form of letters, e-mails, newsletter response forms, and web comments.

Comments, either through public meetings or written correspondence, were received from the following representatives:

- The Access Fund
- Backcountry Horsemen of Washington
- Buffalo Run Inn

- Canadian Ministry of the Environment
- Conservation Northwest
- Environmental Protection Agency
- Miller Construction
- National Parks Conservation Association
- North Cascades Conservation Council
- North Cascades Institute
- Ross Lake Resort
- Seattle City Light
- Skagit County
- Skagit Environmental Endowment Commission
- Student Conservation Corps
- Washington Climbers Association
- Washington Native Plant Society
- Wilderness Conservation Corps
- The Wilderness Society

Summary of Public Scoping Comments

The following summary incorporates both the public workshop comments and the written comments received by the NPS through the close of the public comment period. The NPS received correspondence from over 80 individuals and organizations during the public comment period that provided a total of over 750 specific comments. All comments received were reviewed and considered by the NPS staff for the preparation of this GMP.

The comments received covered a broad range of topics, ideas, and preferences. Many statements or ideas were expressed by several individuals. Comments were grouped into 25 topics, and the number in brackets indicates the number of comments that were received concerning the stated topic. The topics that received the most comments were Recreation (269), Natural Resources (150), Visitor Experience/Use (106), Education and Interpretation (87), Access and Transportation (75), and Visitor Facilities (60). Other topics receiving comments are described below.

Recreation

Most of the comments on recreation stated that Ross Lake NRA should provide a diversity of dispersed recreational activities with an emphasis on non-motorized activities. Many commenters stated that recreational activities should not impact the North Cascades natural ecosystem resources and conditions. Several commenters wanted more dayhiking opportunities, climbing opportunities, and a variety of camping or overnight experiences. Many people said they would be willing to pay fees for service and use of Ross Lake NRA facilities. Comments related to the installation of an advanced reservation system were mixed. Some comments stated that group size limits should be better enforced to ensure that large groups do not overrun Ross Lake NRA.

Lake recreation was a popular topic, and the public provided dozens of comments on boating within Ross Lake NRA. The overwhelming majority of comments on boating and lake recreation stated that self-propelled boating should be emphasized and there could be limits on motorized use that could benefit natural conditions, soundscapes, and visitor experiences on the lakes. Limits that were suggested included limiting boat engine size and horsepower, phasing out the use of 2 cycle engines in favor of 4 cycle engines, and limiting jetskis and float planes.

Natural Resources

The overwhelming majority of comments on natural resources maintained that ecological integrity of resources and processes in Ross Lake NRA should be preserved. These resources include the diversity of wildlife, vegetation, aquatic, air and water resources. Many people were concerned about recreational pressures and hydro-electric demands that could create impacts to natural resources, wilderness values, and the primitive character of Ross Lake NRA.

Commenters wanted to ensure the protection of migration corridors for wildlife. Several people expressed support for the reintroduction of grizzly bears and other native wildlife populations. Comments also expressed concern about the introduction of invasive, non-native species and support for the NPS to remove and prevent invasive species. Some people mentioned concern about climate change and the impacts from global warming on natural resources within Ross Lake NRA.

Visitor Experience/Use

When asked what kind of visitor experience they would like to have at Ross Lake NRA in 20 years, the vast majority of commenters stated that its existing character should be preserved. Comments described the existing character as a place of beauty, spaciousness, and isolation. Commenters wanted the wilderness character to be preserved as well, where

visitors can experience solitude, peace, and quiet in a natural setting.

Several people said that the NPS should allow for a natural increase in visitation and encourage learning about Ross Lake NRA. Several people also recommended that the NPS should seek to diversify its visitor base through new programs and facilities.

Education and Interpretation

Most comments on education and interpretation suggested that the NPS should diversify and increase educational and interpretative programs. The NPS could explore additional ways to connect with the interested public and park visitors, such as internet-based educational programs. Partnerships for education and interpretation should be expanded, and the partnership with North Cascades Institute could serve as a model. The NPS should consider ways to interact with and engage visitors who are driving through Ross Lake NRA on Highway 20.

Access and Transportation

Comments included concerns about new and upgraded roads to and within Ross Lake NRA, the soundscape along the North Cascades Highway corridor, and expanded opportunities for non-vehicular access to Ross Lake NRA's scenic and hiking areas. Several people said their greatest concern is the possibility of paving the road from Hope, British Columbia to Hozomeen; they feared that paving the road will allow larger boats and more visitors which would detract from the visitor experience in the Hozomeen area. Opening up the North Cascades Highway to year-round traffic was a significant concern, and most commenters said that year-round traffic would prevent visitors from wintertime recreational activities along the North Cascades Highway to the east of the Ross Dam Trailhead parking lot. Several comments stated that noise intrusions along the North Cascades Highway affect park users, and the NPS should work with the WSDOT to enforce maximum permissible noise levels. Several comments focused on public transportation to trailheads and scenic areas throughout the park, which could broaden visitor use while reducing vehicular traffic along the North Cascades Highway. Some people thought the parking lot at Ross Dam trailhead should be expanded, as there is not enough parking during the peak season.

Visitor Facilities

Comments on visitor facilities focused on the preventing overdevelopment, locating new facilities within the North Cascades Highway corridor, and creating a distinct park entrance that is consistent with the natural setting. Most comments stated that Ross Lake NRA should maintain existing facilities, and growth, if at all, should be modest and located in existing developed areas of Ross Lake NRA. Several people stated the need for a more formalized entrance, which would provide a distinct sense of arrival to Ross Lake NRA and park complex as well as visitor information. A few people would like to see improved visitor facilities at campgrounds.

User Capacity

Many commenters expressed concern over the region's increase in population, subsequent increase in visitation and the impacts this additional visitation could have on resources and existing visitor experiences. People wanted to ensure that resources will not be degraded by increased visitor use. Some commenters thought the NPS could consider a permitting or reservation system that could regulate the number of visitors to Ross Lake NRA.

Interagency Management

Most comments on interagency management stated that the NPS will benefit from working with related agencies and partners. These entities include Seattle City Light, the Washington Department of Transportation, U.S. Forest Service, Washington Department of Fish and Wildlife, British Columbia Parks, Skagit Environmental Endowment Commission, and the North Cascades Institute. Issues that could

NPS staff collected public comments from community members at 7 public scoping meetings in October 2006.

be mutually addressed through cooperation could be visitor use and facilities management in the Newhalem area, soundscapes along the North Cascades Highway, resource protection strategies and visitor services with neighboring land management agencies, and joint educational programs with Seattle City Light and the North Cascades Institute.

Wilderness

The majority of comments on wilderness pertained to preserving wilderness character, values, and experience. These commenters thought the NPS should provide recreational opportunities that are compatible with wilderness and protect wilderness from impacts. Comments suggested that wilderness educational and interpretive opportunities should be expanded.

Other Comments

The public commented on several other areas of park management and operations. These general comments are listed below.

Comments on staffing recommended increasing staffing, particularly rangers in the field for interpretation, resource protection, and visitor safety.

When zoning the park, visitor facilities and services should be concentrated in already impacted areas along Highway 20.

Comments on concessions focused on the Ross Lake Resort. They stated that some expansion could be manageable; however no new concessions should be added to the lake.

Seattle City Light operations could be coordinated with the NPS, including the ferry schedule, lake levels, and removal of woody debris.

Safety and security were concerns, particularly along Highway 20 and at the international border with Canada.

Partnerships were strongly encouraged to enhance resource protection, visitor recreation, and education and interpretation.

Cultural resources, particularly archeological resources, were highlighted by a few individuals encouraging the NPS to preserve and conduct additional research in cooperation with tribal governments.

Some commenters were concerned about funding for Ross Lake NRA and want to ensure that appropriate funding levels match Ross Lake NRA's needs.

Public Review of the Draft Alternatives

The Draft Alternatives public process was an additional planning step to ensure that the public fully comprehended the range of draft alternatives and was able to comment effectively on these draft alternatives. The primary purpose of this planning step was to understand the public's concerns and preferences with regard to the range of draft alternatives and to assist the planning team in refining the draft alternatives and selecting a preferred alternative.

The official draft alternatives public process began in February 2008 when the NPS produced and mailed the Draft Alternatives Newsletter to approximately 450 contacts on the mailing list and announced this planning step on the NPS website (www.nps.gov/rola and http://parkplanning.nps.gov/rola). The newsletter fully outlined the concepts and actions in the draft alternatives and proposed management zones. A planning schedule including dates, times, and locations for the public workshops invited public participation and comments on the range of draft alternatives. The newsletter also contained a business reply questionnaire that asked the public to comment on the four draft alternatives. Press releases were prepared and mailed to local media in advance of the public meetings by the North Cascades NPS Complex staff.

Public Workshops and Written Comments

The NPS held four public workshops in Concrete, Sedro-Woolley, Bellingham, and Seattle in February and March 2008. Seventy people participated in the public workshops and provided oral comments.

The workshops began with a presentation of the draft alternatives and then transitioned into facilitated group discussions. In the cases of meetings with large attendance, separate stations were set up for the

topics of Recreation/Visitor Experience, Natural and Cultural Resources, and Facilities. Members of the public could visit any or all of the stations to provide comments and join discussions on those topics. Each station was attended by NPS staff with expertise on the relevant issues. Staff took detailed notes on all comments received in their groups. The following table lists the locations, dates, and number of people who attended each meeting:

Table 7.2 Public Draft Alternatives Workshops, 2008

Location	Date	Attendance
Concrete, WA	February 25, 2008	12
Sedro-Woolley, WA	February 26, 2008	26
Bellingham, WA	March 4, 2008	16
Seattle, WA	March 5, 2008	16
	TOTAL	70

During the public comment period, the NPS received a total of 32 written responses in the form of letters, e-mails, newsletter questionnaires, and comments submitted on the NPS Planning, Environment, and Public Comment (PEPC) website. The vast majority of written comments were received from Washington State.

Comments, either through public meetings or written correspondence, were received from the following representatives of entities including:

- The Access Fund
- American Whitewater
- British Columbia Ministry of the Environment
- The Mountaineers
- National Parks Conservation Association
- North Cascades Conservation Council
- North Cascades Institute
- Pacific Northwest Trail Association
- Ross Lake Resort
- Seattle City Light
- Skagit Alpine Club
- Skagit Citizens Alliance for Rural Preservation
- Skagit Commercial Use Authorized Users
- Skagit Environmental Endowment Commission
- Washington Seaplane Pilots Association
- Whatcom County Backcountry Horsemen
- The Wilderness Society

Summary of Draft Alternatives Public Comments

The comments on the draft alternatives covered a broad range of topics, issues, and recommendations for Ross Lake NRA. When compiled, 150 different comments or ideas were represented, with a total of 539 individual comments provided overall. Because various statements or ideas were mentioned repeatedly, similar comments are stated once, but the number of times a particular point was made has been tabulated.

The following summary is organized by topics that are addressed for each alternative in the Draft GMP/EIS. The topics are: Recreation and Visitor Experience, Natural Resources, Access and Transportation, Facilities, Interpretation and Education, Cultural Resources, and Operations. The majority of comments received were related to recreation and visitor experience. Natural resources, access and transportation issues, and facilities each accounted for approximately ten percent of comments. Smaller percentages were split between the additional issue areas discussed below.

Recreation and Visitor Experience

Recreation and visitor experience was the most common area of comment overall, with nearly half of all comments submitted.

Lake Recreation

Lake recreation was an area of strong interest to the public, and the majority of recreation comments overall were related to the use of motorboats within Ross Lake NRA. Although a few commenters supported continuing current motorboat policies and practices, the public expressed a high level of support for setting limits on motorboats in order to protect resources and maintain a high quality visitor experience. There was also strong support for implementing a deadline for engine restrictions before the proposed date of 2020. Suggestions for how to limit motorboats included speed limits, restricting motorboat activities to certain geographic areas, restrictions on amphibious craft, and creating a motorboat "season." There was a moderate amount of support for phasing out gas-powered boats in favor of different engine types. Some opposition to towing of people was also expressed. The public comments also

reflected support for non-motorized boating within Ross Lake NRA.

Camping

Public comments on camping stated support for maintaining camping opportunities as well as support for limited improvements and enhancements. In the face of severe or catastrophic weather events, the public was in favor of a "no net loss" approach to rebuilding campgrounds. Several commenters wanted the NPS to retain existing popular campground sites such as Colonial Creek and Goodell, or provide comparable experiences.

Several comments related to the Hozomeen campground area, in support of improved facilities and programs, including the new ranger station/visitor center, and additional interpretive opportunities. A number of comments also encouraged development of large group areas within Ross Lake NRA, including campsites and picnic areas. These facilities could be geared toward families, educational groups, or other visitor groups.

Some support was expressed for maintenance and improvement of backcountry campsites, as well as for additional frontcountry camping opportunities, including walk-in sites. A few comments stressed maintaining current sites as they are, and were opposed to expansion. Some comments opposed expanded campsite infrastructure such as electricity and RV hookups. The boat-in campsites were of interest to the public, with equal numbers supporting maintenance of the existing boat-in sites and providing new or enhanced boat-in sites. There was also minimal support for year-round camping and recreational access.

Trails, Hiking, and Climbing

The majority of comments on trails and hiking stated support for increased or improved trails within Ross Lake NRA, including day-hiking trails along the North Cascades Highway corridor. The public comments also included several specific ideas for new trails. A few comments suggested limiting the amount of new trails, either by location, length, or number. Additionally, a few commenters preferred to focus on maintaining existing trails.

Most comments related to sport climbing expressed support for enhanced climbing management, including such possibilities as establishing a climbing permit system and developing Climbing Management Areas. A few comments supported continuing the climbing opportunities as they currently exist.

Motorized Recreation

The most comments on motorized recreation were related to seaplanes. Several commenters wanted to maintain current seaplane access to Ross Lake NRA, and expressed concern about possible future limitations on seaplane use. Several comments also suggested restricted seaplane use within Ross Lake NRA, including specific ideas such as designating use areas and restricting times of operation. There was also some general concern about aircraft and interest in limiting overflights. Additionally, some support was provided for limiting snowmobile use.

Non-motorized Recreation

The most prevalent theme among comments on non-motorized recreation was support for enhancements of stock staging area opportunities and improved horse trails and facilities. There was concern with security and vandalism in current parking areas, as well as potential conflict with non-stock users. Some commenters also wanted improvements to bicycle access and facilities, as well as for restrictions on hunting. A few comments were supportive of promoting non-motorized winter recreation.

Fees and Reservations

The public expressed strong support for an expanded reservation system. Ideas included providing additional online information and reservation features, as well as allowing some permits and camping reservations to be arranged online or remotely. A few comments supported implementing limited user fees, which could be restricted to certain geographic areas or activities. Some commenters also stated a concern about obtaining backcountry reservations when entering Ross Lake NRA from the east.

Wilderness

Several comments expressed general support for wilderness preservation within Ross Lake NRA. In addition, the idea of preserving the "wilderness character" of Ross Lake NRA was also stated several times.

Natural Resources

The most common comments on natural resources discussed the need for ecosystem preservation and for native species restoration and stewardship. Noise and light pollution were of concern to the public, and comments expressed strong support for preserving natural soundscapes and dark night sky. There were also several comments in support of continued fire management practices, including cooperative fire management and allowing natural fires to burn. A few comments provided support for a wild and scenic river study of the Skagit River. Strong support was also provided for low-impact research activities within Ross Lake NRA.

Access and Transportation

Access and transportation comments focused on roads, parking, universal access, and alternative transportation.

Comments related to the North Cascades Highway were raised about increased traffic along the highway corridor and its potential impacts on safety, visitor experience, and the rural character of communities outside Ross Lake NRA. The public was also concerned about noise levels along the North Cascades Highway and the need for noise reduction. A few comments expressed support for additional pullouts and overlooks and universal access to resources within Ross Lake NRA. There was also a moderate level of support for expanding the Ross Dam Trailhead parking lot.

There was also strong support for developing alternative transportation options within Ross Lake NRA. A few commenters supported the undertaking of a transportation study to analyze transportation issues. Additionally, a few commenters expressed opposition to the idea of paving the road from Hope to Hozomeen.

Facilities

Public comments on the draft alternatives included many new ideas for placement or development of facilities within Ross Lake NRA. Several public comments were received specific to the Wilderness Information Center and its potential future location. Several commenters supported moving the facility to the North Cascades Highway. Some commenters suggested maintaining the Wilderness Information Center in its current location.

Some commenters expressed support for improved park entrances and improved signage for trails, facilities, and permitting stations. Some people wanted a modest expansion of the North Cascades Environmental Learning Center. A few commenters provided support for employee housing.

Other comments on facilities supported a new ranger station/visitor center at Hozomeen.

Interpretation and Education

Comments on interpretation and education focused on continuation and enhancement of park-based programs. There was also strong support for an increase in interpretation of cultural resources within Ross Lake NRA, including the history of the hydroelectric projects and Native American history and use. Comments supported a continued relationship with the North Cascades Institute and Environmental Learning Center and other education partnerships. Additional comments expressed support for increasing interpretive staff presence within Ross Lake NRA.

Climate Change

Several commenters supported taking actions to reduce Ross Lake NRA's carbon footprint and reduce potential contributions to climate change. A moderate level of public support was expressed for applying sustainable or "green" building design to new facilities.

Cultural Resources

Some support was expressed for researching, documenting, and interpreting cultural resources as well as providing access to cultural resources.

Concessions

Several commenters wanted an expanded water taxi service on Ross Lake. Several commenters were concerned with potential impacts of expanding the Ross Lake Resort. Issues of concern included user capacity, design issues, access, and potential impacts to visitor experience and neighboring campsites. Comments were also received in support of additional overnight lodging opportunities both within and outside Ross Lake NRA.

Partnerships

The public comments showed strong support for domestic interagency partnerships, primarily with the U.S. Forest Service and continued cross-border cooperation and partnership with Canada.

Seattle City Light

Several comments relating to Seattle City Light facilities were received. These were predominately in support of adaptive reuse options in Diablo and Newhalem Townsites. In addition, there were several comments in support of additional Seattle City Light-provided public amenities, such as landscaping and wayside exhibits. The public also expressed interest in increased interpretation of Seattle City Light activities such as facility tours, and interpretation of hydroelectric history.

Staffing

A few public comments expressed support for increased staff presence within Ross Lake NRA, including rangers, interpreters, and seasonal staff.

User Capacity

Some public comments were received concerning user capacity issues. Concern was expressed with how increased visitation will be handled in the future and resulting impacts on visitor experience.

Lands

A few comments suggested expanding the Ross Lake NRA boundary.

Skagit Wild and Scenic River Eligibility and Suitability Study~~ies~~ Public Process

The NPS invited public comments on the Skagit Wild and Scenic River Eligibility and Suitability Study~~ies~~ in fall 2008. The primary purpose of this public comment period was to understand the public's concerns about the preliminary eligibility findings and potentially designating the river segments as wild and scenic rivers. This was an extra planning step designed to provide the public with opportunities to focus on the Skagit wild and scenic study~~ies~~. The information gathered was used in formulating and refining the Skagit Wild and Scenic River Eligibility and Suitability Study~~ies~~.

A newsletter was sent to approximately 450 contacts and thirty people attended the two public meetings held on October 14, 2008 in Seattle, WA and October 15, 2008 in Sedro-Woolley, WA. Press releases were sent to regional media announcing the public meetings and public comments were taken through October 31, 2008. Written comments were received from 52 organizations and individuals.

The three ideas that received the most public comments were support for designation and preliminary study findings, support for adding recreation and scenery as outstandingly remarkable values; and support for conducting additional wild and scenic river eligibility and suitability studies for other river segments within the North Cascades NPS Complex.

More information about the Skagit Wild and Scenic River Eligibility and Suitability Study~~ies~~ and public involvement can be found in Appendix D.

Agency Consultation and Coordination

The following sections document the consultation and coordination efforts undertaken by the NPS during the preparation of this Draft GMP/EIS. Consultation is an ongoing effort throughout the entire process of developing the Final GMP/EIS. Copies of letters exchanged with partners and agencies are in the administrative file.

Consultation with Native American Tribes

In keeping with the provisions of the National Historic Preservation Act- Section 106 process, the North Cascades NPS Complex staff established opportunities for interaction with tribal officials. Swinomish, Sauk-Suiattle, and the Upper Skagit Tribes were consulted for this project.

Consultation with the Washington State Historic Preservation Officer and the Advisory Council on Historic Preservation

The Washington State Historic Preservation Officer must be consulted concerning any resource management proposals that might affect a cultural property listed on or eligible for the National Register of Historic Places; several listed properties exist within Ross Lake NRA. The NPS initiated consultation with the Washington State Historic Preservation Officer and the Advisory Council for Section 106 of the National Historic Preservation Act, as amended, in date during the public scoping period.

Consultation with the U.S. Fish and Wildlife Service

The Endangered Species Act of 1973 (ESA), as amended, directs every federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the existence of any listed species or destroy or adversely modify critical habitat (50 CFR 400). The ESA authorizes federal agencies to enter into early consultation with the USFWS to make those determinations. Formal consultation with the USFWS under Section 7b of the ESA was conducted in date. (See Special Status Species in the Affected Environment.)

Coordination with other Agencies, Organizations, and Groups

The Federal Land Policy Management Act, Title II, Section 202, provides guidance for coordinating planning efforts with American Indian tribes, other federal departments, and agencies of the state and local governments. All local governments, tribal governments, and federal and state agencies with resource management responsibilities or interest in the planning area were informed of the planning effort and encouraged to participate.

List of Draft GMP/EIS Recipients

Paper copies or executive summaries of the draft GMP/EIS were sent to the following recipients. Additionally, executive summaries were sent to the mailing list of approximately 400 individuals and organizations. The draft GMP/EIS is available on the internet at www.nps.gov/noca/parkmgmt/rlna-gmp.htm and upon request.

Federal Agencies and Officials

- Advisory Council on Historic Preservation, Lakewood, CO
- Army Corps of Engineers, Chelan, WA
- Bureau of Indian Affairs, Portland, OR
- Ebey's Landing National Reserve, Coupeville, WA
- Environmental Protection Agency, Seattle, WA
- Federal Energy Regulatory Commission, Portland, OR and Washington, DC
- Honorable Cathy McMorris Rodgers, U.S. House of Representatives, Washington, DC
- Honorable Dock Hastings, U.S. House of Representatives, Washington, DC
- Honorable Maria Cantwell, U.S. Senate, Washington, DC
- Honorable Patty Murray, U.S. Senate, Washington, DC
- Honorable Rick Larsen, U.S. House of Representatives, Washington, DC
- Mount Rainier National Park, Ashford, WA
- National Oceanic and Atmospheric Administration, Seattle, WA
- Office of Federal Programs, Washington, DC
- Olympic National Park, Port Angeles, WA
- San Juan Island National Historical Park, Friday Harbor, WA
- U.S. Department of Transportation, Federal Highway Administration, Vancouver, WA
- U.S. Fish and Wildlife Service, Lacey, WA
- U.S. Forest Service, Mount Baker-Snoqualmie, Okanogan-Wenatchee National Forests
- U.S. Geological Survey, Seattle, WA

State and Local Agencies and Officials

- Chelan County Courthouse, Wenatchee, WA
- City of Burlington, Burlington, WA
- City of Mt. Vernon, Mt. Vernon, WA
- City of Seattle, Seattle, WA
- Concrete Public Library, Concrete, WA
- Economic Development Association, Mt. Vernon, WA
- Governor Christine Gregoire, Olympia, WA
- Honorable Cary Condotta, 12th Legislative District Representative, Olympia, WA
- Honorable Dale Brandland, 42th Legislative District Senator, Olympia, WA

- Honorable Dan Kristiansen, 39th Legislative District Representative, Olympia, WA
- Honorable Doug Ericksen, 42th Legislative District Representative, Olympia, WA
- Honorable Kelli Linville, 42th Legislative District Representative, Olympia, WA
- Honorable Kirk Pearson, 39th Legislative District Representative, Olympia, WA
- Honorable Linda Evans Parlette, 12th Legislative District Senator, Olympia, WA
- Honorable Mike Armstrong, 12th Legislative District Representative, Olympia, WA
- Honorable Val Stevens, 39th Legislative District Senator, Olympia, WA
- Seattle City Light, Newhalem, Rockport, and Seattle, WA
- Sedro-Woolley City Council, Sedro-Woolley, WA
- Skagit County Commissioners Office, Mt. Vernon, WA
- Skagit Environmental Endowment Commission, Seattle, WA
- Town of Concrete, Concrete, WA
- Washington Department of Archaeology & Historic Preservation, Olympia, WA
- Washington Department of Ecology, Olympia, WA
- Washington Department of Fish & Wildlife, Wenatchee, WA
- Washington Department of Natural Resources, Olympia, WA
- Washington Department of Parks and Recreation
- Washington Department of Tourism, Olympia, WA
- Washington Department of Transportation
- Washington Department of Transportation, Olympia, WA
- Washington Department of Water Resources
- Washington State Historic Preservation Officer, Olympia, WA
- Whatcom County Office, Bellingham, WA
- Whatcom County Parks, Bellingham, WA
- Whatcom County Planning & Development Services, Bellingham, WA
- Winthrop Town Council, Winthrop, WA

Tribes

- Sauk-Suiattle Tribe, Darrington, WA
- Swinomish Tribe, La Conner, WA
- Upper Skagit Tribe, Sedro-Woolley, WA

Businesses, Institutions, and Organizations

- Adventures Cross Country, Mill Valley, CA
- Alpine Ascents International, Seattle, WA
- American Alpine Institute, Bellingham, WA
- American Mt. Guides Association, Boulder, CO
- American Rivers, Seattle, WA
- American Whitewater, Seattle, WA
- Ascent Institute (Teams & Leaders), Seattle, WA
- Backcountry Horseman of WA, Lake Stevens, WA
- Base Camp, Inc., Seattle, WA
- Bellingham Bicycle Club, Bellingham, WA
- Blue Water Network, San Francisco, CA
- Boy Scouts of America, Seattle, WA
- Camp Nor'wester, Lopez Island, WA
- Camp Thunderbird, St. Louis, MO
- Cascade Bicycle Club, Seattle, WA
- Cascade Corrals Cragg, Stehekin, WA
- Cascade Loop Association, Wenatchee, WA
- Concrete Chamber of Commerce, Concrete, WA
- Conservation Northwest, Bellingham, WA
- Dali Llama Wilderness Adventures, Bow, WA
- Defenders of Wildlife, Washington, DC
- Discover Your Northwest, Seattle, WA
- Earth Justice Legal Defense Fund, Oakland, CA
- FOCUS, Rockport, WA
- Go-Trek and Expeditions, Bellevue, WA
- Hi Lakers, Mercer Island, WA
- International Mountain Guides, Inc., Ashford, WA
- Izaak Walton League, Bellevue, WA
- King County Outdoor Sports Council, Seattle, WA
- Longacre Expeditions, Newport, PA
- McGraw YMCA, Camp Echo, Evanston, IL
- Methow Biodiversity Project, Twisp, WA
- Methow Conservancy, Winthrop, WA
- Moondance Adventures, Asheville, NC
- Mount Baker Council of the Boy Scouts of America, Everett, WA
- Mountain Madness, Seattle, WA
- National Outdoor Leadership School, Conway, WA
- National Parks Conservation Association, Seattle, WA
- North Cascades Chamber of Commerce, Marblemount, WA
- North Cascades Conservation Council, Seattle, WA

- North Cascades Institute, Sedro-Woolley, WA
- North Cascades Mt. Guides, Mazama, WA
- Northwest Mt. School, Leavenworth, WA
- Outdoor Recreation Information Center, Seattle, WA
- Outward Bound West, Mazama, WA
- Pacific Northwest Trail Association, Sedro-Woolley, WA
- Paddle Trails Canoe Club, Seattle, WA
- Pro Guiding Service, North Bend, WA
- REI, Seattle, WA
- Ross Lake Resort, Rockport, WA
- Sedro-Woolley Chamber of Commerce, Sedro-Woolley, WA
- Sierra Club Cascades Chapter, Seattle, WA
- Sierra Club Cascades Chapter, Tacoma, WA
- Sierra Club Outing Committee, Corvallis, OR
- Skagit Alpine Club, Mt. Vernon, WA
- Skagit Audubon Society, Mt. Vernon, WA
- Skagit Community Action, Mt. Vernon, WA
- Skagit County Historical Society, Larcener, WA
- Skagit County Parks Foundation, Mt. Vernon, WA
- Skagit County Upriver Services, Concrete, WA
- Skagit Fisheries Enhancement Group, Mt. Vernon, WA
- Skagit Land Trust, Mt. Vernon, WA
- Skagit River Bald Eagle Awareness Team, Concrete, WA
- Skagit Watershed Council, Mt. Vernon, WA
- Student Conservation Association, Seattle, WA
- Summit Expeditions International, Colorado Springs, CO
- The Access Fund, Moab, UT
- The Evergreen State College, Olympia, WA
- The Mountaineers, Bellingham, WA
- The Mountaineers, Seattle, WA
- The Nature Conservancy, Mt. Vernon, WA
- The Nature Conservancy, Seattle, WA
- The Road Less Traveled, Chicago, IL
- The Wilderness Society, Seattle, WA
- Trout Unlimited, Arlington, VA
- University Kayak Club, University of Washington, Seattle, WA
- Washington Kayak Club, Seattle, WA
- Washington Native Plant Society, Seattle, WA
- Washington Outfitters & Guide Association, Snohomish, WA
- Washington Recreational River Runners, Renton, WA
- Washington Trails Association, Seattle, WA
- Washington Water Trails Association, Seattle, WA
- Washington Wilderness Coalition, Seattle, WA
- Washington's National Park Fund, Seattle, WA
- Western Land Exchange Project, Seattle, WA
- Western Washington University Outdoor Center, Bellingham, WA
- Wild Fish Conservancy, Duvall, WA
- Wildcat Steelhead Club, Sedro-Woolley, WA
- Wilderness Inquiry, Minneapolis, MN
- Wilderness Ventures, Jackson Hole, WY
- Wilderness Watch, Missoula, MT
- Winthrop Chamber of Commerce, Winthrop, WA
- Youth Dynamics Adventures, Leavenworth, WA
- YMCA of Greater Seattle, Seattle, WA

Canadian Entities

- British Columbia Ministry of Environment, Vancouver, BC
- British Columbia Parks, Vancouver, BC
- Tourism British Columbia, Vancouver, BC

Public Review of the Draft GMP/EIS

For the remainder of this chapter, all information is new for the final GMP/EIS.

The official public review process for the Ross Lake Draft General Management Plan and Environmental Impact Statement began on July 1, 2010 and ended September 30, 2010. The NPS intentionally held the public review period during the peak summer visitation season in order to provide opportunities for the visiting public to learn about the NPS's preferred alternative for Ross Lake NRA and provide their comments on the draft plan. The draft plan and information about how to provide public comments were made available on the NPS and Planning, Environment, and Public Comment (PEPC) websites (www.nps.gov/rola and http://parkplanning.nps.gov/rola) on July 1, 2010.

The NPS also announced the public review process through a Notice of Availability published in the *Federal Register* (v75, n136, pp 41512-14) on July 16, 2010. In early July 2010, the NPS distributed approximately 160 paper and digital copies of the complete draft GMP/EIS to state congressional offices, local tribes, governmental agencies, and other interested organizations and individuals. The NPS also produced and mailed the Draft GMP/EIS Executive Summary Newsletter#3 to over 900 contacts on the mailing list. The newsletter fully outlined the four alternatives and encouraged the public to participate in the planning process. The public had opportunities to provide comments through attending a public open house, submitting comments on the NPS PEPC website, writing a letter or e-mail, or providing comments on the postage paid comment form enclosed in the newsletter. Dates, times, and locations for the public open houses were clearly listed in the newsletter and on the NPS and PEPC websites. Contact information for the public to either request more planning materials and/or comment on the draft plan was also printed in the newsletter and available on the web.

Press releases were prepared and mailed to local media in advance of the public open houses by the North Cascades NPS Complex staff, and a series of posters were distributed to approximately 35 locations throughout Ross Lake National Recreation Area and the region announcing the public open houses and requesting public comment.

Public Meetings and Written Comments

The NPS held six public open houses in Sedro-Woolley, Marblemount, Newhalem, Seattle, Bellingham, and Winthrop in July 2010. Seventy-seven people participated in these public open houses and provided oral comments.

The open houses began with a presentation of the draft general management plan and then transitioned into smaller facilitated discussions at three to six subject-based stations. Station topics included: the Skagit Corridor, Gorge and Diablo Lake Area, Ross Lake Area, Resource Protection, Boundary Modifications, and the Skagit Wild and Scenic River Designation Study. For open houses that had smaller attendance, some stations were combined for efficiency. Members of the public could visit any or all of the stations to provide comments and join discussions on these topics. Each station was attended by at least one, if not two NPS staff with expertise on the relevant issues. Staff took detailed notes on all comments which contributed to the record of public comments.

The following table lists the locations, dates, and number of people who attended each meeting:

Table 7.3 Public Open House Meetings on Draft GMP/EIS, 2010

Location	Date	Attendance
Sedro-Woolley, WA	July 21, 2010	9
Marblemount, WA	July 22, 2010	12
Newhalem, WA	July 24, 2010	19
Seattle, WA	July 27, 2010	13
Bellingham, WA	July 28, 2010	16
Winthrop, WA	July 29, 2010	8
	TOTAL	77

The National Park Service received approximately 1,645 total comments on the draft plan by mail, e-mail, fax, hand delivery, oral transcript, and the Internet via the NPS Planning, Environment, and Public Comment (PEPC) website. A number of groups and individuals submitted duplicate comments by different means, and several people commented up to four times. Of the comments received, 7 were from agencies and elected officials, 5 from businesses, and 22 from organizations. The remaining comments were from individuals. Approximately 1,220 individuals responded by using one of two different form letters.

Range of Comments

The comments on the draft GMP/EIS covered a broad range of topics, issues, and recommendations for Ross Lake National Recreation Area. The comments were entered into the NPS Planning Environment and Public Comment database and analyzed.

The following topics received the most comments:

Alternatives

Approximately three quarters of the public comments received explicitly stated a preference for one of the alternatives over the others. Nearly all of these comments expressed support for the NPS preferred alternative and the future vision for Ross Lake NRA. Many people also stated support for the preferred alternative with one or more significant modifications. The most common suggested modifications were the conversion of portions of Ross Lake NRA to national park and allowing seaplanes to access all of Ross Lake. A few comments also favored Alternative A and Alternative D.

Connection to the "National Park"

Whether commenting on visitor facilities, recreational activities, interpretive programs, or boundary modifications, a dominant theme in the comments was an expressed desire for a "national park" experience while visiting Ross Lake NRA. While Ross Lake is an important and dominant feature in the landscape, most people's affiliation to the area is with the North Cascades as opposed to Ross Lake. This sentiment came across particularly clear when talking about the relationship between North Cascades National Park, Ross Lake National Recreation Area, the North Cascades Highway, and the gateway communities. Numerous commenters expressed a desire to encourage people to understand the magnificence of this place, to learn about this national resource, and to ultimately get out of their cars and experience what this landscape has to offer. Particular comments encouraged the NPS to create a more distinguished "entrance" along the North Cascades Highway that welcomes visitors from both the east and west sides of the North Cascades NPS Complex. Many other commenters requested more opportunities to stop along the road, learn about the area, and perhaps day hike to a scenic vista. Others sought increased access to Ross Lake and surrounding areas and urged the NPS to improve visitor services and amenities to engage citizens from all ages, abilities, and interests.

Despite the topic, commenters made it clear that they value Ross Lake National Recreation Area and seek to enhance the experience of the place for both themselves and others.

Boundary Modifications

Many comments received by the NPS were in reference to **internal boundary changes**. Of these, several commenters requested that the NPS convert portions of the National Recreation Area to National Park designation, particularly along the North Cascades Highway and areas in the NRA that do not have hydroelectric features or activities.

Many commenters also requested that the NPS consider **external boundary modifications** in order to allow for more holistic management, assure the successful recovery of threatened or endangered species, and/or respond to threats within these surrounding lands. Some comments suggested that boundaries be based on ecological or hydrological functions/divides, and, related to this, some suggested

> *"While. . .the present working relationship between the National Park Service and the U.S. Forest Service is effective at protecting lands in the Skagit Watershed, this may not always be the situation in the future. Boundaries following hydrologic divides would provide for simpler and more consistent management in the long run. . .Boundary evaluation does not necessarily need to be part of the GMP, but the plan should explicitly allow for it."*
>
> *Public Comment*

NPS staff speak with community members at Public Meeting in Sedro-Woolley, 2010.

"Preserve the character of Ross Lake. There are so few places with limited mechanization and noise."

Public Comment

"I like advance trip planning. Keep it local though because park employees know usages and accommodations and what else is going on in the park."

Public Comment

a formation of an international park between Canada and the United States. More specific comments recommended incorporating lands to the east such as the Skagit River, Baker River, Bacon Creek, and Cascade River Watersheds currently managed by the U.S. Forest Service, and sections of the Mount Baker Wilderness north of Mt. Shuksan. Some comments also requested that the NPS expand to the west to incorporate all or various sections of U.S. Forest Service lands in the upper Methow River watershed. Some commenters voiced their support of the NPS's decision to not change their external boundaries. These commenters thought the changes in designation were unnecessary and some feared that the boundary changes would change the character of surrounding communities.

The NPS received numerous comments about the proposed boundary modification in the town of **Diablo**. While many commenters expressed support for the land exchange due to the number of opportunities for education, lodging, trailhead maintenance, and visitor services, other commenters voiced concern about future plans. Some of these comments referred to staff, budgeting, and operating costs. Others brought up safety concerns (both natural and human caused hazards) on the site and future needs such as a sewage treatment plant. Other commenters wanted to learn more about the NPS's future plans for this site before expressing their support for this proposed land exchange.

Visitor Experience

The vast majority of comments on the Draft GMP/EIS discussed visitor experience within Ross Lake NRA. The areas of visitor experience that received the most comments included: backcountry permit system, boating, climbing, concessions operations, hunting, interpretation, seaplanes, and soundscapes..

The NPS received many comments regarding an advanced trip planning option for **backcountry permits**. Some commenters expressed their support for such a change, and several suggested that this option be available online. Some commenters also expressed a great appreciation for the current system, noting the value of personal interaction with NPS rangers, and offered suggestions for how to create a balance between online and in-person permitting. Suggestions included: offering advanced trip planning for only a portion of current campsites, requiring confirmation or in-person pickup, allowing only certain user groups to access an online option, requiring commitment to "leave no trace" principles in an online system, and maintaining a shorter time frame for advanced trip planning. Several commenters requested that any permitting system remain "local".

The NPS received many comments about **boating** regulations, ranging from opposition to any additional regulations to support for a complete ban of all motorized activity on Ross Lake. Several commenters questioned the need for additional boating regulations as motorboat access to Ross Lake is already limited in large part by the gravel road to Hozomeen. Other commenters also expressed concerns about safety (search and rescue and tree stumps in the northern section of Ross Lake) and the ability to access the entirety of Ross Lake if restrictions on boating were implemented. Other commenters urged the NPS to implement regulations on engine size and type, horsepower, zoning (concentrated use) and maintain its ban on personalized water craft and towing activities. Many commenters who said they favored the four-stroke engine requirement also requested that the regulation be implemented sooner than 2015. Several commenters requested additional or more stringent regulations on boating such as restricting the number of boats on Ross Lake, limiting access to only electric boats, or eliminating all motorized uses on the lake. Many people stated that the wilderness qualities of Ross Lake and natural soundscapes were justification for new restrictions. Some commenters also questioned the justifications for proposed regulations. A few commenters suggested that waves from wind are more responsible for erosion on Ross Lake than any boating activity. Two commenters also questioned the size of boats operated by Seattle City Light and the National Park Service, and several others questioned the four-stroke engine requirement, suggesting that this regulation may not ensure less pollution.

The Skagit River.

Most of the comments received regarding recreational **climbing** in Ross Lake NRA voiced "tentative support" for proposed climbing management areas. These commenters were in favor of maintaining if not improving access for climbers along the North Cascades Highway, but voiced concern over the process of defining these areas and the potential to limit climbing to the Skagit River area through this type of management. Some commenters expressed concerns about locating any climbing management area near hydroelectric facilities; some discussed locating parking lots around such areas; and some were concerned about the overall environmental damage to resources in these areas. Some of those particularly concerned about environmental impacts requested a full environmental assessment before designating climbing management areas and suggested that education be a part of this management proposal. Some comments also suggested that the NPS create a stand-alone climbing management plan.

Comments about **concessions** in Ross Lake NRA generally referred to one of three topics: commercial air tours, Ross Lake Resort expansion, and suggestions for new concessions. Those that responded to commercial air tours voiced their support against this type of concession in favor of private pilots. Those that responded to the Ross Lake Resort expansion varied from support of the expansion to concerns about the architectural consistency of new development, future transportation to the Resort, and the financial implications of any expansion. Suggestions for new concessions ranged from horse packing concessions to new lodging opportunities, as well as public transportation ideas such as a shuttle or ferry.

The NPS received several comments about **hunting** in Ross Lake NRA. Some of these comments raised concerns over impacts to wildlife populations, safety, education, and increased use. Other commenters expressed their support for the ban on lead-based ammunition.

The NPS received many comments in support of education and **interpretation** in Ross Lake NRA. Some of these commenters voiced general support for the NPS's proposed "primary interpretive themes" and goals in the draft plan. Other commenters urged even greater support for interpretation through increased staff and funding. Additional commenters made specific suggestions for interpretation and visitor services within Ross Lake NRA. These suggestions ranged from increased services in Newhalem, to more

visitor services along the North Cascades Highway, information waysides along trails, extending seasonal operations, and expanding the climate friendly parks initiative. Many of these suggestions also encouraged increased cooperation between the NPS and the U.S. Forest Service, Seattle City Light, and other regional and local entities.

Many citizens submitted comments regarding the proposed regulations on **seaplanes** in the preferred alternative. These comments ranged from full support of a ban on seaplane landings and take-offs to full access for seaplanes. Some commenters expressed concerns over the impact of seaplane noise on natural soundscapes, wildlife populations, and the tranquil and pristine character of the reservoirs. Many of these commenters questioned the compatibility of seaplane use with the backcountry and wilderness character of Ross Lake NRA. In contrast, many commenters urged the NPS to reconsider the proposed limitations on seaplane access. Numerous reasons were stated for this reconsideration including: the historic use of seaplanes on Ross Lake, the nature and relative small size of the seaplane pilot community, the comparative impacts between boats and seaplanes, the lack of significant environmental impacts from seaplanes, safety concerns in different areas of Ross Lake, border control issues, and a desire to access prime campsites along the middle sections of Ross Lake. Many commenters also questioned the justification for such limitations. Other commenters suggested alternative approaches for managing seaplane use and suggested a noise abatement program and other soft approaches such as education and stewardship opportunities. Some commenters suggested a permit system that could be operated online. Others suggested changes to the proposed management zones such as limiting landing sites to seaplane accessible campsites. And others suggested placing time limits on operation, restricting flight elevation, limiting the number of landings and take-offs one pilot could do within 24 hours, or simply allowing seaplanes to deviate from rules during unusual weather conditions.

> *"Float plane landings and take-offs on Ross Lake are incompatible with the backcountry and wilderness experiences."*
>
> *Public Comment*

The NPS received a number of comments regarding natural **soundscapes** in and around Ross Lake. Some commenters highlighted the importance of natural soundscapes and expressed concern about the impact of human caused noise on wildlife within Stephen Mather Wilderness. Many of these commenters voiced particular concern about the noise generated from motorcycles and other traffic on the North Cascades Highway and seaplanes on Ross Lake. To this end, some commenters voiced their support for the preferred alternative, its attention to these natural soundscapes, and its proposed concentration of noise in already developed areas (such as along the North Cascades Highway). Other commenters suggested that the NPS enhance education about soundscapes and increase support for soundscape monitoring programs. Some people proposed additional regulations to protect the natural soundscapes such as decreasing the size of proposed front country zones to further concentrate motor use, enforcing noise standards on all motor vehicles, encouraging use of EPA certified motors, and limiting administrative use of helicopters. Other methods for controlling human caused noise included creating "acoustic cushions" (areas where motorized vehicles are excluded) and promoting more non-motorized activity on Ross Lake. Some commenters requested that the NPS address in particular noise created by motorcycles in the general management plan.

In addition to the comments listed above, the NPS received other comments concerning bicycling, stock use, fishing, dogs, helicopters and other motorized aircraft, recreation along the Skagit River, and spiritual practices within Ross Lake NRA.

Facilities

The NPS also received numerous comments about current and proposed facilities in Ross Lake NRA. While these comments covered a range of topics, from signage to sustainability and energy conservation, the NPS received the most comments on trails, campgrounds, facilities in Hozomeen, facilities along the North Cascades Highway, and other transportation amenities.

Some comments responded to recommendations in the draft plan regarding **campgrounds** in Ross Lake NRA. A few commenters specifically voiced their support for the proposal to consider locating campgrounds near the aggregate ponds, but others were concerned about this proposal due to impact on salmon habitat and requested a

further analysis of what species would be impacted by such a development. A few other commenters suggested that the NPS add more campsites along Ross Lake or add a front country campground that would be accessible for stock. Other commenters were primarily concerned about operations of campgrounds, specifically requesting that the NPS maintain full control of the facilities rather than allowing a concessionaire to provide this service. Some commenters also discussed Colonial Creek Campground and steps the NPS would take if the campground was destroyed by a natural hazard. Some of these comments voiced support for relocating the campground if destroyed, but some voiced concerns over relocation. These commenters suggested that facilities should not be rebuilt in a hazard area, and if relocation was necessary, the new site should be located so as to minimize loss of important forest habitat.

Comments about **Hozomeen** generally referred to border control issues, facilities and development, and/or international coordination. Some commenters voiced their support for maintaining the gravel road to Hozomeen, citing the current access conditions as important to maintaining the character of the experience on Ross Lake. Some commenters expressed opinions about the proposed changes to the campgrounds, ranging from those in support to those against the proposal. Some commenters liked the proposal to improve facilities, particularly a ranger station if managed by both British Columbia and the National Park Service. Many commenters also urged the NPS to work with B.C. Parks to improve consistency across the border, whether through changes in information, regulations, camping fees, or overall quality of facilities. Some of these commenters suggested creating an international park.

Many citizens wrote to the NPS about hiking **trails** in Ross Lake NRA. Some comments voiced support for new proposed trails such as Happy Flats, Goodell Creek, and County Ponds, and some suggested closures or improvements to current trails such as the Gorge Overlook, Newhalem Creek, Sourdough, and Stetattle Trails. Many comments expressed the need for more, easy to moderate, mid-elevation trails that are varied for different audiences and accessible from the North Cascades Highway or Newhalem. Some of these comments specifically requested more loop trails, particularly to Thornton Lakes. Many comments also suggested specific new trails that could be added. These suggestions ranged from a new trail to the Pickett Range, to a trail to Silver Lake, a trail up Ruby Mountain, a loop trail around Diablo Lake, and a Skagit River Trail. A few commenters were not in support of increasing the number of trails. Some commenters raised concerns for the location of new trails which ranged from border issues with Canada to concerns about over-development in Newhalem and protecting high quality and diverse wildlife habitat, particularly for grizzly bears.

The NPS also received a number of comments about roads and **transportation** within Ross Lake NRA. These comments ranged from suggestions to run a shuttle along the North Cascades Highway to building a tram up Ruby Mountain, operating a ferry on Ross Lake, regulating motorcycles and snowmobiles in the NRA, and increasing the number of turn-outs along the highway. A number of commenters also wrote to the NPS regarding the proposed addition of a water taxi on Ross Lake, some in support of the additional service and others against such an enterprise. Most transportation comments though referred either to the proposal to designate the North Cascades Highway as a **National Scenic Byway** or the proposal to close the last one mile of the Thornton Lakes Road at the wilderness boundary. Many commenters voiced their overall support for the designation of the North Cascades Highway as a National Scenic Byway, though some expressed concern about more federal bureaucracy and the continued closure of the highway during the winter.

In general, commenters who wrote letters about **Thornton Lakes** expressed support for closing the last mile of the road at the wilderness boundary. Commenters requested that the NPS rehabilitate the one mile of closed road, formalize a parking lot and trailhead at the wilderness boundary in an existing disturbed area, and upgrade the trail access to Thornton Lakes. Most commenters requested that this trail be constructed as a loop, along the ridge, and remain short in length. Some commenters also expressed concern about the size of the parking lot, and some expressed frustration, stating that the road should be kept open in honor of its historic use and high mountain access.

Many people also submitted comments about general facilities along the North Cascades Highway. A number of these commenters addressed the proposal to increase the footprint of the **Ross Dam Trailhead Parking Lot**. While some commenters saw the need to increase the size of the lot to accommodate traffic, others were concerned about the size of the footprint and the impact on fauna. Other commenters also

wrote to the NPS about the location of the **Wilderness Information Center**. Most individuals commenting on the Wilderness Information Center requested that the NPS relocate the facility along the North Cascades Highway in Marblemount, although a few expressed concerns about physically separating the functions in that office. Other commenters were concerned about general development along the North Cascades Highway and the proposal to widen the **Skagit Bridge** in Newhalem. Some commenters expressed frustration at the expense of the bridge, stating that the money could be better used elsewhere and was not needed, but many others expressed the need for a new bridge to encourage more use of the North Cascades Visitor Center. In general, comments ranged from demanding more opportunities to engage with the National Park along the North Cascades Highway to stating that the development along the road was sufficient for visitor contacts.

Resource Management

The NPS received numerous comments relating to **grizzly bear management** and development of Core Areas within Bear Management Units. A few commenters voiced concerns about the impact of the NPS's proposed management strategy on human/bear contacts while other comments voiced overall support for the restoration of grizzly bears in Ross Lake NRA and North Cascades National Park. Most of the comments pertaining to this topic urged the NPS to reassess the proposed retention of 70% Core Area, as many commenters believe that this percentage is too low. Some of these commenters questioned the standard for the following reasons: 1) they wondered how the 70% Core Area would be measured either as an average of cumulative or individual Bear Management Unit, 2) they questioned the scientific accuracy of that estimation, given the current condition of 82-92%, and pointed out differences between Yellowstone National Park and the North Cascades for potential different grizzly bear uses of habitat, and 3) they wondered how this proposal would impact trails and other developments. Several other commenters differentiated between early, mid, and late season habitats and requested that any siting of trails be based on science and avoid high quality habitat. Some comments requested that the NPS strike a balance, if not favor, grizzly bear habitat over constructing new trails while other comments recommended that Bear Management Unit Core Areas see no net loss. Some comments also addressed food storage and the importance of public education in light of grizzly bear recovery.

Other resource management topics that were addressed by comments include: climate change, visitor capacity and its effects on resources, cultural resources, support for Class I Airshed Designation, habitat fragmentation, water resources, water quality, watershed management, invasive species, night sky, mineral and timber extraction, and mushroom foraging.

Wilderness

The NPS also received a number of comments concerning the wilderness character of Ross Lake NRA and the North Cascades NPS Complex. Many of these comments expressed appreciation of the wilderness character of these lands and requested that the NPS create a balance between protecting this character and promoting access to the area. A number of people also wrote to the NPS in full support of the proposal to recommend converting **Thunder Creek Potential Wilderness** to designated wilderness. Some commenters also requested that the NPS convert Big Beaver Potential Wilderness as well.

Skagit Wild and Scenic River Eligibility and Suitability Studies

Many citizens wrote to the NPS concerning the **Skagit Wild and Scenic River Studies**. A few commenters thanked the NPS for embarking on such a project and for the quality of information included in the document. Many others voiced their overall support for the proposal to recommend Wild and Scenic River designation for the segment of the Skagit River from Gorge Powerhouse to the Ross Lake NRA boundary, Goodell Creek, and Newhalem Creek. Some of these comments were particularly pleased about the possibility of further protecting the Skagit River between Goodell and Copper Creek. Reasons given for support of this designation included the potential for cohesive management with the U.S. Forest Service of the designated segment of the Skagit River; increased recognition for the Skagit River,

> *"We are long-time river rafters and we return again and again to this section of the Upper Skagit as a respite. It's very important to us that this section of the river be protected by the Wild and Scenic designation. "*
>
> *Public Comment*

Goodell and Newhalem Creeks; the value and beauty of the North Cascades ecosystem; and the recreational opportunities provided by the river system. Only a few commenters expressed their disappointment that several other creeks including Thunder, Fisher, Ruby, and Big Beaver were not included in this study. Some of these commenters encouraged the NPS update the eligibility and suitability analysis for these other creeks in the future as proposed in the draft plan.

Partnerships

Many commenters wrote to the NPS about **partnerships** with the U.S. Forest Service, Seattle City Light, British Colombia Parks, tribes, and gateway communities. Most of the comments addressed interpretation, education, and visitor services that could be coordinated between the NPS and these partners. Some of these comments commended the interagency work with regards to recreational and preservation projects and requested that SCL tours continue. Other comments suggested that the NPS create joint visitor centers in Winthrop or Twisp, Marblemount, and at Washington Pass. A few other comments addressed resource management concerns, particularly with reference to noise along the North Cascades Highway and with debris on the northern end of Ross Lake. Of the comments that addressed cooperation with B.C. Parks, most urged the NPS to improve the consistency of regulations with B.C. Parks with regards to visitor contact, resource management, and use permits. Comments that addressed gateway communities criticized the draft plan for ignoring crucial local businesses and encouraged the NPS to use the North Cascades community as an important resource for addressing NPS needs.

Operations

The NPS also received a small number of comments concerning the operation of Ross Lake NRA. They included comments about funding, Seattle City Light operations, and staffing.

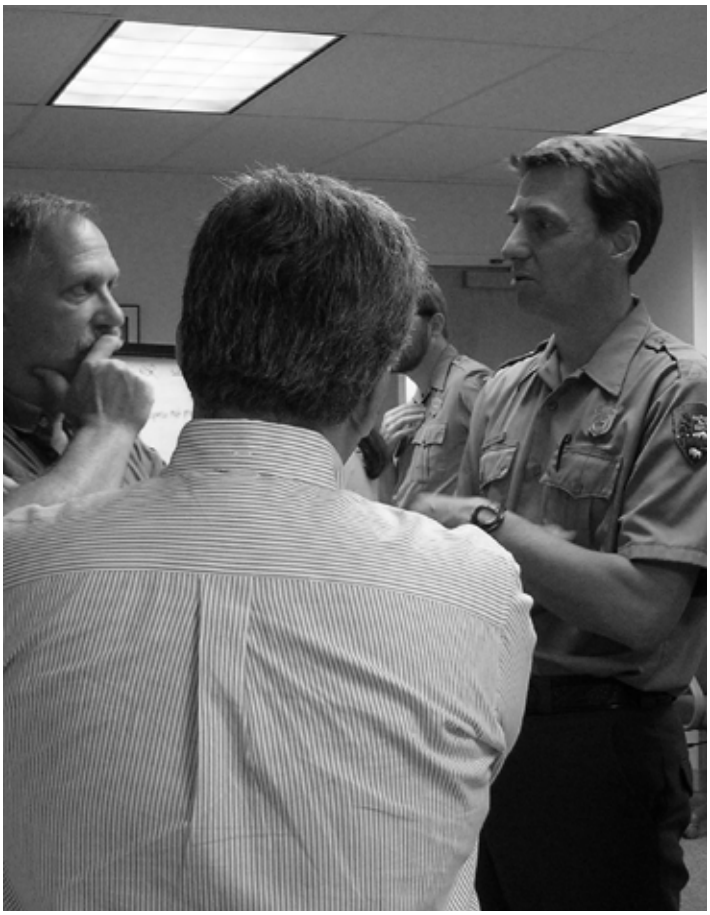
Planning

Some people also commented about specific components of the GMP and the planning process, including the foundation statement, management zoning, and the public involvement opportunities during the general management planning process.

Additional Comments

In addition to the comments referenced above, some commenters requested actions that were too detailed for the plan, were outside the scope of the general management plan, were considered in other plans, or could be achieved through other methods outside the general management plan process. Some comments were more relevant to implementation plans, provided site specific ideas that would be used in future planning efforts, or would be more appropriately addressed through the regulation and rulemaking process. Some commenters presented alternatives that are not reasonable, presented personal opinions or grievances, or presented alternatives that are outside the jurisdiction of the National Park Service.

> *"Working cooperatively with Canadian agencies in all areas of park protection is an important aspect of the GMP."*
>
> *Public Comment*



Members of the public share their comments about the ROLA GMP with NPS staff.

Changes and Clarifications to the Draft GMP/EIS

Numerous changes were made to the *Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement* as a result of comments are summarized below. This list includes the major changes that have been made to the preferred alternative. This list does not include all the changes that were made to clarify points, provide additional rationale for decisions, or correct minor errors or omissions.

- Recreational uses, such as seaplane use and sport climbing, have been modified
- Grizzly bear management has been updated with additional information and guidance
- Future uses and land acquisition at Diablo Townsite has changed, including removing the option for an exchange of Reflector Bar for Hollywood
- A name change from Ross Lake National Recreation Area to North Cascades National Recreation Area has been added
- Guidance for several visitor facilities has changed, including the bridge over the Skagit River at Newhalem, trails and trailheads, the boat launch at Colonial Creek Campground, parking areas, and camping locations

List of Commenters

The following is a list of federal, state, and local governments; businesses; and interest groups and organizations that provided comments on the draft plan. These comment letters are included in this volume. Names of private citizens are not included in the list, and due to the extensive number of comment letters, are not included in the final volume. Copies of the letters that are required for inclusion are in the section following the "Substantive Comments and Responses" section. Copies of all letters are available in electronic format, with individual names and addresses removed, and are available upon request.

NOTE: Letters are numbered by the National Park Service Planning, Environment, and Public Comment (PEPC) system and are part of a nationwide database; therefore, the numbers are not in chronological order (The comment letters in this document are also not in this order).

> *"I have been hiking, camping and climbing in the Washington Cascades and Olympic mountains for over 40 years. My experiences there have frequently been almost religious as I have enjoyed the beauty and majesty of these marvelous areas."*
>
> *Public Comment*

NPS staff discuss camping facilities in Hozomeen, Bellingham Public Meeting, 2010.

Table 7.4 Commenters on Draft GMP/EIS, 2010

PEPC ID	Log #	Commenter
Federal, State, and Local Governments		
1625	26	United State Environmental Protection Agency, Region 10
3	474	Washington State Department of Transportation, Aviation
1632	887	Whatcom County Commissioner Carl Weimer*
811	1000	Seattle City Light
1626	470	State of Washington Department of Archeology and Historic Preservation
578	956	Washington State Department of Transportation, Northwest Region/Mount Baker Area
Businesses		
48	515	Aeromarine Publishing Corp.
347	467	Kenmore Air Harbor, Inc.
1631	719	Law Offices of Ronald A. Stearney
723	636	Tanglefoot Seaplane Base
Interest Groups and Organizations		
813	889	Access Fund*
13	28	Airports and State Advocacy
812	999	American Rivers*
812	999	American Whitewater*
691	604	Aviation Foundation of America, Inc.
727	640	Columbia Seaplane Pilots' Association
686	599	Lake Amphibian Flyers Club
138	692	League of Northwest Whitewater Racers
762	1028	Montana Seaplane Pilots' Association
825	4	National Historic Lookout Register
411	886	National Parks Conservation Association
577	955	North Cascades Conservation Council
833	1667	North Cascades Institute
13	483	Aircraft Owners and Pilots Association
700	613	Recreational Aviation Foundation
721	634	Seaplane Pilots Association
1632	887	Sedro-Woolley Chamber of Commerce*
495	952	Skagit Audubon Society
524	953	Skagit Environmental Endowment Commission
813	889	Washington Climbers Coalition*
68	535	Washington Seaplane Pilots' Association
812	999	Washington Wilderness Coalition*
819	883	Wilderness Society
Form Letters and Petitions		
158	32	National Parks Conservation Association - Form Letter - 423 Received
638	454	National Parks Conservation Association - Form Letter - 795 Received

*Letter written jointly with another agency, business, or organization. Letters are reprinted only once, under first listing (alphabetical by type of organization).

Substantive Comments and Responses on the Draft General Management Plan and Environmental Impact Statement

This section summarizes the comments received following the release of the *Ross Lake NRA Draft General Management Plan and Environmental Impact Statement* on July 1, 2010. All written comments were considered during the preparation of the final general management plan and environmental impact statement in accordance with the requirements of Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR 1503).

The comments allow the planning team, NPS decision-makers, and other interested parties to review and assess the views of other agencies, organizations, and individuals related to the preferred alternative, the other alternatives, and potential impacts. It is important to stress that the selection of the preferred alternative and revisions to the alternative are not based on how many people supported a particular alternative.

Analysis of Substantive Comments on the Draft Plan

Consistent with the requirements of 40 CFR 1503, the NPS staff provided written responses to those pieces of correspondence that have either substantive comments or comments that the NPS planning team determined written response was required for clarification.

Substantive comments are defined by Director's Order 12, "Conservation Planning, Environmental Impact Analysis and Decision-Making" (NPS, 2001) as those comments that:

- Question, with reasonable basis, the accuracy of information in the environmental impact statement.
- Question, with reasonable basis, the adequacy of the environmental analysis.
- Present reasonable alternatives other than those presented in the environmental impact statement.
- Cause changes or revisions in the proposal.

Substantive comments raise, debate, or question a point of fact or policy. Comments in favor of or against the preferred alternative or alternatives, or those that only agree or disagree with NPS policy are not considered substantive.

NPS Responses to Comments

Comments that contain substantive points regarding information in the draft GMP/EIS or comments that need clarification are extracted below. A concern statement has been developed to summarize the comment, but representative quotes are also included from original letters, edited only for style consistency and spelling. All comment letters from agencies, organizations, and businesses have been scanned and are included in this volume.

Where appropriate, text in the *Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement* has been revised to address comments and changes, as indicated in the following responses. Unless otherwise noted, all page number citations refer to the *Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement*.

Boundary

Boundary Modifications

Boundary Concern 1: Convert the southern portion of Ross Lake NRA to "national park."

Representative Comment:
"The most significant modification is our request to include a boundary adjustment that will bring North Cascades National Park closer to park visitors. Highway 20 is the major route through the heart of the North Cascades Complex but, as we know, it is all within the Ross Lake NRA and the park can only be seen through the windshield. We strongly urge the Park Service to adjust the boundary of Ross Lake to include much of the Highway 20 corridor, including the areas identified as Frontcountry Zone, Backcountry Zone, Wilderness Zone, and Skagit River Zone in the national park... The Hydroelectric Zone would remain part of the Ross Lake NRA. Visitors come to the greater North Cascades Ecoregion because of its wildlife and natural wonders and for the area's recreational opportunities, including its visitor center, trails and campgrounds. Sustaining and protecting these important recreation and natural values while also working to increase that visitation is

critical to a sustainable and healthy local economy and environment.....We feel that redrawing the boundaries of the Ross Lake NRA to provide the opportunity for highway visitors to actually be within the North Cascades National Park proper will likely increase visitation and it is a low cost way of improving the visitors' experience. Also, this will provide for better protection of natural and cultural wonders."

Response:
The NPS considered a variety of internal boundary modifications and name changes in order to achieve the goal of providing highway visitors with a "North Cascades" and "national park" experience. However, due to the initial designation of the Ross Lake NRA and the presence of three hydroelectric facilities within this NPS unit, the NPS recommends retaining the "national recreation area" designation and current boundaries, and instead proposes to rename the Ross Lake NRA as the "North Cascades National Recreation Area." This proposal, which would require congressional designation, is included in the final GMP/EIS.

While the NPS understands the appeal of a "national park" designation, the NPS believes that changing the actual boundary to include much of the North Cascades Highway (Highway 20) corridor would not advance the purpose of Ross Lake NRA. The Congressional intent for the designation of Ross Lake NRA in 1968 was to establish a unit of the NPS that would preserve the majestic scenery of the area and offer a variety of recreational opportunities, all while maintaining hydropower projects on the Skagit River and at other locations. The NPS believes that this boundary change proposal would not substantially improve the protection of resources since all lands within the Ross Lake NRA and North Cascades National Park, regardless of designation, are managed and consistent with the laws and policies that guide management of all units within the national park system. Changing the boundary of Ross Lake NRA and converting these areas to North Cascades National Park would likely result in additional restrictions on recreational activities such as hiking with dogs, motor boating, and hunting, which are currently permitted within a national recreation area but not within a national park. Finally, any conversion of the lands containing the two Federal Energy Regulatory Commission's (FERC) licensed hydroelectric projects in Ross Lake NRA (the Skagit Hydroelectric Project, #553 and the Newhalem Hydroelectric Project, #2705) to national park would result in the loss of the NPS's mandatory conditioning authority. This authority, granted under Section 4(e) of the Federal Power Act (16 U.S.C § 797(e)), allows the NPS to mandate conditions under FERC's licensing process for the adequate protection and utilization of the NPS unit. Since this authority only applies to national recreation areas within the national park system, and not national park units, Ross Lake NRA would lose this authority if the boundary of Ross Lake NRA was changed and the southern portion was included in North Cascades National Park.

Furthermore, Ross Lake NRA contains concentrated areas of development, vast expanses of water, and rugged mountain wilderness. The concentrated areas of development are located in the southern portion of Ross Lake NRA along the North Cascades Highway, in Newhalem, Diablo, and include the hydropower facilities associated with the Skagit River Hydroelectric Project. It is this most developed and industrialized portion of the NRA that this commenter proposes for conversion to "national park," leaving the most undisturbed and pristine areas in the NRA. While the proposal would link the north and south units of North Cascades National Park, the focus of the conversion is more about visitor perception, the identity of the national park, and attracting more visitors to the North Cascades.

The NPS also considered, but ultimately dismissed, an alternative idea to align the NRA boundary with the Skagit River Hydroelectric Project boundary and convert the remainder to a "national park" designation. However, the hydroelectric project boundary has changed in the past during the re-license process at the request of Seattle City Light, and it is realistic that Seattle City Light could request future boundary changes for their hydropower operations. If these changes were requested and made, the boundaries of the NRA and national park would not align with the new hydroelectric project boundary. Therefore, maintaining this alignment in the future would be complicated and difficult to adjust with each additional hydroelectric boundary change.

In order to address the public concerns about the desire for an improved connection to the "North Cascades" and the park, while understanding the implications and benefits of maintaining the national recreation area designation, the NPS proposes a name change from Ross Lake National Recreation Area to North Cascades National Recreation Area. The name North Cascades National Recreation Area would be consistent with the North Cascades National Park units to the north and south, the names of the visitor

facilities currently located within the NRA, and with the concept of naming the recreation area after the mountain range in which it resides. While the name of the national recreation area would change under this NPS proposal, authorized activities including hunting and hiking with dogs would not change and would continue in the North Cascades National Recreation Area.

Congressional legislation would be required to authorize the name change from Ross Lake National Recreation Area to North Cascades National Recreation Area.

Boundary Concern 2: Additional boundary changes could better protect the North Cascades NPS Complex and achieve ecosystem management.

Representative Comment:
"NCCC raises the issue of RLNRA boundary changes to better protect the North Cascades NPS Complex and to achieve management on an ecosystem basis. At a minimum, the Final RLNRA GMP EIS should acknowledge the lack of ecosystem-based boundaries and assess the continuing impacts on Park resources and management."

Response:
The NPS agrees that the current boundaries of Ross Lake NRA and the North Cascades NPS Complex are not aligned along ecosystem-based boundaries which can create additional challenges for protection of NPS lands. In response, this issue has been more explicitly stated in the final GMP/EIS. However, the NPS does believe the impacts and challenges of ecosystem management provided by the current boundary alignment have been reasonably disclosed.

The NPS has considered but dismissed proposing to expand the Ross Lake NRA boundary along ecosystem-based boundaries due in part to the limited current or reasonably foreseeable problems on adjacent lands that would warrant such a proposal. The lands surroundings Ross Lake NRA are largely managed as wilderness by the USFS or as some form of protected status across the border in Canada. Those lands that are not presently designated as wilderness (or some other protected status) are not notably threatened by adverse development or incompatible uses. In addition, very few public comments were received on this issue, and comments from the USFS indicated concern for expansion of the NPS boundary. These circumstances would seem to suggest little public support for legislative action to expand the boundary. Absent public and agency support, proposals for expansion could fail. For these reasons the NPS does not support legislative action to realign the boundaries along ecosystem lines such as watersheds. Instead the NPS believes time and energy would be better spent improving interagency coordination for ecosystem management purposes.

Boundary Concern 3: Commenters provide new information for boundary proposals at Diablo Townsite.

Representative Comments:
"Recent federal security restrictions and other requirements have forced City Light to reconsider plans of land exchange at Hollywood and Reflector Bar. Critical staff for City Light will now be housed in Hollywood and not Reflector Bar as previously planned. The cookhouse and all housing and residential storage facilities at Reflector Bar will be removed. City Light is open to continued negotiations regarding possible partial sale of the Hollywood property that might include some or all of the houses. City Light is also open to discussions with NPS on the rental or lease of some number of houses in Hollywood. In lieu of this, City Light plans to remove all houses not immediately on Diablo Road with the exception of House 6 and the emergency response structures. City Light is committed to working with the NPS to improve access to and visibility of the Stetattle Creek and Sourdough Mountain trails. In addition, City Light will work with the NPS in designing the interior of the Ross Lodge in a manner that will meet NPS needs for a facility in Diablo."

"Regarding the Diablo Townsite, we support the general concept of reallocation of ownership as described in Alternative B as it appears to be in the best interest of the public. . .Additionally, we have a concern about the impact on the access of the trailhead that currently comes out of Reflector Bar. We want to be sure that this access will be maintained even if the NPS no longer owns the land."

Response:
The NPS recognizes the changed circumstances regarding security concerns for Diablo Townsite and respects Seattle City Light's decision to rescind their proposal for a land exchange of Hollywood for Reflector Bar. Should circumstances change, the NPS would be interested in acquisition of Hollywood in the future, given that the property is within the legislated boundary of Ross Lake NRA. In the meantime, the NPS also remains interested in adaptively reusing some number of houses in Hollywood for the NPS and its partners. The NPS also supports consideration of a possible partial purchase of the Hollywood

property in the event that Seattle City Light is a willing seller.

As a separate but related matter, the NPS remains committed to improving the trailheads for Sourdough and Stetattle Creek trailheads in an effort to make these more welcoming to visitors. To that end, the NPS and SCL will continue to collaborate on a plan to combine the trailheads so they are easier to find, adaptively reuse facilities as appropriate, and provide parking, picnic and restroom facilities.

Visitor Experience

Backcountry Permits and Reservations

Concern: Commenters requested additional information or clarification of proposals for the backcountry permit system and provided suggestions for alternatives to consider.

Representative Comments:
"We believe that the existing reservation system for recreation in the North Cascades National Park Complex is cumbersome and discourages park use. We support creation of an on-line reservation system for all areas of the RLNRA (and the North Cascades National Park). However, to discourage spurious reservations, it would be good if the system required a confirmation within two days before use and that a portion of the recreation sites be set aside for on-site reservation."

"Any backcountry permitting system should be a combination of day-of use and reservation. Given the current technology, it seems a little out of date to not have an online system. You could even have the system force people to click through and agree to regulations."

"Online permits: I want to know what the capacity is at different locations. This would help with trip planning. . ..I like picking up permits in person and talking to people which seems to help with education and enforcement. Rangers have personal familiarity with places and can provide current info (e.g. bear activity)."

"[W]ould [backcountry permits] all be done on-line in the future? Or would the option to do it in person still be there? I think it is obviously valuable to keep the latter as an option for those who need help planning their trip. Also, how far in advance could permits be issued?"

Response:
Many commenters asked for more details about an advance permit (reservation) system. Although complete details of such a system are beyond the scope of this plan, the final GMP/EIS has been updated to include some known changes to the permit system (Chapter 4, p. 95-96). Thus far, the NPS has determined that some number of advance permits would be available on-line for a fee (the fee is required to cover the cost of the reservation system), with a portion of permits held for walk-ins. All advance permits, where feasible, would require conversion to an active permit via an in-person contact at a ranger station within one day prior to the start of the backcountry trip.

The primary purpose of the in-person contact is for education and safety, so that rangers can discuss current conditions, low-impact techniques, and wilderness protection. Although some of this information can be provided on-line (such as regulations), an on-line checklist is not considered as effective as personal interaction in planning a reasonable trip or conveying an educational message, nor can it reflect recent changes in conditions such as wildfire, weather, wildlife interactions, etc. The requirement for the permit conversion no more than one day in advance allows the NPS to track which reservations cancel or change at the last minute and prevent no-shows from occupying sites that could be used by other visitors. Overall, the permit process would be streamlined. The advance permit to active permit conversion would be quick and simple, and advance permitting could alleviate some visitors' concerns about getting a campsite.

Beyond these measures, the NPS would ensure any advance permit system supports the original purpose of the permit system, as articulated in the 1989 Wilderness Management Plan and other management documents. The purpose of the permit system is to disperse visitor use, reduce crowding and conflicts, and provide information and education about safe and low-impact wilderness and backcountry use, thereby providing a quality wilderness experience that protects natural resources. In designated wilderness, the permit system helps ensure the preservation of natural conditions and a sense of solitude, which are characteristics of wilderness defined by the 1964 Wilderness Act. Further parameters of any on-line advance permit system, beyond those listed above, cannot be determined until funding is obtained and a detailed analysis is undertaken. When creating such a system, the NPS would consider public comments

and effects on all user groups, as well as administrative costs and fiscal constraints. Finally, this GMP proposal applies only to Ross Lake NRA, and not the entire North Cascades NPS Complex, but any advance permit system would allow for scaling up to the entire North Cascades NPS Complex as future planning processes (i.e. wilderness management planning) provide direction and give all stakeholders a chance to comment. This language has been clarified in the main text of the final GMP/EIS.

Boating

Boating Concern 1: Existing conditions provide adequate limits on motorboat recreation on Ross Lake and additional regulations are not warranted.

Representative Comments:
"The poor access road to…Hozomeen already restricts the number of powerboaters enough."

"The number of powerboaters on the lake is hardly enough to disrupt the existing soundscape…In the ten years we have been vacationing there, I would say that we see an average of 1 or 2 private powerboats larger than 10 horsepower per day in the 'backcountry.' We see more Ranger boats or Seattle City Light boats in the "backcountry" than private boats greater than 10 horsepower."

"The existing soundscape is already disrupted by the Seattle City Light chain saws and diesel engine driven log towing boat. That log towing boat is operating at wide open throttle towing logs most of the day. Any boat that has to tow those big log booms is going to be way louder that any private powerboat."

"Ross Lake is a large lake. Usually horsepower limitations are found on smaller lakes where safety is a concern with congestion. Congestion is definitely not a concern on Ross Lake."

Response:
The NPS agrees that the current experience on Ross Lake is characterized by few powerboats, mostly smaller than 10 horsepower, and the access to Ross Lake is a primary factor in limiting the number of motorboats on Ross Lake. In an effort to preserve the experience on Ross Lake, a number of strategies and regulations are included in the final GMP/EIS related to powerboat use in the NRA. The primary tools for managing motorboats would involve maintaining and not expanding or improving the current access to and infrastructure on Ross Lake. In discussions with the British Columbia (B.C.) government, the NPS understands that B.C. does not have any plans for improving access to Ross Lake (e.g. there are no plans to upgrade the road from Hope, B.C. to Hozomeen) or adding substantial new facilities in the Skagit Provincial Park. Additional regulations, such as the Clean Engine requirement and requirement for four-stroke or equivalent engines, would not only help maintain soundscapes on Ross Lake, but other values including water quality. These requirements are consistent with EPA regulations. Additional regulations, such as horsepower, size, and speed limits would be implemented in the future should congestion become a problem, soundscape concerns persist, or other assumptions change. The final GMP/EIS has been updated to clarify the point at which these measures would be implemented.

The NPS also recognizes the role it plays in contributing to the character of the experience on Ross Lake, including the impact its own operation of motorboats has on the quality of visitor experiences, including natural soundscapes. New language has been added to the final GMP/EIS that provides guidance for how NPS motorboat operations can help achieve the goals for maintaining a tranquil experience on Ross Lake.

Boating Concern 2: Clarify how motorboats may use Ross Lake under the management zoning proposed in Alternative D.

Representative Comment:
"The Northern 'Frontcountry' [zone in Alternative D] is too shallow for higher horsepower boats to safely use. Tree stumps sticking up from the bottom in shallow water will tear the outdrive off a boat and cause the boat to sink…If that is one of the two only zones for powerboaters, people will think it has been deemed 'safe to use' and families will get hurt. Also, how is a higher horsepower boat supposed to get down to the South 'frontcountry' without passing through the restricted 'backcountry'?"

Response:
In Alternative D, motorboats would be allowed in all zones on Ross Lake. The only motorboat activity that would be restricted to the "frontcountry" zone is recreational towing, such as waterskiing. It would still be possible for boats to travel the length of Ross Lake, passing through the "backcountry" portion of the lake, and resume these activities on the other end. It should also be noted that Alternative D is not the NPS's preferred alternative.

Boating Concern 3: Consider additional prohibitions on motorboats in Ross Lake NRA.

Representative Comments:
"I think that [motorboats] should also be banned on Gorge Lake, on most of Ruby Arm on Ross Lake (east of the campgrounds), and on most of Thunder Arm on Diablo Lake, particularly near Colonial Creek Campground and the Highway 20 bridge. I'm also wondering if motorboat usage near campgrounds should be forbidden from 8 or 9 PM at night until 7 or 8 AM in morning, to make sleeping and breakfasts and campfire events more peaceful (particularly NPS interpretive campfire events?)"

"I would like to see all motorboats eliminated."

Response:
While the NPS agrees that non-motorized recreation activities are low-impact and desirable forms of recreation, the NPS does not agree a full ban on motorboat activity within the NRA is reasonable or justified. Motorboating is prevalent on the three reservoirs within Ross Lake NRA and is currently an efficient way to transport visitors and NPS, SCL, and Ross Lake Resort staff and materials. A ban on motorboats is therefore inconsistent with the goal of the NRA to provide a wide variety of recreation for visitors and could negatively impact the efficiency of NPS maintenance, law enforcement, and potentially search and rescue work. Additionally, the NPS knows of no adequate scientific data – on water quality, social science, or noise - to support such a ban.

Based on relatively limited road access, and no plans to upgrade road access, the NPS does not anticipate substantial growth in motorboat use on Ross Lake. Based on continued siltation of the public boat ramp on Diablo Lake, the NPS does not anticipate substantial increase in motorboat use on Diablo Lake. Considering the number of comments received that expressed a desire to "preserve the quality of the experience on Ross Lake," which included the types of boating that are characteristic of today's activities, and the lack of justification for a ban, the NPS rejects the proposal to ban motorboats entirely.

Rather, in order to achieve the goal of maintaining the experience on Ross Lake, the NPS proposed a variety of measures to manage and monitor motorboat usage across the reservoirs as opposed to restricting the activity in certain locations on the reservoirs. Providing guidance for motorboats and motorboating in general is more feasible to implement and monitor than trying to limit the activity on certain portions

> *I like that you only see a few boats on Ross Lake. It is unique. Preserve this tranquility.*
>
> *Public Comment from Bellingham Public Meeting*

of the reservoir. Other techniques for managing motorboating, such as quiet hours, could be done operationally through the park's normal operational procedures and articulating specific quiet hours is too detailed to include in a long-range programmatic plan.

Boating Concern 4: Accelerate the deadline for converting to four-stroke engines to improve air and water quality.

Representative Comment:
"[T]he exclusive use of four-stroke engines should be required sooner than 2015 since these engines are easily accessible on today's market and significantly reduce water pollution from the inefficient two-stroke. NPCA supports the use of four stroke engines but is concerned that use of direct-injection two stroke engines could allow significant pollution of Ross Lake to continue. The elimination of more polluting motors would help in the effort to redesignate the NRA Airshed from Class II to Class I."

Response:
While four-stroke engines may be easily accessible in today's market, the NPS needs adequate time in order to inform and educate the public about proposed changes for implementing a clean engine requirement in Ross Lake NRA, including exclusive use of four-stroke engines or equivalent technology. In the interim, the NPS and Ross Lake Resort have converted nearly all of their boats to four-stroke engines. These boats are the most prevalent and frequently operating boats on Ross Lake, which will help accelerate the elimination of more polluting motors prior to 2015. Ross Lake Resort voluntarily converted their boats to four-stroke engines and the NPS appreciates their leadership on this issue. Furthermore, the 2015 deadline does not preclude individuals from converting to four-stroke engines sooner, as demonstrated by the NPS and Ross Lake Resort. The deadline provides a reasonable amount of time to implement and enforce the conversion. The conversion of these boats to four-stroke engines should also help efforts to redesignate the Ross Lake NRA airshed to Class I. The NPS has determined that 2015 is an appropriate deadline for implementation

and will provide time needed to develop and distribute signs, information, and any additional public information necessary to implement such a requirement.

Boating Concern 5: Consider other standards, such as Environmental Protection Agency regulations, for managing motorboats.

Representative Comment:
"[D]on't limit the lake to 4 stroke motors as there are 2 stroke motors that pollute less than some 4 strokes. If you are going to limit motors, limit them to some kind of EPA or similar regulation that applies to boat motors."

Response:
The preferred alternative does allow for more than just four-stroke engines; it states "or equivalent" to address alternative or future technological advances. This proposal is consistent with EPA's proposals for emissions standards for marine spark-injection engines and vessels. The final GMP/EIS has been updated to provide additional information that clarifies the goal of this proposal as a clean engine requirement and includes the link between NPS proposals and the final EPA rule for gasoline spark-ignition marine engines.

For additional information on EPA's standards and final rule published in 2010, please visit EPA's website at http://epa.gov/otaq/marinesi.htm.

Boating Concern 6: Additional clarification and detail is needed for proposals to manage motorboats.

Representative Comment:
"[T]he vagueness of management controls (horsepower, boat size, and/or speed limits, etc.) is disconcerting as these are the kinds of details that need to be addressed in a General Management Plan. NCCC is generally in support of the directions proposed but we would have liked to see more detail. Will these details be addressed in future Management Plans?"

Response:
The GMP is a long-range, programmatic document that is used to guide future decision-making within Ross Lake NRA. Therefore, determining the specific details for horsepower, boat size, and/or speed limits is beyond the scope of this plan. Rather, implementing the GMP recommendations and setting specific numbers or details for regulations would be done through the operational and rule-making procedures available to the National Park Service under 36 CFR 1.5 which allows the superintendent to implement closures or set public use limits. The NPS is relying on the relatively difficult access for motorboats and the fact that there are no plans in the U.S. or Canada to improve road access and make it easier to bring powerboats to Ross Lake. While the NPS does not propose developing a separate management plan such as a boat management plan to implement these recommendations, the NPS would provide opportunities for public involvement as the specific details of these recommendations are proposed, evaluated, and decided. The NPS would also consider the best available science, technology, and information at the time in order to determine the details of the regulations.

Climbing

Concern: Additional guidance or clarification on the process of establishing climbing management areas, or more information on specific climbing areas, is needed.

Representative Comments:
"I need clarification from the NPS on the exact geographic scope of the allowed 'Climbing Management Areas' and on the process and timing for actually getting NPS approval for designating new climbing management areas."

"It is difficult to determine if climbing could present access or security issues at City Light's facilities without knowing the exact location of the four areas agreed upon between the NPS and the climbing community. City Light is concerned about existing and new routes that require access across the Gorge Bypass Reach and/or parking along Highway 20 between Newhalem and Diablo. Public access to the Gorge Bypass Reach is prohibited due to potential hazards from water releases from Gorge Dam. In addition, parking along the narrow road between Newhalem and Diablo is a safety hazard that will require coordination with the State Department of Transportation."

Response:
An Interim Agreement between the NPS and the Washington Climber's Coalition was completed in 2008 regarding the establishment of new rock climbing routes in the Skagit Gorge area of Ross Lake NRA. The Interim Agreement specified that this GMP would provide new guidance on rock climbing in Ross Lake NRA and replace the guidance provided in the Interim Agreement. The Interim Agreements stated that new climbing routes could

be established at the Diablo Crag, Newhalem East, Newhalem West, and Town Crags. In practical terms this would mean sport climbing and development would continue to be authorized in these same areas. The Interim Agreement is accessible on the internet at: http://www.nps.gov/noca/parkmgmt/loader.cfm?csModule=security/getfile&PageID=223642

With regards to designating new climbing areas, the NPS would work with the climbing community to establish additional Climbing Management Areas (CMA's) in the Skagit River Gorge between Diablo and Newhalem on a case-by-case basis. Consideration of new CMA's would begin with advance written request to the superintendent. Approval of CMA's would then follow the same basic process as approval of new trails within the park, including a site specific evaluation of resources and values at risk of damage from route development and use.

The geographic scope for future CMA's could include the Skagit River Gorge between Diablo and Newhalem, except for areas zoned wilderness where installation of bolts and use of mechanized equipment is prohibited by national NPS policy. The Gorge bypass reach of the Skagit River would also continue to remain off limits due to the risk of sudden releases from Gorge Dam.

Concessions

Concern: Clarify what is included in the 10% expansion of Ross Lake Resort as well as the second water taxi and relationship to Ross Lake Resort.

Representative Comments:
"Would [a second water taxi] be in conflict with the services presently offered by Ross Lake Resort? Would the new taxi service be housed at Ross Lake Resort?"

"I am concerned about the 10% expansion of Ross Lake Resort and SCL's ability to supply transportation to the resort considering the fact that their visitor services are decreasing."

Response:
The GMP would allow the number of beds at Ross Lake Resort to expand by 10%. It would be up to the concessioner to decide how the bed spaces are allocated, as either employee or visitor beds or a mix of the two. This expansion was based upon an analysis of what the sewer system could accommodate. The NPS did not want to increase the capacity of the infrastructure that supports the resort or dramatically change the footprint of the operation on land.

> *"We applaud the approach proposed to identify clearly defined Climbing Management Areas within the NRA. The transparency and clear communication of the process and the proposed dialogue with stakeholders and the general public are forward thinking and provide a good example of recreation planning proposed right."*
>
> *Cynthia Wilkerson, The Wilderness Society*

As previously stated in the GMP, the Resort would also be permitted to run two water taxis on Ross Lake. This increased service would enhance opportunities for visitors to efficiently move around Ross Lake, accessing campsites and trailheads, while still maintaining the quality of the experience on Ross Lake. The second water taxi, run by Ross Lake Resort, would enhance the services provided by the Resort as opposed to conflict with the services presently offered.

Hunting

Hunting Concern 1: The assumptions for hunting in the analysis of impacts are inconsistent with respect to visitation numbers.

Representative Comment:
"In Volume II, on page 103, we find the statement: 'It is assumed that demand for hunting within Ross Lake NRA would remain relatively constant under the No Action Alternative'. At many other points in the draft GMP/EIS (e.g. page 105) the assumption is stated that park visitation will increase in proportion to population growth in western Washington and British Columbia. Why would this assumption of visitation increase not also pertain to hunter numbers under all the plan's alternatives? Greater population could well mean more hunters as well as more hunting areas lost to development or other factors and, hence, more hunting pressure in Ross Lake NRA."

Response:
There does not appear to be a positive correlation between population growth and hunting. National and regional surveys of hunters (and anglers) actually indicate ongoing or consistent slight declines in the number of people hunting (and fishing) over the past two decades, in spite of population growth. Informed by these statistics, the NPS assumed hunting would remain constant (as opposed to declining) because that assumption would provide a more conservative assessment of potential adverse effects.

Reference: U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Hunting Concern 2: Consider expanding the proposal for no lead in hunter's ammunition to anglers.

Representative Comment:
"Why does the RLNRA Management call for no lead in hunter's ammunition but not the same for anglers? [The American Fisheries Society new policy white paper calls for banning of lead shot, etc. in fishing]."

Response:
The NPS agrees; and it is stated in preferred alternative in the Alternatives Comparison Table of the draft GMP/EIS and in the final GMP/EIS that the NPS would "work with WA State Fish and Wildlife to prohibit use of lead tackle in Ross Lake NRA." This guidance has also been added to the description of the preferred alternative in the final GMP/EIS.

Hunting Concern 3: Consider a hunting ban in the GMP.

Representative Comment:
"The proposals to expand safety zones around trails and provide education on the presence of hunters are wholly inadequate for protecting RLNRA visitors from hunting accidents. Given the desired and expected increase in family-friendly recreation in the RLNRA, hunting should be banned in all areas of the RLNRA."

Response:
While the NPS understands concerns about hunting and visitor safety, the NPS did not consider a hunting ban in the GMP. According to the legislative history, Ross Lake National Recreation Area was designated as a National Recreation Area, as opposed to a National Park, for two key reasons: (1) to accommodate hydroelectric development including future raising of Ross Lake; and (2) to provide for more diversified and intensive recreational use, such as hunting, than is normally the custom within a national park. Congress recognized that hunting would have the potential to adversely affect visitor safety and conflict with the conservation mandate of the mission of the NPS. To mitigate these risks, Section 402(d) of the Enabling Legislation provides the NPS the authority to curtail, but not prohibit, hunting in certain areas for a wide variety of purposes. Additional legislation would be required to prohibit hunting in Ross Lake NRA. The NPS does not believe such legislation is warranted because (a) Congress intended for hunting to continue by designating the unit an NRA; (b) statistics indicate very few people currently hunt in the NRA; (c) very limited numbers of wildlife are taken each year; and (d) to the best of the agency's knowledge, there have been very few accidents or incidents related to hunting that could justify such a ban since the NRA was established. The NPS has also proposed to expand safety zones in the vicinity of trails and developed areas such as visitor centers, campgrounds, and the ELC to maximize visitor safety. Should circumstances change and hunting becomes a more prominent activity, the NPS has the authority to impose further restrictions on hunting and still achieve the conservation mission.

Hunting Concern 4: Commenters question the information in the GMP related to fishing and hunting and the NPS's role in and goals for managing these activities.

Representative Comment:
"The statement that 'The Washington State Department of Fish and Wildlife would continue to regulate fishing (or hunting) in Ross Lake NRA' (p. 95) implies that the NPS does not have any role in fish management. This is contrary to what we understand to be the case at present. NPS has a significant role to ensure non-impairment of resources. The NPS played a very active role in defining fish mitigation arrangements in the Skagit Project Relicensing...What is the NPS goal of fish management of fisheries? What about management of hunting where mountain goat numbers have plummeted in the North Cascades?"

Response:
The commenter raises two interrelated but separate concerns about fishing (and hunting): the regulation of this recreational activity and the management of the resources. While the NPS actively surveys and manages the fish populations in Ross Lake NRA (including pursuing mitigation activities with SCL), the NPS believes the regulations established by the Washington Department of Fish and Wildlife (WDFW) are currently effective at regulating fishing activities within Ross Lake NRA. The enabling legislation for Ross Lake NRA provides for hunting and fishing to occur under the applicable laws of the United States and of Washington State, but also provides the NPS the authority to override state regulations for a wide spectrum of reasons including public safety and conservation of fish and wildlife resources. The NPS and WDFW do work in cooperation for fishing regulations. For example, the 2010 WDFW regulation change on Ross Lake aimed at helping protect native Bull Trout (listed as a threatened

species under the Endangered Species Act) was done at the request of the NPS. The goal of the NPS regarding conservation of fish and wildlife resources is to actively support native species in their native habitats. Since the fishing regulations established by the Washington State Department of Fish and Wildlife reasonably support this goal, the NPS does not believe an override of these rules is reasonable at this time.

Seaplanes

Seaplane Concern 1: The need for additional management, regulation, or restriction of seaplane access and use is questioned.

Representative Comments:
"Seaplane use of the park has never been excessive and there is no data to suggest that will change."

"Seaplane rated pilots are decreasing in number and Ross Lake remains a relatively remote location." "It has been estimated that there are probably less than a dozen seaplanes in a season." "A permit system limiting seaplane access for the estimated 12 flights per year would be costly and unnecessary."

"The proposal does not provide adequate and secure/safe campsites to seaplane visitors." "Only north facing campsites provide sufficient protection from the southerly swell." "There are only a limited number of campsites (north facing with a dock) which are well suited for float planes." "Safety is always paramount in operation of boats and/or seaplanes. Limiting access to the ends of the lake would compromise safety. The center of the lake is always the safest location on which to land and take off."

"Seaplane pilots must be licensed by the federal government and are required to complete recurrent training. . . The pilot community is also very effective at policing themselves. This is one reason few problems occur with those in the seaplane community. The Federal Aviation Agency, under whose regulations seaplanes operate, advises seaplane pilots to operate in a safe and friendly manner in/over wilderness areas."

"It is unfair and unjustified to limit seaplane access."

"The draft plan would allow motorboats to continue to operate in both the frontcountry and backcountry management zones; seaplanes should be treated no differently."

"Seaplanes provide access to the elderly and handicapped who cannot readily access Ross Lake."

Falls on Ross Lake.

Response:
In the final GMP/EIS, restricting seaplane landings and take-offs to the Frontcountry Zone has been removed from the preferred alternative. 36 CFR 7.69 would not be changed. 36 CFR 7.69 states "the operation of aircraft is allowed on the entire water surface of Diablo Lake and Ross Lake, except that operating an aircraft under power on water surface areas within 1,000 feet of Diablo Dam or Ross Dam or on those posted as closed for fish spawning is prohibited."

It is recognized that seaplane use in Ross Lake NRA occurs infrequently due primarily to limiting factors that will not change, such as weather, the steep terrain and physical geography of Ross and Diablo Lakes, reservoir levels, border security, Federal Aviation Administration regulations and licensing of pilots and planes, and costs. Additionally, existing data shows that seaplane ownership and use in Washington has not increased in the last two decades and is not anticipated to increase in the near or long term future.

The NPS also believes safety is vital for all recreational activities in Ross Lake NRA, including seaplane use. Strong winds from the south and limited available water surface make landings and take-offs aeronautically challenging on Ross Lake. North facing docks are best suited for seaplanes because they provide shelter from the southerly swells. The number of docks that meet this criteria are limited and will not increase in the future. Together with dock requirements, these limiting factors narrow the options for safe access and use on Ross Lake to a handful of lakefront campsites that are located sporadically along the full length of Ross Lake.

Public meeting in Bellingham, 2010.

The intent of the preferred alternative is to largely maintain the visitor experience on Ross Lake as it currently exists, including use levels, forms of access, and range of recreational activities. Seaplane use is recognized as a mode of transportation, similar to other motor vehicles, to access Ross and Diablo Lakes and campsites along the reservoirs. The change in the preferred alternative would continue to maintain this form of access for seaplanes. The plan also proposes to maintain existing facilities and infrastructure in kind. Day and overnight use could continue for seaplanes at 9 of the 19 campsites on Ross Lake that are suitable for seaplane docking. Seaplane users who overnight at lakefront campsites would continue to need a backcountry permit similar to all users of these sites.

The cumulative effect of all these factors, including long-term seaplane use trends, increasing costs, increasing regulatory requirements of pilots (including border security), limited weather windows (which may become smaller with climate change and will also contribute to more debris on the lake), limited infrastructure such as docks, will all combine to limit seaplane use of Ross Lake.

Seaplane Concern 2: Commenters question the impact analysis related to seaplane use.

Representative Comments:
"The infrequent seaplane operations at Ross Lake cause no adverse effect to the environment, neither to nature nor to people."

"The argument that seaplane noise is a detriment to the wilderness environment is invalid."

"No data was presented to show prior complaints."

"Any rational and fair estimate of the long-term beneficial cumulative impacts on visitors in the broader North Cascades by restricting seaplane access would realistically, applying your own criteria and methods, fall somewhere between slightly above negligible to minor and fleeting. Even the harshest reasonable assessment, informed by the facts, would be a long way from 'moderate'. The findings in this report regarding seaplane access are unrealistic, unfair, misleading and cannot be borne by the facts."

"Seaplanes pollute less than any motor boats. Engine exhaust does not enter the water."

Response:
New information about levels of seaplane use and noise has also provided a clear rationale for changing

the preferred alternative and updating the impact analyses and impact intensity determinations in the final GMP/EIS. The impact analysis and impact intensity determinations for natural soundscapes, wilderness character, visitor opportunities, access and transportation, and socio-economics have been updated in relation to seaplane use in the Environmental Consequences chapter. The preferred alternative has been changed to state that seaplanes are allowed to land and take off in Ross Lake NRA compliant with CFR 36 7.69. A new proposal for noise abatement procedures for seaplanes has been added to the preferred alternative.

Seaplane Concern 3: Commenters provide a new idea for the preferred alternative to include noise abatement procedures to address concerns related to noise and soundscape on Ross Lake.

Representative Comments:
"Any concerns about noise or excessive use could be readily addressed through the implementation of a standard noise abatement policy and guidelines for seaplane access" to address concerns related to noise and soundscapes on Ross Lake.

"Seaplanes make less noise than outboard engines in aggregate. It has been estimated that there are probably less than a dozen seaplanes in a season. Seaplanes only make sizable noise when taking off which only lasts 30 to 60 seconds. The total time of noise (in excess of an outboard motor) is no greater than 10 to 12 minutes a year."

"Few, if any, noise complaints have been raised by visitors or anyone else."

Response:
The preferred alternative has been changed to include noise abatement procedures for seaplane use in Ross Lake NRA and to develop and maintain a long term acoustic monitoring program to better understand soundscape impacts, particularly on wildlife. The NPS would work collaboratively with the seaplane pilots community to create noise abatement procedures (such as reducing propeller speed as much as possible for take-off, reducing it further once off the water; maintaining distance from campsites and vessels on the lake; making every effort to fly no less than 2,000 feet above ground level (AGL); avoiding prolonged flight at low altitudes; and others, recognizing that safety is the first priority) and educate pilots about these procedures and general seaplane use in Ross Lake NRA. Noise abatement procedures would be instituted through the superintendent's compendium or through voluntary compliance. These noise abatement procedures would seek to minimize noise during take-off and while flying in or near Ross Lake NRA. These changes have been updated in the final GMP/EIS.

Soundscapes

Concern: Additional suggestions for alternatives related to managing soundscapes and noise impacts in the NRA are provided.

Representative Comments:
"Develop an agreement with Washington DOT that would restrict motorcycle access on Highway 20 to a daytime period like 7AM to 8 or 9 PM so they also wouldn't pollute the natural soundscape during campfire and sleeping times."

"[E]ither unilaterally or via an agreement with DOT, have rules that forbid leaving motorcycles and other noisy vehicles from idling their engines at overlooks and in parking areas at Visitor Centers and Campgrounds."

"Prevent motorcycles from driving up the roads to the Newhalem and Marblemount Visitor Centers, with parking areas on Highway 20 and shuttle buses from there to the Visitor Centers...many other National Parks have major free shuttle systems [Glacier, Rainier, Olympic, and Yosemite, all places where my family has ridden them], so there must be some way to reduce expenses."

Response:
The Washington Department of Transportation manages the North Cascades Highway. To the best of the NPS's knowledge, no 2-lane paved state highway is managed to exclude certain types of passenger vehicles commonly found on those highways. NPS campgrounds themselves have quiet hours established (generally 10 pm – 6 am) which should preclude loud noises from any vehicles within the campground that are mentioned in the comment, but the NPS has no authority to prohibit these types of vehicles on the North Cascades Highway. As noted in the description of the preferred alternative, the NPS will look for ways to enforce existing noise standards and increase education efforts about noise impacts and the values of natural sounds along the North Cascades Highway.

Also, as articulated in the GMP, the National Park Service will increase its visitor education efforts related to natural sounds and the impact of noise to wildlife and the visitor experience in these locations. Other

reasons to decrease engine idling throughout the park will also be emphasized, notably to decrease carbon emissions into the atmosphere.

Finally, the road to the Marblemount Wilderness Information Center is owned by Skagit County, not the National Park Service. At this time, a shuttle bus system to serve the one-mile of road from the North Cascades Highway to the Newhalem Visitor Center is not fiscally viable. The free shuttle bus system at Glacier National Park is funded by visitor entrance fees (Ross Lake NRA has no entrance fees) and serves most of the roadways in that park, rather than just one short segment to a lone destination (such as the Newhalem Visitor Center). In the summer of 2011, Glacier National Park and the Washington office of the NPS are doing a business plan on that shuttle system to determine if it can be financially sustainable. Again, at this point the NPS believes that visitor education is the initial starting point to try to reduce noise impacts from motorcycles.

Other Park Uses or Activities

Concern: Policies for mushroom harvesting are questioned.

Representative Comment:
"My primary concern is that none of the alternatives address the issue of foraging, specifically collecting wild mushrooms. . .The present policy, which prohibits the 'gathering, collecting, or harvesting of all mushrooms,' . . .is based on a lack of information. Fortunately, two studies published in 2006 provide information directly relevant to this policy. Both studies show that responsible harvesting does not damage this resource."

Response:
The NPS remains concerned about impacts from mushroom harvesting, including effects on mushroom populations as well as associated impacts on other resources from harvesting. Very few surveys have been conducted to document the species of mushrooms within Ross Lake NRA or North Cascades National Park Service Complex. The NPS currently has very little information on the number and distribution of fungus species or the range of these species within the North Cascades NPS Complex. The NPS is also concerned about impacts from harvesting activities on additional resources including trampling of other sensitive natural and cultural resources that may be in proximity to mushroom populations, trail impacts, take or harvest of other materials (inadvertent or otherwise), enforcement capacity, conflicts with other users, etc. As a result of a lack of local or site-specific knowledge about mushroom populations in the North Cascades NPS Complex and in Ross Lake NRA specifically, and concerns about effects not only on mushroom populations but all resources affected by harvest activities, the NPS maintains its current restriction in order to preserve the ecological integrity of the forest systems in Ross Lake NRA.

Facilities

Campgrounds

Concern: The aggregate ponds are not a viable location for potential future campground development.

Representative Comments:
"Development of a campground near the aggregate ponds is likely to be inconsistent with managing this area as salmon habitat, which is required in the Settlement Agreement for the Skagit License. However, City Light is willing to work with the NPS to identify locations for a new campground that may exist on other City Light-owned property."

"At one point in Volume I of the plan, the possibility is raised of a replacement campground development near the Ag Ponds west of Newhalem. This is an area well-known to birders for its avian diversity and nesting species [that are] rare west of the Cascades; for example, American Redstart, Veery, and others."

Response:
Based on consultation during the review of the draft GMP/EIS, the NPS recognizes that potential future development of a campground at the aggregate ponds is inconsistent with Seattle City Light's management of the area as salmon habitat. As a result, the NPS has removed the aggregate ponds as a potential future camping location, and the final GMP/EIS has been updated to reflect this decision. Instead, the NPS has substituted a broader statement reflecting that Seattle City Light is willing to work with the NPS to identify locations for a new campground that may exist on other Seattle City Light property.

Hozomeen

Concern: The NPS should include a plan for Hozomeen should the road from Hope be paved.

Representative Comment:
"Paving the road to Hozomeen will greatly change Ross Lake. Encourage Canada to not pave road, but it

will happen in the next 20 years. NPS needs a plan to respond to this change."

Response:
Throughout the planning process, the NPS has consulted with the B.C. government and the NPS understands from this consultation that there is no priority to pave the road from Hope to Hozomeen. The NPS has also heard from B.C. Transportation that there are no plans to pave the road. The NPS has stated its position in the GMP (Volume I, page 91). The NPS would encourage Canadian officials to maintain the existing gravel road in order to preserve the relatively low-intensive and tranquil experience on Ross Lake NRA, recognizing that paving this road could fundamentally alter the character of Hozomeen and Ross Lake NRA. Given the information the NPS has received from B.C. government bureaus, and the position of the NPS as articulated in the GMP, the NPS does not see the threat to pave the road from Hope to Hozomeen as a threat that requires an articulated or more detailed plan.

Skagit River Bridge in Newhalem

Concern: Commenters question the rationale for replacing the Skagit River Bridge in Newhalem.

Representative Comments:
"N3C is strongly opposed to investing $6,100,000 in construction of a new two-lane bridge to reach the existing visitor center behind the Newhalem campground. These funds could much better be spent creating a new visitor center in Marblemount."

"Why is the bridge over the Skagit leading to the Newhalem Visitor Center going to be replaced? If the bridge is structurally sound, I don't understand why several million dollars would be spent replacing it. The inconvenience of a one-way bridge is very minimal. I'm sure the Park can use this money in many better ways."

Response:
Replacement of the bridge across the Skagit River at Newhalem has been removed from the preferred alternative. The Federal Highway Administration conducted a condition assessment of the bridge and determined that it is structurally sound and that its lifespan is projected to be beyond the time frame of this GMP. In the future, there will continue to be a need for a bridge across the Skagit River in Newhalem to access the Newhalem Creek Campground, trails, natural features, and Seattle City Light hydropower operations. Based on the Federal Highway Administration finding and the high cost of bridge replacement, the NPS proposes to maintain the existing bridge until such a time when the bridge needs replacement. Better pedestrian and bicycle access and a two lane option would be considered in the design for a replacement bridge. The costs associated with bridge replacement have also been removed from the preferred alternative.

Trails

Concern: Suggestions for new trails to consider were provided.

Representative Comments:
"I am writing to introduce the concept of building a "Skagit River Trail" within the recreation area."

"I urge you to develop a Ruby Mountain trail so that the NRA truly serves a larger portion of its visitors and fulfils the founding vision of the North Cascades National Park Complex."

"The park needs more low elevation, three season trails. Create additional trails to views/points to experience world class scenery…"

"Create a loop trail around Diablo (from overlook to colonial campground). It would be a low elevation trail, somewhat easy, with great views. It also shouldn't impact grizzly core habitat."

"The viewpoint trail to Little Jackass should be considered again because it would be a premier day hike, and we are lacking mid-elevation trails to great views in the park complex."

"Make Thunder Knob a loop trail."

Response:
The NPS reviewed several trail proposals presented in the public comments. In response, a new statement has been added to the preferred alternative about the consideration for a modest expansion of trails to scenic vistas along the North Cascades Highway

> *"We agree with Alternative B's approach of trying to replace storm damaged facilities at non-hazard areas nearby but not rebuilding them within the hazard zones."*
>
> *Public Comment*

"We have been coming to ROLA since 1973 for a quiet, wilderness experience. Keep it as it is."

Public Comment from Newhalem Public Meeting

corridor in addition to the specific trails listed in the preferred alternative. These additional trails could be considered during the lifetime of this GMP.

Transportation Facilities

Transportation Concern 1: Commenters provide additional information about improvements or the management of facilities along the North Cascades Highway.

Representative Comment:
"The preferred alternative recommends several improvements including signage, parking, and pullouts. WSDOT's funding is extremely limited; however, we often help other agencies that have their own funding to complete projects on or near the state highways, and we would be happy to assist you as you implement these plan recommendations. Anything constructed along SR 20 would require close coordination between WSDOT and National Parks, consistent with the Highway Easement Deed. The following are a few considerations: - Improvements should be consistent with WSDOT's Design Manual and access management practices. - The addition of permanent signage on the highway requires approval from our traffic engineer and would be installed by our maintenance crews. - Design standards guide the placement of turn lanes based on traffic operations and roadway geometry. Changes to roadway channelization, such as the proposal to add a turning lane at the Ross Dam Trailhead Parking Lot, must be evaluated by our traffic engineer. - A traffic control plan for the time of construction would be needed to avoid potential traffic hazards."

Response:
The NPS recognizes improvements proposed along the North Cascades Highway such as signage, parking, and pullouts would need to be coordinated with WSDOT and implementation of many actions will require consultation with a WSDOT staff, as well as WSDOT policies and procedures. While some specific actions, such as using WSDOT maintenance crews to install signs or instituting a traffic control plan during construction of the Ross Dam Trailhead Parking Lot, will be addressed during project implementation as opposed to a long-range programmatic plan, the final GMP/EIS has been updated to include a broad statement about ongoing coordination between WSDOT and the NPS for actions on State Route 20, the North Cascades Highway.

Transportation Concern 2: Comments express a desire for additional road access to Ross Lake.

Representative Comment:
"City Light encourages the NPS to consider the possibility of a road approximately 1 mile in length between Washington State Route 20 and Ross Dam itself."

Response:
The NPS and Seattle City Light have historically worked closely together to repair and/or replace facilities that are damaged by natural events, such as rockfall, and reestablish the required access cut off by these events. The dam and powerhouse were constructed and have been maintained with the access that presently exists. Establishing a new road would not prevent future rockfalls or natural events that may cause temporary disruptions to regular access. Further, establishing additional road access to Ross Lake would result in extreme pressure to open Ross Lake up to more intensive recreation and would fundamentally alter the character of the experience on Ross Lake. This type of intensive recreation is inconsistent with the legislative intent of creating Ross Lake NRA, which clearly envisioned a hydroelectric facility but also a remote and wild experience on the reservoir itself. The public has also expressed strong desire to maintain the character of the experience on Ross Lake as it is today; therefore, the potential impacts and pressures associated with extending additional road access to Ross Lake is not warranted and the NPS is not including this idea in the final GMP/EIS.

Visitor Orientation Center

Concern: Comments express a desire for a visitor orientation center in the town of Marblemount.

Representative Comments:
"[T]he Newhalem Visitor Center should be phased out and the site restored. The more visible and accessible visitor center in Marblemount would be used by far more visitors and would provide far more opportunity for educating North Cascades visitors on the recreation amenities and conservation values of the North Cascades. Placement of the visitor center in Marblemount would also create the potential for public-private partnerships that could substantially

improve the economies of Marblemount and other gateway communities in the Skagit Valley."

"The gateway communities need to serve as 'visitor orientation centers' for Park visitors… [T]his location is uniquely suited to a visitor orientation center. There is literally no other site so well prepared in the Marblemount/Rockport area.…Instead of building a $6,100,000 bridge, that money should be allocated to the gateway community 'visitor orientation centers' to build year-round Park traffic that could really justify a new bridge."

Response:
While the NPS recognizes the desire for a greater sense of arrival and orientation to the park in Marblemount, constructing or locating an additional visitor orientation center is not financially feasible during the life of this GMP. Such a center would place additional strain on building operations, maintenance, and staffing, and it is extremely unlikely that the NPS would receive the funding needed to support these additional costs within the next twenty years. There are also concerns about overdeveloping the park and confusing visitors with too many facilities spread along the west side of the North Cascades Highway. However, if circumstances presented themselves at some time in the future where the North Cascades Visitor Center in Newhalem was no longer functional, the NPS should rethink its visitor facilities and consider consolidating visitor information and orientation services in Marblemount.

Wilderness Information Center

Concern: Commenters suggest updating the Wilderness Information Center or incorporating Alternative D's proposal to move the public function of the Center out to the highway in Marblemount.

Representative Comments:
"We support moving the Marblemount Ranger Station, or at least a Visitor Contact station to the highway. In the long term, ease of visitor access to the superb information provided by the Wilderness Information Center will continue the trend of educated and informed visitors to the wilderness. Having a Park presence on Highway 20 would make the Park presence more visible and improve access for bicyclists as well."

"It is essential to get the Wilderness Information Center onto Hwy 20. It will be more convenient which will improve compliance, protect resources better, and reduce infractions based on ignorance."

> *"Extend climate friendly parks initiative to clarify for visitors how they can do their part so it isn't so park-centric. What can visitors do? If every visitor who visited the park could learn how to be a better steward of their public lands, it would be great."*
>
> *Public Comment from Sedro-Woolley Public Meeting*

Response:
The NPS agrees with the commenters' desire to provide an easily accessible, engaging, and high-quality visitor contact station in Marblemount.

However, as articulated in the final GMP/EIS, maintaining the location of the current Wilderness Information Center is administratively reasonable and fiscally responsible.

The NPS has recently upgraded significant portions of the Wilderness Information Center. As part of the final GMP (page 91 and 166 in the draft plan), the NPS would continue to address commenters' concerns about an office that is relevant and welcoming to modern wilderness visitors. Upgrades will include continued landscape re-design to improve visitor orientation, a re-designed entryway, and updated exhibits, as funding becomes available.

Similarly, moving the public functions of the permit center would also have some effect on service levels, since it would separate the staff from the base of emergency operations. Many staff perform multiple functions (such as both visitor service and emergency response) in the program and therefore having all the functions together is the most efficient organization.

Finally, as the draft GMP/EIS currently states, "this alternative would not preclude moving public functions of the wilderness center to another location if found suitable and feasible in the future" (page 91). Therefore, if circumstances presented themselves such that the Visitor Center in Newhalem were no longer functional, the NPS could consider locating a visitor center or combined visitor and wilderness permit center and consolidated services in the town of Marblemount. However, it is unrealistic to expect that within the twenty-year life of this plan the NPS would be able to obtain funding to construct, maintain, and staff another facility.

Sustainability

Concern: Comments request additional information be included in the final GMP/EIS.

Representative Comment:
"[W]e believe that a summary of the practices and federal requirements related to green building and conservation such as the list below is appropriate to include in the EIS (e.g. in Table 2.1). We recommend that they be considered in developing the final EIS and during development of new facilities."

Response:
The NPS has updated the final GMP/EIS to include a new section on Climate Change and Sustainability in the Desired Conditions Based on Law and Policy in the final GMP/EIS. The information provided has been included in this section in the final GMP/EIS.

Resource Management

Air Quality

Concern: Commenters question the analysis of air quality in the impact analysis.

Representative Comments:
"We note that in Volume II, "Impacts from Alternative B: Air Quality," on page 122, the effects of a change to Class I are not described."

"Burning debris at the north end of Ross Lake is negatively impacting the visual characteristic of the area. Does this impact the potential change from Class II to Class I air designation?"

Response:
The final GMP/EIS has been revised to include the missing portion of the impact analysis. In summary, this redesignation would require legislation, and if passed, would have limited practical effect given the intermingled geography of the North Cascades National Park and Ross Lake NRA. The airsheds are essentially comingled, so the Prevention of Significant Deterioration (PSD) provisions in the Clean Air Act, which afford the highest protection to the Class I airshed of North Cascades, would inadvertently afford a similar level of protection to Ross Lake NRA regardless of whether it remains as a Class II airshed or is converted to a Class I airshed. Therefore there would be a negligible beneficial impact to air quality and air quality related values such as visibility. This "negligible impact" also relates to the commenter's concern about burning debris at the northern end of Ross Lake. The proposal to change from Class II to Class I would have no effect on Seattle City Light's longstanding practice of burning woody debris because that action is not governed by the Prevention of Significant Deterioration regulatory provisions of the Clean Air Act as amended in 1990.

Cultural Resources

Concern: New information about the significance of cultural resources is provided.

Representative Comment:
"City Light understands the importance of maintaining historic structures in Diablo and Newhalem and is actively working to revitalize many of these facilities. At the same time,. . .some housing and other buildings will be removed. City Light has also recently completed an update National Historic Register nomination for the Skagit River and Newhalem Creek Hydroelectric Projects. There are now over 70 buildings, structures, and objects that are eligible for listing on the National Register. The final GMP should reflect the results of this assessment."

Response:
This information has been added to the final GMP/EIS.

Grizzly Bear Management

Concern: Commenters request clarification of the rationale for 70% maintenance of BMUs and suggest consulting with additional technical teams in developing a standard for maintaining core area for grizzly bears.

Representative Comments:
"NOCA needs to clarify if 70% maintenance BMU core area is an average of all BMUs, or per each BMU. A high number would be preferred for the area as a whole."

"Bear habitat is now at 82-90%. Why allow lowering this to 70%? Why degrade core area (or allow it) if it is not necessary? Yellowstone habitat is different than the NOCA habitat - 70% Core Area values is enough for Yellowstone, but it does not automatically translate to those values are sufficient for NOCA.. . .So, 'when drawing comparisons to Yellowstone' NOCA needs to understand the differences between the two places before we blindly accept 70% as a sufficient level for NOCA."

"BC Technical Team should review these proposed core values and NPS should solicit their input. This could help encourage consistency across the landscape/other agencies such as the Okanagan."

"Don't manage any BMU to 70% minimum, particularly without adequate data that shows how grizzlies might use the area, and in so doing preclude any options for management flexibility in that BMU. 70% Core Area should be a value to exceed, not manage to."

Response:
The NPS recognizes the value of maintaining grizzly bear core habitat and understands the delicate balance between resource protection and development. In response to the commenters' concerns about bear management units, the NPS consulted with the North Cascades Ecosystem Grizzly Bear Technical Team, which consists of biologists from the US Fish and Wildlife Service, US Forest Service, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, the British Columbia Ministry of Environment – Ecosystems Branch, and the National Park Service, on what would constitute proper management of the BMUs found within NPS boundaries, based on the best available science.

The NPS has incorporated the Team's recommendations into the final GMP/EIS:

- Current science supports a core area standard of ≥70% per BMU. This value is not a goal, but rather a minimum standard that is known to support recovering grizzly bear populations.
- The NPS will maintain a core standard at higher levels than this 70% value, particularly given that current core area values for all but four of the 11 BMUs within NPS boundaries range from 79-92%.
- A habitat assessment will be completed for any proposed development that might affect a BMU within Ross Lake NRA, North Cascades National Park and Lake Chelan NRA. This will provide an analysis of impacts to grizzly bear habitat in addition to any changes to the percentage of core habitat. The NPS will strive to minimize, avoid, or mitigate impacts on high quality spring and fall grizzly bear habitat.
- A habitat assessment and consultation with the North Cascades Ecosystem Grizzly Bear Technical Team has been completed for proposed trails that are included in the Ross Lake GMP/EIS. These trails would generate only a 0.3% loss of core area, which is considered to be a negligible loss of core area.
- Three BMUs shared with the Mt. Baker-Snoqualmie National Forest (two within the north unit of the national park, one within the south unit) do not achieve 70% core area because of road and high-use trail densities primarily on national forest and private lands. One shared BMU achieves 71% core area, with most development occurring on national forest and private lands. The NPS will consult with the USFS in any circumstance where the development of potentially high use trails within the national park would affect a shared BMU that is currently below the 70% core area ratio, or which could reduce the core area ratio below 70% overall for a shared BMU.
- Any new proposals for development (trails included) will be evaluated for potential impact on core area and habitat quality.

> *"We strongly support a careful, science-based approach to siting any new development, including trails, in Ross Lake NRA in the interests of resource protection and restoration and fulfillment of the NPS mission."*
>
> *Public Comment*

Wilderness

Concern: Commenters question the rationale and analysis for the statement regarding no net increase of trails in wilderness and provide suggestions for new trails to consider in the Preferred Alternative.

Representative Comments:
"We are perplexed about the statement that there will be no net increase of trails in wilderness… the purpose and need of this policy is unclear… We suggest that the approach of a resource capacity combined with a social needs assessment be combined to explore whether there exists demand for more trails in wilderness and, if so, whether the natural resources have the capacity to offer any additional opportunities."

"Today, Ross Lake NRA offers very little for the casual visitor who enters and exits the Area via SR-20…for the day user the only attractive trails are Thornton Lake and Sourdough Mountain. Given the

characteristics of these two trails, which have been in existence since before the park creation in 1968, the GMP is providing very little for the vast majority of visitors to the Ross Lake NRA. This situation could be improved dramatically, if the plan included a world class trail up Ruby Mountain from the Diablo Lake Overlook."

"The park needs more low elevation, 3 season trails. Create additional trails to views/points to experience world class scenery…"

Response:
The statement of "no net increase in miles of trails in wilderness" has been removed and the final GMP/EIS has been updated to clarify proposals for new trails in addition to criteria for considering new trails in designated wilderness. Trail development in the Wilderness Zone will be very minimal and primarily accessed along the North Cascades Highway corridor. In large swaths of trail-less wilderness of Ross Lake NRA or North Cascades National Park the NPS would strive to preserve opportunities for solitude and the untrammeled and undeveloped character of the wilderness when considering new trails. Any trail actions in designated wilderness must meet the minimum requirement analysis.

Many of the suggestions for new trails may be considered, but no specific trails will be built before assessing visitor demand, considering the resource impacts, analyzing feasibility, and obtaining funding. To provide clarification about areas and zones where new trails will and will not be considered, the language of the final GMP/EIS has been modified. Emphasis will first be placed on improving existing trails and trailheads to make them more welcoming, such as the Sourdough and Stetattle Creek Trailheads. Development of trails will focus primarily in the Frontcountry, Backcountry, and Skagit River zones.

Foundation Statement

Concern: Reference to seaplanes should be added to the Foundation Statement.

Representative Comment:
"I believe this document is missing references to seaplanes as a historical artifact at Ross Lake. They have been a key mode of transportation since the inception of Ross Lake… Ross Lake has a tradition and history of seaplane access in keeping with Northwest history and the history of the lake. Not only has Ross Lake been accessible throughout its life to seaplanes, the founder of Ross Lake Resort frequently accessed the resort via floatplane. Also, 'seaplanes' should be added to 'camping, boating and fishing' in paragraph 10.3."

Response:
The foundation statement documents a shared understanding of Ross Lake NRA's purpose, significance, and fundamental resources and values that provide basic guidance for decision-making and management of the unit. While seaplane use on Ross Lake has occurred for decades, it occurs infrequently and is not a common recreational activity shared by the general public. The NPS has received public comments during the planning process that display a range of opinions about seaplane activity on Ross Lake, ranging from supporting a ban on seaplanes within Ross Lake NRA to supporting unlimited seaplane use. In light of these differences of opinion about seaplane use and limited seaplane activity, the NPS has determined that while seaplane use is an historic and appropriate recreational activity, it is not a fundamental resource and value for Ross Lake NRA.

Planning Process

Concern: Commenters question the public involvement process and opportunities to comment during the planning process.

Representative Comment:
"I am always somewhat offended when I am asked to respond to a Plan that has already been developed, as opposed to having input early on in the development of a Plan. 'Articulating a vision and overall management philosophy' is only really possible when one has early input, not after four like-minded scenarios have already been solidified, none of which shows awareness of the realities that face our North Cascades region… I do not believe that responding to a pre-conceived Plan has any chance of impacting that Plan, or altering the outcome of this 'planning event'. There is a reason why you keep people out of the real planning process, and only due to requirements by law do you 'allow' for this comment period. You are not responsible to the people of this area, and you know it."

Response:
The NPS invited the public to contribute their concerns, ideas, and opinions during three important stages in the GMP planning process: scoping (September-December 2006), draft alternatives (February-March 2008), and draft GMP/EIS (July-

September 2010). The NPS also invited public involvement on the Skagit Wild and Scenic River Studies (October 2008). The NPS went far beyond the requirements for engaging the public that are required by law, including holding nearly 20 public meetings in Ross Lake NRA, gateway communities, Seattle, and British Columbia. Presenting the draft alternatives to the public and inviting public comment was an additional step that the NPS conducted to gather input to assist in refinement of the alternatives and selection of the preferred alternative. Furthermore, the NPS held the public comment period on the draft GMP during the peak visitation season to attract a wide range of visitor comments. Public comments were received in meetings, letters, postage paid comment forms, and electronically via e-mail and the project website. Many of the concepts and actions in the final plan came directly from individuals who participated in the planning process. Public involvement has been an essential component to the development of this GMP for Ross Lake NRA and has influenced all aspects of the final GMP/EIS.

Comment Letters

The following section shows reproductions of the comment letters from federal, state, and local governments; businesses; and interest groups and organizations that provided comments on the draft plan. Due to the extensive number of comment letters, comment letters from private citizens are not included in this final volume.

Copies of all letters are available in electronic format, with individual names and addresses removed, and are available upon request. The responses to these letters are shown in the previous section.

Public meeting in Bellingham, 2010.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS TRIBAL AND
PUBLIC AFFAIRS

September 7, 2010

Palmer Jenkins
Superintendent
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, Washington 98284

Re: EPA comments on draft Environmental Impact Statement (DEIS) for the Ross Lake National Recreation Area (NRA) General Management Plan. EPA Project Number 06-066-NPS

Dear Mr. Jenkins:

The U.S. Environmental Protection Agency (EPA) has reviewed the DEIS in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and the document's adequacy in meeting NEPA requirements.

The DEIS analyzes the no Action Alternative, Alternative A, and three action alternatives (Alternatives B, C and D) for future management of the Ross Lake NRA during the next 15 to 20 years. The DEIS presents strategies for resource protection, education and interpretation, visitor use and facilities, land protection and boundaries, and long-term operations and management of Ross Lake NRA. The alternatives vary by degree of management to support visitor use, desired future conditions, and application of the following management zones: Frontcountry, Backcountry, Wilderness, Skagit River, and Hydroelectric. The Frontcounty exists along the North Cascades Highway and developed areas and supports the highest degree of visitor access while the Backcountry and Wilderness zones focus on limited facilities and provide a sense of remoteness and natural conditions. The Skagit River Zone focuses on visitor facilities associated with river recreation and the Hydroelectric Zone includes areas where Seattle City Light operations exist and are linked to Frontcounty recreation activities. Alternative B contains a balance between Frontcounty and Backcountry management zones, Alternative C contains the most backcountry designation, and Alternative D contains the most Frontcountry designation. The DEIS identifies Alternative B as the Preferred Alternative and the Environmentally Preferred Alternative.

The document clearly describes the context for the plan, significance of natural resources, management strategies, and connection to other plans and authorities (e.g., Skagit River Management Plan, adjacent Forest Service plans, Seattle City Light's 30 year hydroelectric license). The document is also incredibly easy to follow and provides outstanding photographs

and watercolors that help the reviewer understand the setting and resource values of the NRA. We support the Preferred Alternative, Alternative B, and believe that this document will provide a management direction that protects and preserves resources, provides for a positive visitor experience, and a method for monitoring and assessing impacts over the life of the General Management Plan. Based on our review and evaluation, we have assigned a rating of LO (Lack of Objections) to the draft EIS. We have suggestions for you to consider including in the final EIS related to energy efficiency, green building, and stormwater management.

We acknowledge that "Energy Requirements and Conservation potential" were included in the topics dismissed from further consideration. However, we believe that a summary of the practices and federal requirements related to green building and conservation such as the list below is appropriate to include in the EIS (e.g,. in Table 2.1). We recommend that they be considered in developing the final EIS and during development of new facilities.

- Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. This EO directs agencies to utilize environmentally preferable materials, products, and services and to design, construct, maintain, and operate high performance sustainable buildings.
- Energy Independence and Security Act of 2007 (EISA), Section 438
    - Stormwater: EISA Section 438 requires federal agencies to develop and redevelop facilities with a footprint that exceeds 5,000 square feet in a manner that maintains or restores the pre-development site other impacts. Hydrology to the maximum extent technically feasible.

  http://www.epa.gov/owow/nps/lid/section438/
- LEED Certification. The General Services Administration requires new projects to achieve LEED Silver, DOE requires LEED Gold. CBP requires LEED Certified.
- Low Impact Development and cost-efficient, environmentally friendly landscaping. EPA's GreenScapes program provides cost-efficient and environmentally friendly solutions for landscaping. Designed to help preserve natural resources and prevent waste and pollution, GreenScapes encourages companies, government agencies, other entities, and homeowners to make more holistic decisions regarding waste generation and disposal and the associated impacts on land, water, air, and energy use. http://www.epa.gov/osw/conserve/rrr/greenscapes/index.htm

Thank you for the opportunity to review this DEIS. If you would like to discuss these issues, please contact Lynne McWhorter of my staff at (206) 553-0205, or via email at mchworter.lynne@epa.gov .

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

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3

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

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Construction Mitigation Measures Adopted for Several Major Projects in California

A. Administrative
   1. Have a Mitigation Plan that is included in the FEIS and committed to in the ROD.
   2. Require reporting.
      a. Prepare inventory of all equipment prior to construction.
      b. Report on suitability of add-on controls for each piece of equipment before groundbreaking.*
      c. Evaluate other engine alternatives: electric, CNG, LNG, fuel cell, alternative diesel.
      d. Monthly, public reports by Environmental Coordinator regarding fulfillment of requirements
   3. Have suitability report subject to review by Air District, USDOT, State DOT, EPA and the public.

B. Equipment
   1. Use add-on controls such as catalysts and particulate traps where suitable.
   2. Use fuel with 15 ppm of sulfur or less unless unavailable.
   3. Establish idling limit (e.g., 5-10 minutes per hour).
   4. Tune to manufacturers' specs and do so at manufacturers' recommended frequency.
   5. Prohibit any tampering with engines and require continuing adherence to manufacturers' recommendations.
   6. Require that leased equipment be 1996 model or newer unless cost exceeds 110% of average lease cost.
   7. Require 75% of total horsepower of owned equipment to be used to be 1996 or newer models.

C. Work limitations
   1. Establish a cap on daily emissions and/or hours of work.
   2. Use no more than 2 pieces of equipment simultaneously near or upwind from sensitive receptors.
   3. Establish additional emissions limits within 1000 feet of any K-12 school.
   4. Provide notification to all schools within 1000 feet.
   5. Reduce truck trips and/or restrict hours of driving through communities to minimize risk.

* Suitability of control devices is based on whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused by the construction equipment engine, or whether there may be a significant risk to nearby workers or the public. Such determination is to be made by the Contract Project Manager (CPM) in consultation with the appropriate vendor.

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 3

Author Information

Keep Private:	No
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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 07/30/2010	Date Received: 07/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

Correspondence Text

As Director of Aviation for the Washington State Department of Transportation, I am concerned by the alternatives being proposed that would restrict aviation access to Ross Lake. WSDOT is responsible for preserving the state's transportation system to accommodate all types of aviation activities, such as, seaplane access. Similarly, we operate 16 airports primarily in the backcountry, some of which we manag on behalf of federal partners including the Stehekin Airport. The purpose of these airports is to provide access to remote areas for recreation and more importantly emergency services. In our years of experience backcountry aviation including seaplanes activity has maintained a compatible relationship with other users of federal lands and has provided public benefit. As a result we see no justification to change park management policy that would restrict seaplane access to Ross Lake. Thank you for your consideration.

John Sibold
WSDOT Aviation Director

Sept 30, 2010

SEP 3 0 RECD

We, the undersigned, support shifting the boundary of Ross Lake National Recreation Area (NRA) to include more land into North Cascades National Park. We make this suggestion as the National Park Service contemplates changes to how it manages the Ross Lake National Recreation Area through proposed draft changes to its General Management Plan. The Ross Lake NRA is part of the North Cascades National Park complex and is at the heart of our region. National park sites such as the North Cascades and Ross Lake provide key habitat for wildlife such as salmon, fishers, black bears and wolves. Visitors come to the greater North Cascades because of its wildlife and natural wonders and for the area's recreational opportunities, including its visitor centers, trails and campgrounds. Sustaining and protecting those important recreation and natural values while also working to increase that visitation is critical to a sustainable and healthy economy and environment. We feel that redrawing the boundaries of the Ross Lake NRA to provide for more land within the North Cascades National Park proper would likely increase visitation and would be a low cost way of improving visitors' experience and would provide for better protection of natural and cultural wonders.

We feel a greater focus on North Cascades National Park would be a key driver for our regional economy. Research shows that for every dollar invested in national parks, fours dollars are returned to park gateway communities. Across the country, national parks generate approximately $12 billion and support over 200,000 jobs. In the North Cascades, federal and visitor spending pumps roughly $15 million into local communities and supports more than 350 jobs.

Park visitation drives these numbers. The national park system is made up of nearly 400 park units, but only 58 are National Parks. The remainder is national recreation areas, national historic sites, national monuments, and other units. The entire national park system saw record visitation last year with more than 274 million. More than 62 million of these visitors went to national parks such as Yellowstone, Mount Rainier and Denali. National parks drew the largest number of visitors in part because of their higher public profile and we'd like to see that higher profile attached to North Cascades

Therefore, we the undersigned support the National Parks Conservation Association's call for shifting Ross Lake NRA acreage into the North Cascades National Park.

Sincerely,

Pola Kelley
Executive Director
Sedro Woolley Chamber of Commerce

Carl Weimer
Whatcom County Commissioner

City of Seattle
Michael Patrick McGinn, Mayor

Seattle City Light
Jorge Carrasco, Superintendent

September 30, 2010

Chip Jenkins, Superintendent
Attn: Ross Lake NRA Draft GMP/EIS
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 98284-1239

Re: Ross Lake National Recreation Area GMP Alternatives

Dear Mr. Jenkins:

Seattle City Light (City Light) appreciates the opportunity to provide comments on the Draft General Management Plan and Environmental Impact Statement (GMP) (July 2010) for the Ross Lake National Recreation Area (NRA). City Light and the National Park Service (NPS) have enjoyed many years of shared projects and collaboration in this area and we are pleased to participate in the planning for the future use and preservation of the NRA. We commend the NPS for a well-written document, the thoughtful definition of GMP management zones, and the range of alternatives provided for review.

City Light respectfully submits the following general comments on the GMP for your consideration. Attached to this letter are specific corrections and points of clarification related to City Light's Skagit operations and license obligations for resource protection.

Comments on Draft GMP

- ***Colonial Creek Campground Boat Launch*** – City Light looks forward to working with the NPS on the possible movement of the boat launch from Colonial Creek Campground to the north side of the highway in the vicinity of the Diablo Lake boathouse. However, very recent security measures recommended by the Pacific Northwest National Laboratory (PNNL), a division of the Department of Energy, should be mutually reviewed to fully determine what, if any, vehicular access restrictions may be recommended to safeguard the dam itself.

- ***Newhalem Skagit General Store and Main Street*** – City Light is in the process modifying the interior of the Skagit General Store to include a deli that would be available to NRA visitors as well as City Light staff. This will enhance the store to better serve NRA visitors. In addition, City Light has retained architects and other designers to formulate plans and documents to revitalize the Gorge Inn and, possibly, the Hotel. These two facilities, potentially packaged with the store, may be

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offered to concessionaires for public use if approved by the NPS. Services provided by the concessionaires could include food preparation and service and overnight accommodations. However, at this time, City Light's plans for Skagit facilities have not been finalized and specific details should not be included in the GMP.

- ***Diablo Townsite: Hollywood and Reflector Bar*** – Recent federal security restrictions and other requirements have forced City Light to reconsider plans of land exchange at Hollywood and Reflector Bar. Critical staff for City Light will now be housed in Hollywood and not Reflector Bar as previously planned. The cookhouse and all housing and residential storage facilities at Reflector Bar will be removed. City Light is open to continued negotiations regarding possible partial sale of the Hollywood property that might include some or all of the houses. City Light is also open to discussions with NPS on the rental or lease of some number of houses in Hollywood. In lieu of this, City Light plans to remove all houses not immediately on Diablo Road with the exception of House 6 and the emergency response structures.

  City Light is committed to working with the NPS to improve access to and visibility of the Stettalle Creek and Sourdough Mountain trails. In addition, City Light will work with the NPS in designing the interior of the Ross Lodge in a manner that will meet NPS needs for a facility in Diablo.

- ***Ross Dam: Road Access*** – A Probable Failure Mode Analysis (PFMA) performed on Ross Dam by independent consultants, and taken up by the Federal Energy Regulatory Commission (FERC), has noted that access to the dam during times of storm, flood or other emergencies may not be available via existing means. A recent rockslide that has blocked the Ross Dam Access Road for the majority of 2010 underscores this threat. Failure to station personnel properly could threaten the dam itself and possible populations and properties downstream. City Light encourages the NPS to consider the possibility of a road approximately 1 mile in length between Washington State Route 20 and Ross Dam itself. This road could be (1) restricted to NPS or City Light use only; (2) restricted to emergency use, either for evacuating injured public users or for accessing the dam; (3) used to ferry boats and equipment for Ross Lake Resort, or (4) some combination thereof. City Light asks the NPS to also consider the environmental risk to Diablo Lake associated with the existing operational challenges of barging large amounts of petroleum products to Ross powerhouse and the Ross Lake Resort. A road could limit this risk for these and/or similar products.

- ***Newhalem and Diablo Waste Water Treatment Plants: Future Plans*** – In the future, City Light will remove existing Waste Water Treatment Plants at Newhalem and Diablo. These plants will be replaced by drainfields and associated septic systems. An engineering study has been completed that supports the advantages to these systems.

- ***Cultural Resource Conditions: Skagit River Hydroelectric Project Zone, Historic Structures*** – City Light understands the importance of maintaining historic structures in Diablo and Newhalem and is actively working to revitalize many of

these facilities. At the same time, as noted in the GMP, some housing and other buildings will be removed. City Light has also recently completed an update National Historic Register nomination for the Skagit River and Newhalem Creek Hydroelectric Projects. There are now over 70 buildings, structures, and objects that are eligible for listing on the National Register. The final GMP should reflect the results of this assessment.

- ***Climbing*** – It is difficult to determine if climbing could present access or security issues at City Light's facilities without knowing the exact location of the four areas agreed upon between the NPS and the climbing community. City Light is concerned about existing and new routes that require access across the Gorge Bypass Reach and/or parking along Highway 20 between Newhalem and Diablo. Public access to the Gorge Bypass Reach is prohibited due to potential hazards from water releases from Gorge Dam. In addition, parking along the narrow road between Newhalem and Diablo is a safety hazard that will require coordination with the State Department of Transportation to resolve.

- ***Campgrounds*** - Development of a campground near the aggregate ponds is likely to be inconsistent with management this area as salmon habitat, which is required in the Settlement Agreement for the Skagit License. However, City Light is willing to work with the NPS to identify locations for a new campground that may exist on other City Light-owned property

City Light values its partnership with the NPS in the Ross Lake NRA. We trust that you will consider our comments to refine the preferred alternatives presented in the GMP. If you have any questions, please call Andy Strong, Interim Power Production Director at (206) 386-9741, or Colleen McShane, Manager of Natural Resources and Environmental Planning at (206) 684-4238.

Sincerely,

Michael J. Haynes
Power Production Director

CM:sw

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ROSS LAKE NATIONAL RECREATION AREA
DRAFT GENERAL MANAGEMENT PLAN

SEATTLE CITY LIGHT'S
POINTS OF CLARIFICATION, CORRECTIONS, AND SUGGESTIONS

VOLUME 1

1) Page 1, paragraph 3.

Suggested changes:
The hydroelectric facilities and portions of the townsites at Newhalem and Diablo comprise the Skagit River ~~and Newhalem Creek~~ Hydroelectric Project~~s~~ Historic District, which was listed on the National Register of Historic Places in 199~~6~~0.

Comment: Not all of Diablo and Newhalem are part of the Historic District. The official title is the Skagit River Hydroelectric Project Historic District; it encompasses facilities associated with both the Skagit River and Newhalem Creek hydroelectric projects. It may be worth noting that the boundaries of the historic district extend in a linear, but disconnected, fashion along the Skagit River, from the town of Newhalem to the Ross Powerhouse and Dam.

2) Page 1, paragraph 4

Suggested changes:
Vehicular access is limited to ~~the Ross Dam parking area from the U.S. side and to~~ the Hozomeen area ~~from~~ in Canada.

Comment: There is no vehicle access to Ross Lake from the parking area.

3) Page 2, paragraph 2

Suggested changes:
Located partially within Ross Lake NRA, the Skagit River is the only Puget Sound tributary to support all native species of anadromous salmonids; the river just downstream of the RNA ~~and~~ hosts one of the highest concentrations of wintering bald eagles in the lower 48 states.

Comment: As written, this sentence is somewhat misleading. The entire Skagit River is not in Ross Lake RNA and the high concentrations of wintering bald eagles actually occur outside the RNA.

4) Page 2, paragraph 6

Suggested changes:
Within Ross Lake NRA, year-round residents live and work in Newhalem and Diablo to provide operational functions for ~~the~~ Seattle City Light and to support NPS and county services.

Comment: Staff from the Park Service, North Cascades Institute, and Whatcom County also live in Diablo and Newhalem.

5) **Page 7, paragraph 3**

Suggested changes:
This agreement had to be approved by FERC, which, after many additional meetings, hearings, and negotiations later, occurred on ~~June 26, 1996~~ May 16, 1995, when FERC issued an order for the Skagit River Project's new license.

6) **Page 7, paragraph 4**

Suggested changes:
In 1990~~6~~, the Skagit River ~~and Newhalem Creek~~ Hydroelectric Project Historic District was listed on the National Register of Historic Places. The original listing ~~District~~ include~~d~~s more than 30 contributing resources, such as Diablo Dam, Gorge Powerhouse, and historic houses and structures related to the Skagit and Newhalem Hydroelectric Project. The National Register nomination was updated in 2010 and the District now encompasses more than 70 contributing resources, including Ross Dam and Powerhouse.

7) **Page 16, Interpretive Theme 8. Skagit River**

Suggested changes:
Significance: The Skagit is the largest river draining into Puget Sound. ~~Stable flows help make i~~It the only Puget Sound tributary to host all native species of anadromous salmonids; it also supports ~~and~~ one of the highest concentrations of wintering Bald Eagles in the lower 48 states. Stable flows resulting from the Skagit Hydroelectric Project improve salmon survival and spawning success.

Comment: Stable flows are not the reason the Skagit River hosts all species of anadromous salmonids or high concentrations of winter bald eagles. Stable flows do influence salmon spawning success and survival.

8) **Page 18, Interpretive Theme 11. Hydropower Landscape**

Suggested changes:
The story of creating one of the last great wilderness parks in the lower 48 states and the ongoing struggle about how to provide for wilderness preservation, a

national park experience, and Seattle City Light's needs for hydropower development began with the creation of North Cascades NPS Complex and continued through the landmark FERC negotiation and settlement. Today, the two organizations partner on a variety of education, research, monitoring, and interpretive activities in the NRA.

9) Page 44, bullet 1

Suggested changes:

Climate change ~~could also~~ is likely to alter how Seattle City Light operates the Skagit River Hydroelectric Project to optimize generation and meet recreation, fisheries, and flood control obligations. ~~dramatically affect reservoir water levels, and therefore~~ These changes may affect ~~Seattle City Light's power generation capability as well as~~ reservoir-based visitor recreation.

Comment: This statement is based on Seattle City Light's most recent Integrated Resource Management Plan.

10) Page 44, bullet 4

Suggested changes:

The Skagit River Hydroelectric Project Historic District is listed on the National Register of Historic Places. It includes the parts of the towns of Newhalem and Diablo, the Gorge, Diablo, and Ross ~~P~~powerplant c~~C~~omplexes, Ladder Creek Gardens, and ~~Diablo Powerplant Complex~~a number of houses and other buildings built between 1917 and 1960. ~~Under the relicensing agreement, the City of Seattle must evaluate their buildings and structures for historic significance and update the National Register nomination on a regular schedule. Seattle City Light is currently evaluating additional sites for National Register eligibility, including Ross Dam and powerhouse and the Hollywood housing district in Diablo Townsite.~~ The GMP could identify mechanisms for future management that comply with NPS standards.

Comment: The update to the National Historic Register nomination is complete and now includes over 70 structures and objects. In addition, Seattle City Light may not need to conduct additional updates since the Washington State Department of Archeology and Historic Preservation has agreed the period of significance for the entire district ends in 1960, with the completion and operation of all facilities associated with the Skagit River and Newhalem Creek Hydroelectric Projects. Thus, the eligibility of all potentially significant structures has been evaluated as of 2010.

11) Page 63, Hydroelectric Zone, paragraphs 1, 3, and 5

Suggested changes:

National Register ~~and National Register eligible~~ sites would be preserved and used in conjunction with ~~the operation of~~ Seattle City Light operations.

To the extent possible, ~~H~~historic structures would be maintained and functional through established use or adaptive reuse.

Seattle City Light would continue its responsibilities to identify, preserve, rehabilitate, and interpret their cultural resources ~~and nominate them to the National Register~~, as appropriate.

Comment: See comment above.

12) Page 65, Skagit River Zone, paragraph 6

Suggested changes:
Motorboat restrictions on the Skagit River would vary by alternative, except for emergency, law enforcement, and NPS and Seattle City Light operational, research, and monitoring needs.

13) Page 65, Hydroelectric Zone, paragraphs 2 and 4

Suggested changes:
Seattle City Light would continue to provide the visitor services stipulated in the Settlement Agreement and FERC license. These include guided tours of the Skagit Project; operation of the Skagit Visitor Information Center; operation of the tug boat/ferry service on Diablo Lake; maintenance of public facilities in Diablo and Newhalem; and maintenance of Ladder Creek Falls trail.

Motorboats would be allowed on the reservoirs except for spatial or temporal restrictions that could apply for emergency, law enforcement, and NPS and Seattle City Light operational needs.

Comment: First statement needs more definition. Second statement is unclear.

14) Page 71 and Figure 1.2

Comment:
Figure 1.2 shows Big Beaver Valley and Thunder Creek Arm as Potential Wilderness. On page 71 Thunder Arm is proposed as an addition to the Stephen Mather Wilderness Area because of Seattle City Light's decision that a hydroelectric project on this creek is not economically or environmentally feasible. Big Beaver is not mentioned at all, leaving the reader to wonder why. Suggest adding the following to the discussion on wilderness and backcounty on page 71:

> *In recognition of Seattle City Light's easements under the Skagit River Treaty, Big Beaver Valley is not proposed for wilderness designation at this time.*

15) Page 72, Wild and Scenic River, paragraph 6

Suggested changes:
The Skagit River ~~below~~ between Gorge Dam and Gorge Powerhouse was found ineligible because the limited water in this reach does not meet the free-flow requirement of wild~~l~~ and scenic river eligibility.

16) Page 77, Climate Change

Comment: Consider adding a sentence on coordinating with Seattle City Light on appropriate conservation measures for NPS facilities in the NRA.

17) Page 81-84, Maps

Comment: Please add Gorge Dam and vicinity to the Hydroelectric Zone to Figures 4.2 and 4.3.

Comment: Also, the water in the parts of the reservoirs appears as dark pink, which is not in the legend. Is this a color artifact resulting from the blue hatching designating water overlaying the orange for the backcounty zone?

18) Page 85, paragraph 3

Suggested changes:
New camping facilities could be considered and constructed at Newhalem Creek Campground, and Upper and Lower Goodell group sites~~, and in consultation and cooperation with SCL at the aggregate ponds near the lower portions of the Skagit River~~. Other sites may be identified in cooperation with Seattle City Light.

Comment: As stipulated in the Settlement Agreement, Seattle City Light was required to develop the aggregate ponds (also known as Newhalem Ponds) as fish channel spawning and rearing habitat. This work was accomplished in 1996. In addition, the Settlement Agreement states that:

> *The City shall leave undisturbed the exiting riparian zone around all pond and channel habitat unless such disturbances are approved in advance by the Non-flow Coordinating Committee.*

Development of a campground near the aggregate ponds is likely to be inconsistent with management this area as salmon habitat. However, opportunities for a new campground may exist on other Seattle City Light-owned property.

19) Page 87, paragraph 1, Seattle City Light Visitor Facilities

Suggested changes:
In addition to NPS facilities, Newhalem also contains the visitor facilities operated by Seattle City Light, including the ~~SCL visitor~~ Skagit Information

Centercontact station, which serves as the starting point for tours of the Skagit power facilities, trails, and the Skagit General Store.

20) Page 87, paragraph 6, day hiking

Comment: Seattle City Light is open to partnering with NPS on new trails in the Newhalem area. It would be helpful to know where these might be.

21) Page 87, paragraph 8, North Cascades Environmental Learning Center

Suggested changes:
The North Cascades Institute would continue to work in cooperation with the NPS and Seattle City Light on plans for the ELC and management of the area.

Comment: Please acknowledge Seattle City Light as a partner in the operation and maintenance of the ELC.

22) Page 88, paragraph 5, Diablo Townsite

Suggested changes:
In 19908989, six five buildings and structures in Diablo Townsite were listed on the National Register of Historic Places. Five of these structures are on Reflector Bar and are as part of the Skagit River and Newhalem Creek Hydroelectric Project Historic District that was designated in 1996. To comply with the Federal Energy Regulatory Commission (FERC) license agreement, In 2010 Seattle City Light is completed an evaluationing of the remaining buildings, structures, sites, and landscape elements associated with the Skagit River Hydroelectric Project to determine their historical significance and eligibility for nomination to the National Register. The historic district has been expanded and now includes 47 contributing resources in Diablo townsite. This analysis will help inform future use of the facilities.

Comment: Diablo Dam was one of the 6 structures listed in the Diablo area of the historic district; the dam, however, is not part of the townsite. Seattle City Light would be happy to provide NPS with a copy of the latest National Register of Historic Places (2010) for updated information on historic resources.

23) Page 97, paragraph 7, Boating

Suggested changes:
Motor boats would be excluded on the Skagit River, except for emergency, law enforcement, NPS and Seattle City Light operational, research, and monitoring needs.

24) Page 128, Ecosystem Functions and Processes: Mass Wasting, Alternative B

Suggested changes:
Work with Seattle City Light, the Washington State Department of Transportation, the Federal Highway Administration, and others to ~~improve~~ avoid maintenance practices that trigger events and maximize ~~mitigation for~~ actions taken to protect roads and infrastructure.

25) **Page 136, Science Communication, Alternative B**

Suggested changes:
Engage partners, such as North Cascades Institute and Seattle City Light, in the process of communicating the results of research and monitoring to a wider public audience

26) **Page 146, Motor Boats of the Skagit River, Alternative B**

Comment: See Comment 20 on motor boat use for research and monitoring.

27) **Page 148, Sport Climbing in the Skagit Gorge, all alternatives**

Comment: Is there an annual process for evaluating the four agreed upon climbing areas and any newly designated climbing routes to determine use by nesting peregrine falcons and the need for temporary closures?

28) 25) **Page 166, Campgrounds, Alternative B**

Comment: See Comment 16 on concern with aggregate pond site.

29) **Page 176, Seattle City Light, all alternatives**

Suggested changes:
Continue to work cooperatively with Seattle City Light and international agencies and organizations, including the Skagit Environmental Endowment Commission, to develop projects and conduct programs for the international benefit of the Upper Skagit Watershed.

Comment: SEEC operates under the auspices of the City of Seattle, not Seattle City Light (although Seattle City Light provides staff support and funding).

Suggested changes:
Continue to provide utilities and infrastructure to ~~support a Canadian crew, employed by~~ Seattle City Light ~~who~~ for maintenance duties associated with Ross Lake reservoir on both sides of the Canadian border. ~~Continue to provide housing for Canadian and U.S. interpreters at Hozomeen.~~

Comment: Seattle City Light appreciates the support of NPS at Hozomeen but is under no obligation to hire a Canadian crew for maintenance duties associated with Ross Lake

reservoir. Why housing for interpreters is included in this section on cooperation and collaboration with Seattle City Light? The NPS provides housing for Canadian and U.S. interpreters at Hozomeen.

30) Page 202, Fish and Wildlife, Alternatives B, C, and D

Suggested change – Alternative B
Impacts to wildlife from hunting and fishing would continue to cause negligible to minor impacts to fish and wildlife populations.

Comment – Alternatives C and D: Why are the effects of climate change on fish and wildlife populations mentioned for these two alternatives and not alternatives A and B? It seems like the effects of climate change would be similar for all alternatives and should either be discussed under each or none.

31) Page 204, Historic Structures and Cultural Landscapes, all alternatives

Comment: This section should be modified for all alternatives to reflect the 2010 update to the National Historic Register and the uncertainty associated with NPS acquisition of the entire Hollywood area.

VOLUME 2

32) Page 3, paragraph 5

Suggested change
~~The Newhalem Project includes several historic cultural resources and recreational amenities that are also tied to the Skagit River Project. These include the National Register listed "company towns" and associated hydroelectric infrastructure in Diablo and Newhalem, the Ladder Creek Falls Trail and the Trail of the Cedars~~.

Comment: Suggest deleting the paragraph as it confusing. The two company towns and associated hydroelectric infrastructure in Diablo and Newhalem and Ladder Creek Falls Trail are considered part of the Skagit River Project. There are no historic cultural resources associated with the Newhalem Project except the powerhouse site (the powerhouse burned).

33) Page 69, Seattle City Light

Suggested change
Seattle City Light is a key partner of the NPS on numerous visitor information, maintenance, and resource management projects. Seattle City Light is a publicly-owned utility that manages ~~the Skagit Hydroelectric Project~~ a complex of four

hydroelectric dams within Ross Lake NRA. Seattle City Light constructed and owns the North Cascades Environmental Learning Center and operates two "company towns" within Ross Lake NRA for its employees. Additional explanation about Seattle City Light and its projects are located in the chapter under "Skagit River Hydroelectric Project" and "Newhalem Creek Hydroelectric Project."

34) Page 70, photo caption

Typo (Diable vs Diablo)

35) Pages 107-108, Historic Structures and Cultural Landscapes

Comment: Suggest revising this section to reflect the updated National Historic Register nomination and the uncertainty of NPS acquisition of the entire Hollywood area of Diablo. In addition Seattle City Light's plans for housing and building renovations in Newhalem and Diablo are not final and should probably not be described in detail in the GMP.

36) Pages 211-217, Appendix B

Comment: See comment 31; suggest working with Seattle City Light to revise this appendix.

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

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September 15, 2010

Mr. Palmer L. Jenkins
Superintendent
National Park Service
North Cascades National Park Complex
810 S.R. 20
Sedro-Woolley, Washington 98284-1239

In future correspondence please refer to:
Log: 091510-02-NPS
Property: Ross Lake National Recreation Area
Re: Draft General Management Plan

Dear Superintendent Jenkins:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP) regarding the National Park Service (NPS) Draft General Management Plan (GMP) for Ross Lake National Recreation Area (NRA). In response, I have reviewed the Draft GMP/Environmental Impact Statement (EIS) Executive Summary included with your letter. As a result of the review, I am providing the following comments/recommendations for your consideration:

1. DAHP supports and appreciates the NPS effort to update its GMP for the Ross Lake NRA. We also note and support discussion in the GMP about planning issues in the various alternatives affecting historic and cultural resources within the NRA.
2. DAHP views the GMP as a document that identifies NPS land use management policies as well as specific projects, in concept only. Therefore, please keep in mind that once the preferred alternative is selected and the Ross Lake GMP is finalized, actual implementation of projects identified in the plan will require review by DAHP under the provisions of Section 106 of the National Historic Preservation Act (NHPA). This review requires specific steps and detailed information including: defining the area of potential effects (APE), identifying all cultural resources within the APE, determining how significant cultural resources will be affected, and implementing mitigation measures when these cultural resources are adversely affected.
3. We note that all the GMP alternatives describe a potential exchange between Seattle City Light and NPS of land at Hollywood for land at Reflector Bar. Knowing that historic properties have been identified in both areas, DAHP will look forward to Section 106 consultation with the NPS when this action is initiated. For your information, existing information on historic properties in Hollywood, Reflector Bar, and elsewhere in the NRA can be accessed by visiting DAHP's interactive on-line WISAARD database at www.dahp.wa.gov.

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION
Protect the Past, Shape the Future

4. We understand from your letter that a programmatic agreement (PA) will be drafted that will identify specific actions from the GMP affecting cultural resources (such as the proposed land exchange) or will be reviewed programmatically. In the meantime, we look forward to reviewing and commenting on a draft document.
5. Finally, on behalf of the State Historic Preservation Officer (SHPO) and DAHP staff, I would like to extend an invitation to you and your staff to participate with us here at our Olympia office in training on Section 106 and other NHPA programs. DAHP staff members have acquired considerable skills in training cultural resource professionals and non-professionals alike in historic preservation principles and processes.

In closing, thank you for the opportunity to review and comment on the Draft GMP for the Ross Lake NRA. We look forward to working with you and your staff successful implementation of the plan and your efforts to protect significant cultural resources within the park. Should you have any questions, please feel free to contact me at 360-586-3073 or greg.griffith@dahp.wa.gov.

Sincerely,

Gregory Griffith
Deputy State Historic Preservation Officer

C: Jesse Kennedy
Gretchen Luxenburg
Bob Mierendorf

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION
Protect the Past, Shape the Future

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 578

Author Information

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

Thank you for the opportunity to comment on the Draft General Management Plan and Environmental Impact Statement for the Ross Lake National Recreation Area. National Park Service staff involved the Washington State Department of Transportation (WSDOT) early in the plan development process, and we appreciate the opportunity to participate and comment. We provide the following comments for your consideration and look forward to working with the National Park Service as the plan is implemented.

As you know, the North Cascades Highway (SR 20) is a regionally significant highway that provides a vital connecting route across the Cascades in northern Washington State. Management of the portion of the highway addressed in the plan is governed by a Highway Easement Deed with the Secretary of the Interior acting by and through the National Parks Service. That easement specifies the terms and conditions of the design, construction, and preservation of the highway.

We offer the following comments for your consideration:

IMPROVEMENTS
The preferred alternative recommends several improvements including signage, parking and pullouts. WSDOT's funding is extremely limited; however, we often help other agencies that have their own funding complete projects on or near the state highways, and we would be happy to assist you as you implement these plan recommendations.

Anything constructed along SR 20 would require close coordination between WSDOT and National

Parks, consistent with the Highway Easement Deed. The following are a few considerations:

? Improvements should be consistent with WSDOT's Design Manual and access management practices.

? The addition of permanent signage on the highway requires approval from our traffic engineer and would be installed by our maintenance crews.

? Design standards guide the placement of turn lanes based on traffic operations and roadway geometry. Changes to roadway channelization, such as the proposal to add a turning lane at the Ross Dam Trailhead Parking Lot, must be evaluated by our traffic engineer.

? A traffic control plan for the time of construction would be needed to avoid potential traffic hazards.

? This section of SR 20 is designated a Washington State Scenic and Recreational Highway. That designation comes with additional requirements, particularly related to the aesthetics of any improvements made along the corridor. We support the National Parks Service's proposal to prepare the corridor so it would be eligible for nomination as a Nationally Designated Scenic Byway.

MAINTENANCE AND PRESERVATION ACTIVITIES
The preferred alternative proposes future coordination between the National Park Service and WSDOT on maintenance and preservation practices. It is important for WSDOT to maintain flexibility in these practices in order to respond to changing conditions. Maintenance activities identified in the plan and EIS include:
? Avalanche control
? Plowing of overlooks and trailhead areas
? Hazard tree management
? Vista clearing
? Non-native plant management
? Gravel storage location areas

These topics are addressed by the Highway Easement Deed. WSDOT and the National Park Service work together to implement the deed, and this close coordination will be important as we move forward.

The preferred alternative also calls for the agencies to develop a proactive approach to avoid catastrophic channel avulsion and road closure, and minimize impacts to fish populations and other resources. Although WSDOT's funding is extremely limited, we look forward to coordinating these activities with your agency within the constraints of our budget.

SKAGIT WILD AND SCENIC RIVER STUDIES
The National Parks Service recommends that Congress extend the Skagit Wild and Scenic River designation to include an 11-mile upper Skagit segment and the two largest tributaries flowing into this reach.

WSDOT's environmental goal is articulated in the agency's Strategic Plan: "To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment." WSDOT believes that the proposed Wild and Scenic River designation is consistent with this goal. WSDOT currently maintains highways within the boundaries of

designation. If this segment of the Skagit River and its two largest tributaries receive federal Wild and Scenic River designation, WSDOT will look forward to participating in the subsequent development of the management plan for the river.

We thank you again for the opportunity to comment on the draft General Management Plan and Environmental Impact Statement. Please do not hesitate to contact me at 360.757.5981 or woehlek@wsdot.wa.gov if you have any questions or if I can be of assistance.

Sincerely,

Kerri Woehler
Planning Manager
Washington State Department of Transportation
Northwest Region/Mount Baker Area

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 48

Author Information

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Correspondence Information

Status: Reviewed	Park Correspondence Log: 515
Date Sent: 09/14/2010	Date Received: 09/14/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

My company operates a seaplane in the course of doing business. Our activities bring us to three types of lakes. The first are remote lakes that are only accessible by seaplane or helicopter.

The second type has more available access, aided, in some cases, by primitive roads, trails or boat launches. Due to their relative inaccessability, these bodies of water are visited infrequently by any kind of aircraft.

The third type is the urban lake or river, bodies of water such as Lake Union or the north and south ends of Lake Washington, that have relatively large volumes of seaplane traffic.

It has been our experience that Ross Lake falls into the second category. Seaplane operations are infrequent, and there is no doubt that boat traffic far exceeds airplane activity. Having spoken to campers and rangers, it would appear to me that the seaplane operations at Ross Lake raise no more concern than they do at Stehekin, where complaints are rare. Indeed, it has been our experience that seaplanes are often a welcome addition to the community of families and individuals who use the lake.

It must be remembered that the costs associated with seaplane operations limit the number of aircraft in the national fleet. This number is not rising. Therefore, it is extremely doubtful that any of the lakes in our parks or recreation areas will see any uptick in operations over the coming years. This includes Ross Lake.

As to the management plan's recommendations, it must be remembered that when seaplane activities do occur, safety must remain a priority. For this reason, the entire surface of the lake (except for designated swimming areas, of course) should remain accessible for pilots to plan safe approaches for landing and

safe departure corridors after takeoff.

I sincerely hope that the NPS does not limit seaplane use to the extreme ends of the lake. Like boats, seaplanes can access many shoreline campsites, and it is patently unfair to any type of user to deny access. If boats are allowed to access an area, seaplanes should be given access as well.

My family and I backpack overnight and also camp using our canoe, so I understand and appreciate what the NPS terms a place's "soundscape." I also appreciate that our airplane is noisy for several minutes during takeoff, but since we often fly in noise-sensitive areas, we, like most backcountry pilots, make it a practice to "fly friendly" by reducing propeller speed as soon as it is safe to do so.

In closing, I ask that the NPS does not fall into the trap of creating a hierarchy of users at Ross Lake. Whether hikers, boaters, horsemen or pilots, we all enjoy the backcountry and should be able to share the resources equally.

KENMORE AIR™ harbor inc.
6321 NE 175th Street, Kenmore, WA 98028
Kenmore Air, "The Seaplane Airline" • Kenmore Air Express • Kenmore Air Cargo • EDO Floats

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duplicate 926

* also entered in pepc #347 ✓ able

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September 8, 2010

Mr. Palmer "Chip" Jenkins, Superintendent
North Cascades National Park Complex
810 State Route 20
Sedro-Wooley, WA 98284-1239

Regarding: Ross Lake National Recreation Area Draft General Management Plan

Dear Superintendent Jenkins,

Kenmore Air has reviewed the Draft Management Plan and the measures outlined in Preferred Alternative B. We are keenly disappointed to see restrictions on seaplane access to Ross Lake and are hopeful that your office is open to a re-evaluation of the need for such limitations.

Kenmore Air's comments stem from our 64 years of experience in operating commercially to and from Ross Lake. Kenmore Air is based in Seattle and is the largest and most active commercial seaplane operator in the northwest. Our company caries more than 150,000 passengers and flies more than 2 million air miles annually with its more than 20 seaplane aircraft. Arguably, Kenmore Air would be responsible for the majority of commercial flights into and out of Ross Lake. Commercial flights however, are rare events. A review of our aircraft charter records for flights into and out of Ross Lake yield a total of 10 individual flights between 1998 and September of this year-a nearly 12 year period. In no single year did the total exceed two flights and in several years none were conducted at all.

While seaplane activity to and from Ross Lake is scarce this mode of transportation is never the less an important and often critical element of public access to the lake. Informal testimony from Kenmore pilots indicates that although the majority of flights to Ross Lake have a destination at the southern end of the lake, a number of flights have also gone to the campsite area suggested for seaplane limitation. Most, if not all, of these park guests arriving by seaplane would not have been able to enjoy their experience in the park with friends and family if it were not for the fast and convenient access provided by seaplanes. It strikes us as unnecessary, especially here in the northwest, to limit this longstanding and culturally accepted means of access when there is no record of complaints or history of excessive seaplane use within the Park.

Phone 425.485.4774 • Toll-Free 800.543.9595 • Fax 425.485.4774 • KenmoreAir.com

Our company and seaplane proponents, both private and commercial, have long accepted the rationale that where motorized vessels are prohibited on a body of water it often makes sense to also limit seaplanes. For most purposes both have internal combustion engines and fall into the same category. In the case of seaplanes, the aircraft generally produces somewhat higher single event noise levels than motorboats but these impacts last only seconds. The motorboat, however, often remains in the same area creating a continual disturbance over much longer periods. In this regard, we note with dismay that Alternative B places no limits on motorboat access, speed, horsepower, boat size or activity in the proposed restricted seaplane area. To limit seaplanes while allowing motorboats, without limitation, is unfair and discriminatory to seaplane access and is rarely justified when the impacts and merits of both forms of transportation are justly evaluated.

Our company recognizes that there is often value in identifying a special area within a park that offers a more tranquil and primitive experience. Traditionally, in parks across the nation and even in our own state, this need is often met by limiting certain areas to non-motorized craft. Our company and other seaplane advocacy groups would likely not comment if this were the case here but motorized boats **are** allowed in this alternative plan thus discriminating against seaplanes on the basis of perception-not facts or real historical impacts. Kenmore Air urges your office to re-evaluate this limitation with the result that seaplanes would have the same access as motorboats.

In summary, Kenmore Air is hopeful that the Park Service recognizes the longstanding history of unrestricted seaplane access to Ross Lake, the good record of these seaplane users and the unfair bias in limiting seaplanes where there is no restriction for boaters.

Thank you for this opportunity to comment and please do not hesitate to contact us should you have any questions regarding commercial historical use or technical questions regarding seaplane operations.

Sincerely,

Kenmore Air Harbor, Inc

Tim Brooks
Vice President, Flight Operations

LAW OFFICES OF

RONALD A. STEARNEY

111 WEST WACKER DRIVE
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September 17, 2010

Superintendent
North Cascades National Park Complex
810 State Route 20
Sedro-Woolley, Wa 98284

RE: Ross Lake Seaplane Closure

Dear Sir:

Having served as an elected representative in the Illinois House of Representatives, I learned there is no reason to amend statutes or regulations where no problem exists. Your agency proposes regulations that threaten access to Ross Lake.

But I'm told there are no existing problems. Few noise complaints have been made. And those few complainants most like would complain about a 5hp outboard motor as well. Moreover, as seaplane use in the park has not been excessive, so noise cannot be a legitimate complaint.

And it smacks of unfairness to eliminate access to preferred campsites for seaplanes-and most unfair to discriminate in favor of power boaters. Since I am a taxpayer as well as other users of the park, I, too, should be accorded equal treatment.. There is room enough in this world for all of us to enjoy the amenities of the park. Accordingly, I support leaving intact the current regulations on seaplane access to Ross Lake.

As an aside, I might point out that amongst the reasons for the current hostility towards the federal government and congress is the excessive regulation by government agencies over every aspect of our lives.

Respectfully,

Ronald A. Stearney

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SEP 20 2010
MRRD/NOCA

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 723

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Correspondence Information

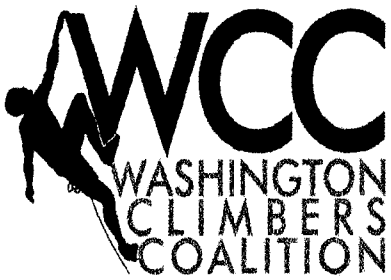
Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

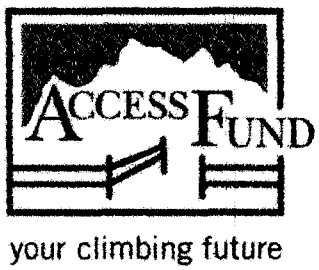
Notes:

Correspondence Text

Thank you for the opportunity to comment in favor of unrestricted seaplane access to Ross Lake.
I operate a public-use seaplane base on Priest Lake, Idaho. Based on 16 years of serving the seaplane community on an alpine lake that shares many of the features and issues of Ross Lake, I recommend that seaplane access to Ross Lake not be limited any more than it is by existing boating and FAA regulations.
Seaplanes and the seaplane community are important assets to remote public resources such as Ross Lake. Seaplane access should be encouraged for the following reasons:
1. Seaplanes provide access to many who would otherwise not experience the scenic beauty, wildlife and recreational opportunities of remote protected areas. Most seaplanes carry not just a pilot, but also friends and family. Seaplanes bring access to children, the elderly and others whose ability to explore remote areas is limited.
2. People who make the significant training and financial investments necessary to fly seaplanes most often do so because of their passion and respect for remote places. These are amongst the strongest and most influential ambassadors encouraging support and protection for places like Ross Lake.
3. Seaplanes provide a vital link in case of emergencies such as fires, earthquakes and floods that can close down usual modes of transport and communication. Most seaplane pilots are highly experienced, and many have had, or still have, careers in the military, in airlines and in law enforcement. The seaplane community consists mainly of dedicated, responsible and mature citizens who serve important roles in search and rescue, disaster planning and who also assist in land and wildlife management. These operators represent a significant asset in planning for and managing emergency situations, and should be welcomed and integrated into management teams and plans.
I understand that few seaplanes visit Ross Lake. Many more may have landed and taken off without being noticed, which is usual. It is worth noting that at Priest Lake, almost all other lake users are well-disposed towards seaplanes, even with respect to landing in wilderness areas of the Priest Lake basin. The

Tanglefoot seaplane base on Priest Lake is visited by many boaters and others who enjoy the classic seaplanes, and seaplanes enjoy the support of the local government and environmental organizations because of our long history of cooperation and shared environmental concerns.
The US Forest Service has recognized the value of public access to remote landing areas for these and other reasons, and I earnestly recommend that continued seaplane access to Ross lake be facilitated and encouraged.
Yours sincerely,
Loel Fenwick, MD





September 29, 2010

North Cascades National Park
c/o Chip Jenkins
810 State Route 20
Sedro-Wooley, WA 98284-1239
noca_superintendent@nps.gov

Re: Washington Climbers Coalition and Access Fund Comments Regarding Ross Lake National Recreation Area General Management Plan

The Washington Climbers Coalition and the Access Fund

The Washington Climbers Coalition (WCC) and the Access Fund welcome the opportunity to provide comments on the preliminary alternatives for the Ross Lake National Recreation Area (NRA) General Management Plan (GMP). Please consider these comments when planning for climbing at the Ross Lake NRA and feel free to contact us anytime for assistance and information regarding established best management practices for climbing used on public and private lands throughout the country.

The Washington Climbers Coalition (WCC, www.washingtonclimbers.org) is a non-profit corporation focused on issues affecting rock climbing, ice climbing, and mountaineering in Washington State. The WCC is affiliated with the Access Fund (www.accessfund.org), a national climbing organization. The WCC's mission is to engage climbers and land managers in discussion of issues related to climbing area management and access, to encourage active involvement in coordinated efforts to preserve our crags and to maintain good relations with other recreational users and land managers or owners.

The Access Fund is a national advocacy organization whose mission is to keep climbing areas open and to conserve the climbing environment. A 501(c)(3) non-profit supporting and representing over 2.3 million climbers nationwide in all forms of climbing—rock climbing, ice climbing, mountaineering, and bouldering—the Access Fund is the largest US climbing organization with over 10,000 members and affiliates. The Access Fund assists land management agencies around the country with climbing management issues. The Access Fund has an MOU with the National Park Service

(www.accessfund.org/mous) and Washington is one of the Access Fund's largest member states.

Climbing in the Ross Lake NRA

Since the early 20th Century, climbers have sought out the alpine challenges of the North Cascades, including those in what is now the Ross Lake NRA. More recently, climbers have discovered the excellent sport climbing the area offers. Many members of the WCC and Access Fund climb and live in Washington and have a direct interest in recreational access at the Ross Lake NRA. The Access Fund and WCC have a long history of cooperative assistance with the National Park Service (NPS) in the Ross Lake NRA. Prior to 2002, climbers began establishing rock climbing and bouldering routes in the Skagit Gorge. Due to concerns regarding bouldering in potentially sensitive areas and to give the NPS the opportunity to develop and implement a climbing management plan for the NRA, climbers agreed to a voluntary moratorium on establishing new climbing and bouldering routes in 2002. Climbers agreed to this voluntary moratorium with the understanding that a climbing management plan would be implemented within 2 years.

Since 2002, WCC and the Access Fund helped ensure climbers respected the moratorium, all the while working cooperatively with the NPS to negotiate an agreement that would allow new climbing in new areas while respecting the unique cultural and natural resources of the NRA. In 2008, we finalized the Newhalem Climbing Agreement (attached hereto) with the NPS to establish four areas in which new climbing routes could be established during the pendency of the current GMP. In addition, we hosted an Adopt-a-Crag event in conjunction with the NPS, Washington Trails Association, the Vertical World Junior Climbing Team, and The Wilderness Society to build a new trail to an established climbing area that enhances access and minimizes impact. We continue to communicate with the climbing community, other organizations and NPS personnel to explore cooperative ways in which the Access Fund and WCC can support our mission of climbing access and conservation at the Ross Lake NRA.

When considering the scope of the GMP, the NPS should consider how it could build further on the successful relationship that the agency has with the climbing community, in particular the WCC and the Access Fund, to ensure future access and conservation in the Ross Lake NRA. When considering the scope of the GMP, the NPS should also consider specific climbing provisions or even a stand-alone climbing management plan. The Access Fund is the leader in compiling climbing management plan information and documenting "climbing management practices that work." See our recent publication "Climbing Management: A Guide to Climbing Issues and the Development of a Climbing Management Plan." The second edition of this 72-page booklet is available for free on our website at http://www.accessfund.org/pdf/CM-web.pdf. In addition, the Access Fund regularly hosts and organizes Climbing Management Summits that attract dozens of federal and state land managers from across the country, including one in October that a North Cascades National Park ranger will attend.

In designing the GMP, we encourage the NPS to strive to manage for the fact that the climbing in Ross Lake NRA provides the public with unique recreation opportunities, which should be preserved. For this reason the WCC and the Access Fund generally support

preliminary Alternative B because it appears to allow for future exploration and establishment of new routes and climbing areas beyond the four currently established areas.

From our review of the Ross Lake GMP Newsletter #3, Volume I, Chapter 4 of the Draft GMP/EIS and conversations with NPS personnel, we understand that Alternative B would automatically establish the existing four areas as "Climbing Management Areas" and would allow continued use and exploration of those areas as contemplated in the 2008 Newhalem Climbing Agreement. In addition, Alternative B allows for the possibility that future areas could be opened to sport climbing throughout the Ross Lake NRA. [1] The WCC, the Access Fund and all the climbers they represent are very excited about the potential to enjoy new sport climbing crags throughout this spectacular area.

We ask, however, that the NPS provide clarification with respect to the geographic scope and operational details of Alternative B. With respect to geographic scope, although the GMP addresses the Ross Lake NRA as a whole, Volume I, Chapter 4 of the Draft GMP/EIS specifically refers only to the Skagit Gorge in discussing sport climbing. It is our understanding and hope that this alternative includes the potential for establishing Climbing Management Areas in other zones throughout the NRA. As it appears from the NPS maps that some of the existing climbing areas are in zones other than that designated the "Skagit River Zone," it appears that the GMP contemplates that "Climbing Management Areas" will not be restricted to the Skagit River Zone. Clarification on this point would help us explain to climbers in the future just which areas could potentially be explored for new climbing opportunities and would avoid misunderstandings about where new sport climbing areas will and will not be allowed.

With respect to the operational details, we seek clarification on the process for establishing new Climbing Management Areas. To whom would we address requests for review of potential new Climbing Management Areas? When could such reviews take place? How long would the approval process take? We are very aware of the budgetary limitations of the NPS and the many other duties of its personnel that could make it difficult to prioritize reviewing new proposals for climbing areas. We would like to establish a review process that would minimize the impact on NPS resources and facilitate speedy approval of suitable new areas. We would be happy to provide resources and expertise as needed to do just that.

It is the WCC's and Access Fund's experience that virtually all potential threats or actual impacts to natural and cultural resources associated with climbing can be eliminated or reduced to acceptable levels through a combination of education, cooperation with the climbing community, and site-specific prescriptions, including rerouting of trails or crag access advisories. The Access Fund's grant program regularly provides funding for management initiatives that raise awareness about climber responsibilities and agency management obligations. Examples of conservation grants that the Access Fund regularly awards to maintain climbing access and preserve the climbing environment include:

- Boise Climbers Alliance, Black Cliffs, ID – cliff nesting raptor signage & brochure.
- Colorado Division of Wildlife, Boulder Canyon, CO – cliff nesting raptor signage.
- Joshua Tree National Park, CA – vegetation surveys, and GPS location of climbing areas

[1] Sport climbing is generally defined as rock climbing on cliff faces where fixed anchors, such as bolts, have been preplaced to enable climbers to more safely ascend rock faces that are not protectable with removable anchors.

management obligations. Examples of conservation grants that the Access Fund regularly awards to maintain climbing access and preserve the climbing environment include:

- Boise Climbers Alliance, Black Cliffs, ID – cliff nesting raptor signage & brochure.
- Colorado Division of Wildlife, Boulder Canyon, CO – cliff nesting raptor signage.
- Joshua Tree National Park, CA – vegetation surveys, and GPS location of climbing areas in relation to Threatened & Endangered species sites.
- North Carolina Wildlife Resources Commission, NC – peregrine falcon monitoring and outreach.

The Access Fund and the climbing community have an exemplary record with regard to supporting natural resource protection. In general, climbers are strong supporters of open space and conservation, have a vested interest in protecting the environment, and understand the balance between conservation and access. When formalizing the GMP alternatives at Ross Lake NRA, the WCC and the Access Fund urge the NPS to reaffirm the positive role that climbing has traditionally had at the NRA, to ensure that current climbing access and the climbing opportunities are maintained intact and that future opportunities for new Climbing Management Areas are prioritized.

If you have any questions or concerns please feel free to contact either representative below.

Sincerely,

Jonah Harrison
Regional Coordinator of the Access Fund
719 Second Avenue, Suite 700
Seattle, Washington 98104
(206) 792-5231

Matt Perkins
Secretary, Washington Climbers Coalition
P.O. Box 77315
Seattle, WA 98177
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www.aopa.org

SEP 13 REC'D #28

August 26, 2010

page #13 ✓ark

Superintendent, attn: Ross Lake NRA Draft GMP/EIS
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 90284

Re: *Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement*

Dear Superintendent Jenkins:

The Aircraft Owners and Pilots Association (AOPA) represents the general aviation interests of 410,000 members, more than two-thirds of the nation's pilots – including 12,061 of our members in the state of Washington. On behalf of our membership, AOPA is committed to ensuring the future viability of and general aviation access to our public lands and waters. To that end we submit the following comments on the *Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement* (GMP/EIS).

AOPA is opposed to the preferred alternative, Alternative B, because it severely limits seaplane access to the Lake by restricting seaplane activity to the extreme northern and southern reaches of Ross Lake. Anecdotal evidence provided to us by pilots who use the lake as well as NPS staff is that seaplane usage occurs on the average of 12 to 24 operations per year and that there is no history of complaints about seaplanes. Seaplane use of the recreational area has never been excessive and there is no data indicating a significant increase in use is likely over the life of the new management plan.

One of the consequences of limiting seaplanes to the north and south ends of the lake is the denial of access to seaplane friendly campsites. The best suited campsites are those with a north facing dock that protects the aircraft from the southerly swells on the lake. By not allowing seaplanes access to the central portion of the lake the number of campsites with north facing docks is dramatically reduced.

Seaplane pilots and visitors to the national parks recognize the need for all users to enjoy their experiences. Normal operating procedures for seaplane pilots include flying friendly to avoid creating disturbances by reducing power settings after takeoff, minimizing over flights and keeping a sharp lookout for other vessels and people on the water. These flying friendly procedures are also known as noise abatement procedures and are a voluntary way of ensuring that other visitors to the NRA are not excessively bothered by the sounds of normal seaplane operations. Seaplane pilots as well as land plane pilots overflying Ross Lake are asked to remain at least 2,000 above ground level while overflying charted National Park Service areas in accordance with FAA Advisory Circular 91-36, *Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas*. Incorporating these procedures in to the seaplane access policy would be acceptable and AOPA is willing to assist the NPS in working with other stakeholders to help craft sensible procedures.

Normal seaplane operations while in the approach, landing and taxiing phases are made at very low power settings and do not generate a significant amount of sound. In fact, the phase of flight that generates the most amount of sound is during takeoff and studies show that the sound levels exceed the federally accepted residential noise threshold of 65 dBA day-night average sound level (Ldn) for less than 60 seconds. By that measure, Alternative B would restrict seaplane access to the lake because of less than half an hour of noise over the course of an entire year.

Even as NPS contemplates limiting seaplane access, we note that motorboats are currently allowed in both the front country and back country management zones according to Table 4-1 of the draft GMP/EIS. We suggest that since seaplanes operate on or near the water in a specific manner and for much shorter periods of time than motorboats, seaplanes should enjoy the same access as motorboats do under the preferred alternative. AOPA respectfully requests that change to the preferred alternative so that current seaplane access is maintained.

In summary, AOPA supports continuing the current access seaplanes have to Ross Lake and respectfully requests that the limitations on seaplane access contained in the preferred alternative be removed as they are the equivalent of swatting at a mosquito with a sledge hammer.

Thank you for the opportunity to provide comments on the draft general management plan and environmental impact statement. If we can be of further assistance please contact us at 301-695-2200.

Sincerely,

Gregory Pecoraro
Vice President
Airports and State Advocacy

American Rivers * American Whitewater * Washington Wilderness Coalition

September 30, 2010
Palmer (Chip) Jenkins, Superintendent
North Cascades National Park Service Complex
810 State Route 20
Sedro Woolley, WA 98284---1239
RE: Ross Lake National Recreation Area General Management Plan

Dear Superintendent Jenkins:

On behalf of American Rivers, American Whitewater, and Washington Wilderness Coalition we are writing to provide our input on the Skagit Wild and Scenic River Eligibility and Suitability Studies as part of the Ross Lake National Recreation Area General Management Plan (GMP). We wish to express our appreciation for all the work you and your staff have invested in this planning effort to date and thank you for following through on your commitment to conduct a suitability evaluation of the Skagit River and the two tributaries Goodell Creek and Newhalem Creek.

We strongly support the conclusions reached in the suitability analysis recommending the Skagit River from the Gorge powerhouse to the National Recreation Area (NRA) boundary and its two major tributaries Goodell Creek and Newhalem Creek for inclusion in the national Wild and Scenic Rivers system. The analysis included a complete review of outstandingly remarkable values and we concur with the conclusions reached that are summarized in Table 1. These river segments are exceptional regional and nationally significant resources that deserve permanent protection that will protect their free-flowing character, outstanding resource and recreational values, and water quality.

While we understand that available resources did not permit an evaluation of all Skagit River tributaries within the North Cascades National Park Service Complex we appreciate the fact that previous findings for these river segments are incorporated into the GMP. Notably, these findings are summarized in graphic form as figure 2, a map illustrating all the river segments within the North Cascades National Park Service Complex. We thank you for considering our request for specific direction in the GMP to conduct an updated eligibility analysis and suitability analysis for these other rivers in the future. The specific direction to work with the U.S. Forest Service to update the Wild and Scenic Rivers analysis for these tributaries over the life of the GMP is an approach we support.

The Skagit River is clearly a superlative natural feature of the North Cascades National Park, which is unique for the diversity of opportunities for enjoying and exploring wild free-flowing rivers in the conterminous United States. We thank you and your staff for the completeness of your review and offer our strongest support for the conclusions you reached to recommend designation of the Skagit River and its two tributaries Goodell Creek and Newhalem Creek under the Wild and Scenic Rivers Act.

Sincerely,
Brett Swift
Northwest Regional Director
American Rivers

Thomas O'Keefe, PhD
Pacific Northwest Stewardship Director
American Whitewater

Nalani M. Askov
Executive Director
Washington Wilderness Coalition

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 691

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 08/24/2010	Date Received: 08/24/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

There should be no changes made to seaplane access in the Ross Lake National Recreation Area. Seaplane access in completely within the definition of what National Recreation Areas are intended to be.

According to the FEDERAL EXECUTIVE BRANCH POLICY GOVERNING THE SELECTION, ESTABLISHMENT, AND ADMINISTRATION OF NATIONAL RECREATION AREAS BY THE RECREATION ADVISORY COUNCIL, the criteria for becoming a National Recreation Area include the following requirements:

1. National Recreation Areas should be spacious areas?

2. National Recreation Areas should be located and designed to achieve a comparatively high recreation carrying capacity, in relation to type of recreation primarily to be served?

3. National Recreation Areas should provide recreation opportunities significant enough to assure interstate patronage within the region of service, and to a limited extent should attract patronage from outside of the normal service region.

4. The scale of investment, development, and operational responsibility should be sufficiently high to require either direct Federal involvement, or substantial Federal participation to assure optimum public benefit.

5. Although nonurban in character, National Recreation Areas should nevertheless be strategically located

within easy driving distance, i.e., not more than 250 miles from urban population centers which are to be served. Such areas should be readily accessible at all times, for all-purpose recreational use.

6. Within National Recreation Areas, outdoor recreation shall be recognized as the dominant or primary resource management purpose. If additional natural resource utilization is carried on, such additional use shall be compatible with fulfilling the recreation mission, and none will be carried on that is significantly detrimental to it.

To restrict seaplane access is clearly opposite of the stated intent of National Recreation Areas in general, and specifically as defined in NRA Criteria #5 above which states that any NRA "should be readily accessible at all times, for all-purpose recreational use."

Seaplanes provide visitors a perspective which engenders a deep respect for the natural appearance of area. They require little infrastructure and are an integral and well accepted part of the region's transportation tradition and history.

To suggest that seaplanes are some how less desirable than motor boats, jet-skis, ski boats and the like is preposterous. Seaplane operations are limited in duration, and only the hulls of the floats make contact with the lake. All other motorized vehicles on the lake are in constant contact with the water, and require physical intake and outflow of lake water to remain operational. They are frequently refueled lakeside, or on the lake. It is not at all unusual to see telltale evidence of fuel and oil spills found adjacent to them. This is not the case with seaplanes.

As well, seaplane operations are, by their very nature, limited in duration. Motorized watercraft, on the other hand are operating their motors when ever they are in motion.

Then there is the question of alcohol and alcohol related accidents and incidents. Pilots are required by law not to consume any alcohol within eight hours of operating their aircraft. Boaters are not so constrained. Unfortunately and by contrast, Washington State holds the unenviable state ranking of #12 in the category of "Number of Alcohol Related Injuries in Recreational Boating Accidents" and is #15 in the per capita rankings.

Seaplanes should be allowed full and unfettered access to any and all areas of the Ross Lake National Recreation Area, consistent with access provided to motorized watercraft. Ross Lake is not a Wilderness Area ? it is a National Recreation Area. It should continue to be treated as such in accordance to the original intentions of its designation.

PEPC Project ID: 16940, DocumentID: 34698 Correspondence: 727

Author Information

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Correspondence Information

Status: New	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

Dear Sirs:

Seaplanes provide an important, unique mode of travel throughout North America, especially in the western states and in Canada. They are particularly useful in providing direct transportation to remote areas, while reducing the carbon footprint inherent in highway vehicles ? which as surface transportation they produce due to longer travel distances and the need for massive oil, tar, and steel based road and bridge infrastructure. Seaplanes simply use existing water bodies for their infrastructure, and carry all of their required equipment and facilities within their vehicle, similar to that of canoes and kayaks.

It is for this reason that we proudly point out that: "Only seaplanes and canoes can visit the wilderness and leave no trace."

Columbia Seaplane Pilots Association is a non-profit organization dedicated to the protecting of seaplane access rights. We have approximately 350 members in Oregon, Washington, Idaho, and Montana. We focus our interest on land within the Columbia River watershed, but comment on other watersheds since we fly between states and internationally.

We must insist that seaplane use of all of Ross Lake be retained as a matter of basic infrastructure need for seaplanes when traveling on interstate and international flights. Our pilots' seaplanes follow the pathways of rivers and lakes, as that creates safety of operations and allows for stopping while traveling as needed due to nightfall, weather, or just overnight recreational camping. Under the Commerce Clause in the U.S. Constitution, Section 9, we believe seaplanes that are traveling from Oregon and through Washington are protected with a right of access to Ross Lake for those travel purposes.

We will be the first to state that we recognize seaplane pilots must be responsible in using this access. Therefore we believe strongly in noise abatement rules, noise abatement procedures, and noise abatement training to minimize noise impacts to other users. I'm sure others have commented to you on this subject. We would be pleased to participate in the development of such procedures for Ross Lake, and will work actively and strongly to get future noise abatement rules and procedures to our members.

When seaplanes are used as "vehicles of arrival" on Ross Lake, the seaplane landing or takeoff occurs as an event of one to two minutes. After arrival and taxiing (which is at idle power or with paddles) to shore, the tents and other camping gear are unloaded, and the pilot and passengers are there specifically to enjoy the near wilderness setting. The seaplane makes no further noise. We understand that there is currently a low volume of usage by seaplanes, and firmly believe that the total impacts of the seaplanes at Ross Lake is miniscule when compared to other vehicles that are more common.

In conclusion, we must with all due respect, request that the final plan continue to allow our seaplanes access to the entirety of Ross Lake.

Thank you for the opportunity to provide comment for your plan.

Respectfully,

Columbia Seaplane Pilots Association

Aron Faegre, President

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 686

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Status: Reviewed	Park Correspondence Log:
Date Sent: 08/31/2010	Date Received: 08/31/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

I would like to comment in opposition to restrictions on seaplane activities on Ross Lake. It is hard to see any justification for this, especially given the extremely low level of seaplane activity on Ross Lake, both present and forecast. Where is the harm in allowing seaplanes to access the lake on an average of once or twice a month in total? I have been to other NRA areas (Lake Powell and Lake Mead) with my seaplane, and there is no problem in these areas with seaplane operations, even though the frequency of seaplane operations there is many times that of Ross Lake, as is the number of persons, boats etc. using the lakes involved.

Please, don't shut seaplanes out of Ross Lake for no good reason.

Marc Rodstein
Executive Director
Lake Amphibian Flyers Club

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 138

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Correspondence Information

Status: Reviewed	Park Correspondence Log: 692
Date Sent: 09/19/2010	Date Received: 09/19/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

The Skagit River from below Gorge Dam to Bacon Creek is very important to whitewater paddlers as a recreational resource. It provides an excellent training site for introducing paddlers to racing and for training camps for members of the US whitewater team. The scenery, the good flows that provide a challenge but are still safe for boats, the easy access and the supporting outdoor facilities (campgrounds) has made this site one of the best locations in the United State for national level races. We strongly support the Park Service recommendations to protect the Skagit River in the Ross Lake Natural Recreational Area and it's two major tributaries, Goodell Creek and Newhalem Creek, with Wild and Scenic designation.

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 762

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Correspondence Information

Status: Reviewed	Park Correspondence Log: 1028
Date Sent: 09/13/2010	Date Received: 09/13/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

Correspondence Text

To whom it may concern,

As president of the Montana Seaplane Pilots Association I am writing to comment on the proposed management plan for the Ross Lake recreational area.

My first comment is the question WHY is this management plan necessary and why would seaplanes be excluded or restricted in any way? I'm sure it is important to reasses management plans from time to time, however there is no legitimate reason to restrict seaplane access in any form. These planes have been flown into Ross Lake for decades with no history of any complaints. As I'm sure you have been informed, seaplane operations and pilots are already subject to strict Federal Aviation Regulations and should not face any more from a government agency that is supposed to act in the best interest of ALL citizens.

Furthermore, on the subject of pollution ,seaplanes in no way come close to the amount of noise, smell and oil/gas leakage left by motor boats and jet skis. Airplanes leave a very short and comparatively low noise footprint in the take off area. Seaplanes serve an important role in the commerce of the United States by delivering goods and people to remote areas of the country. It serves no purpose to restrict seaplane operations that have benefited those who recreate with them and those that provide legitimate services with them.

I urge you to not impose seaplane restrictions on Ross Lake and consider the fairness to all American tax payers who use this beautiful area.

Received 11/20/10 #4

Ross Lake National Recreation Area
General Management Plan
Newsletter #3: Draft GMP/EIS Executive Summary
July 2010

COMMENT FORM

PEPC #825 ✓ ahlc

Please Provide Your Comments by September 30, 2010

The NPS invites you to share your comments and concerns regarding the *Ross Lake NRA Draft General Management Plan* and environmental impact statement (GMP/EIS). By providing your comments, you can help make the final plan a better plan to guide the future of Ross Lake NRA.

The draft GMP/EIS contains four distinct alternatives for the future management of Ross Lake NRA. The draft GMP/EIS identifies Alternative B as preferred by the NPS. Please tell us if you agree with the preferred alternative, prefer another alternative, or elements of any of the alternatives. You may also provide comments on all sections and elements of the draft GMP/EIS.

We hope that you take the time to read and comment on the draft GMP/EIS. Your input is important to us.

1. Excellent presentation
2. Support Alt. B
3. Continue operation & maintenance of Desolation Lookout
4. Keep boundaries as is

You may use the space at the back of this form or a separate sheet of paper to share other thoughts or ideas. ⇨

- ☐ I would like to be placed on the e-mail list for the general management planning effort.
- ☒ I would like to be placed on the mailing list for the general management planning effort.
- ☐ I would like to be taken off the mailing list.
- ☐ The address you have is incorrect. Please change it to the following:

Name: Keith Argow, Nat'l Historic Lookout Reg'is.
Email (required for email list only):
Address: 374 Maple Ave E, Ste 310
City, State, Zip: Vienna VA 2218

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

PEPC # 911

National Parks Conservation Association®
Protecting Our National Parks for Future Generations®

September 29, 2010

SEP 30 RECD

Chip Jenkins
National Park Service
Pacific West Region – Planning Division
909 First Ave., Suite 500
Seattle, WA 98104-9882

Re: Ross Lake National Recreation Area Draft GMP/EIS Comments

Dear Superintendent Jenkins:

On behalf of the National Parks Conservation Association (NPCA) and our more than 340,000 members nationwide, I respectfully submit the following comments on the Ross Lake National Recreation Area Draft GMP/EIS.

NPCA supports the focus of the GMP to meet the intent of the Organic Act by providing enhanced visitor opportunities while ensuring the long-term stewardship of the North Cascades ecosystem and wilderness. As such, we support Alternative B, the preferred alternative and environmentally preferred alternative, but with some modifications.

Boundary Adjustment

The most significant modification is our request to include a boundary adjustment that will bring North Cascades National Park closer to park visitors. Highway 20 is the major route through the heart of the North Cascades Complex but, as we know, it is all within the Ross Lake NRA and the park can only be seen through the windshield. We strongly urge the Park Service to adjust the boundary of Ross Lake to include much of the Highway 20 corridor, including the areas identified as Frontcountry Zone, Backcountry Zone, Wilderness Zone, and Skagit River Zone in the national park. The Hydroelectric Zone would remain part of the Ross Lake NRA.

Visitors come to the greater North Cascades Ecoregion because of its wildlife and natural wonders and for the area's recreational opportunities, including its visitor center, trails and campgrounds. Sustaining and protecting these important recreation and natural values while also working to increase that visitation is critical to a sustainable and healthy local economy and environment. We feel that redrawing the boundaries of the Ross Lake NRA to provide the opportunity for highway visitors to actually be within the North Cascades National Park proper will likely increase visitation and it is a low cost way of improving the visitors' experience. Also, this will provide for better protection of natural and cultural wonders.

Northwest Regional Office
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We request that this boundary adjustment be included in the Final GMP/EIS. A map of NPCA's request is attached to these comments.

NPCA has additional comments and suggestions for modifying the preferred alternative on these following issues:

Grizzly Bear "Core Habitat Area" Management

NPCA supports the return of healthy grizzly bear populations in the North Cascades either through natural migration or augmentation of the current bear population within the park complex. While augmentation is not addressed in the GMP, NPCA does support the National Park Services' (NPS) decision to provide a minimum Core Habitat Area of 70% for grizzly bears within each Ross Lake Bear Management Unit (BMU). According to bear management practices in Montana and Wyoming, a Core Habitat rating of 70% is required to assure viable bear populations. This core habitat rating would also allow for additional facility development such as new trails, trailheads, or backcountry campgrounds. In considering new facilities, NPCA encourages NPS to engage all stakeholders in developing these opportunities so that bear habitat and opportunities for increased bear populations are maximized while still providing for increased access for park users.

Management Zones

NPCA supports the draft plan's creation of 5 management zones to prescribe the intended purpose and guide the implementing management of each area of the NRA. As described above, while removed from consideration in the alternatives, NPCA supports transfer of the Highway 20 corridor to the national park proper, except for those areas required by Seattle City Light and the Federal Energy Regulatory Commission (FERC) for electricity transmission. Specifically, NPCA supports the transfer of management zones identified as the Frontcountry Zone, Backcountry Zone, Wilderness Zone, and Skagit River Zone to the national park. The Hydroelectric Zone would remain part of the Ross Lake NRA. Please see the attached map illustrating this recommendation.

North Cascades Highway Corridor

NPCA strongly supports the effort in Alternative B to "create a distinct sense of arrival to help visitors understand they have entered a unit of the National Park Service" when travelling through the NRA on Highway 20. This sense of arriving at a national park is the very reason for our boundary adjustment recommendation. Redesigned, constructed, and better maintained entrances that contain interpretive displays that are modeled more closely after traditional park entrances found at Mount Rainier National Park or Olympic National Park (although entrance fee stations are not appropriate on a state highway) would let visitors know they are in the North Cascades Complex. Furthermore, increased usage of the Park Service arrowhead on signs and

facilities would remind visitors they are within a unit of the National Park System. Working with Federal and State transportation departments to increase the number of park signs along Interstate 5 and State Highways 20, 153, and 530 would also increase the visibility of the Complex in the region and attract visitors. Additional services along the Highway Corridor, such as enhanced vehicle pullouts, are also supported by NPCA.

Newhalem

One of the most important changes in the NRA that NPCA supports is replacement of the single lane access bridge across the Skagit River to the North Cascades Visitor Center to accommodate tour busses and recreational vehicles. The Visitor Center is not easily accessible in the first place, requiring a short drive from Highway 20, and is not easily accessible for tour busses, whose visitation to the visitor center has declined over the years. The problem of accessibility is only compounded by the single lane bridge and stoplights at each end of the bridge which allow only one direction of traffic at a time. Along with enhanced signage, replacing this bridge with two lane access and removal of the stoplights would greatly increase the ease and likelihood of visitor utilization of the visitor center. While we understand that there are sensitive Native American resources near the bridge, we encourage the NPS to develop a sensible plan that both preserves important cultural resources and improves access to the visitor center.

Another needed improvement is making directions to the visitor center clearer once visitors cross the bridge. Many visitors are confused by the presence of the camp tender building that appears immediately after crossing the bridge and mistakenly believe it is the visitor center. Accordingly, visitors believe that the visitor center is closed or altogether give up on finding the visitor center. As such, any improvements to the bridge should also include improved signage that clearly leads to the visitor center.

In many national parks, the first stop of most visitors is the visitor center. Making the visitor center more accessible will lead to a dramatic increase in the number of visitors to the visitor center, as well an increased public understanding of the Complex's outstanding natural and cultural resources that make it so special.

Diablo Townsite

NPCA supports the land exchange and/or acquisition proposed by the NPS with Seattle City Light at the Diablo Townsite, in which the NPS would obtain the Hollywood area. The Hollywood area provides access to the Stetattle Creek and Sourdough Mountain trailheads. Management by the NPS would ensure appropriate access to these popular trails. This exchange would allow each agency to manage the area it is best suited to administer.

Hozomeen

NPCA supports rehabilitation and reorganization of the Hozomeen campground to allow for a more organized and traditional campground experience. Furthermore, NPCA also supports the construction of a new ranger station/orientation center that would be jointly used in partnership with British Columbia parks. Working cooperatively with Canadian agencies in all areas of park protection is an important aspect of the GMP.

Marblemount Ranger Station

NPCA supports the option presented in Alternative D of moving the Marblemount Wilderness Information Center to a location in the town of Marblemount on the North Cascades Highway. While improved signage has made the Wilderness Information Center easier to find, it is still difficult to access and not easily visible. Just as enhanced entrances to the park would help visitors realize they are in a unit of the park system, a more visible Wilderness Information Center would allow visitor to obtain information before even entering the park.

NPCA also supports Alternative D's inclusion of construction of permanent group housing to provide approximately 20-30 additional bed spaces, particularly for seasonal rangers. Currently, finding housing for employees can be difficult during the summer season.

Air Quality

NPCA supports pursuit of redesignation of the Class II Airshed within Ross Lake NRA to a Class I Airshed. While redesignation is very difficult to obtain, it would provide more stringent protection from some pollution sources.

Wildlife

NPCA strongly supports continuing the effort to restore endangered species to the Complex, including grizzly bears and gray wolves. Working to minimize the possibility of negative wildlife-human interactions through improved food storage methods will help the restoration of these and other important species to the entire Complex.

Boating

NPCA supports the encouragement of self-propelled and non-mechanized recreation in the NRA as well as the prohibition of water skiing. NPCA believes that the exclusive use of four-stroke engines should be required sooner than 2015 since these engines are easily accessible on today's market and significantly reduce water pollution from the inefficient two-stroke. NPCA supports the use of four stroke engines but is concerned that use of direct-injection two stroke engines could allow significant pollution of Ross Lake to continue. The elimination of more polluting motors would help in the effort to redesignate the NRA Airshed from Class II to Class I.

Sport Climbing

NPCA supports the establishment of "Climbing Management Areas" as long as there is significant input from and dialogue with stakeholders and the general public when designating these areas. Sport climbing is a popular sport and excessive limitations on climbing opportunities within the NRA may result in the loss of strong park supporters.

Seaplanes

NPCA supports Alternative B due to the noise and pollution caused by these planes that is not compatible with the backcountry character of the NRA. If the park intends to emphasize the use of self-propelled and non-motorized recreation of the lake, the presence of seaplanes in all areas of the lake will not aid this effort.

However, if this approach is unfeasible, NPCA would support maintaining seaplane use at current levels and instituting a permit system to limit the number of landings. NPCA would also support landing sites limited to areas near floatplane accessible campsites.

Backcountry Permit System

NPCA strongly supports changing the current permit system. Instituting a system which makes obtaining a permit easier will help those people who wish to experience areas of the park not accessible through Marblemount, such as parkland accessible from the Baker Lake Road. Also, providing the option of advance trip planning will likely result in more backcountry use as non-local visitors can be expected to use the service. Furthermore, advance reservation of permits for seaplane access should be required if seaplane use is limited as recommended above.

Management of the North Cascades Highway

NPCA supports the NPS recommending nomination and designation of the North Cascades Highway as a National Scenic Byway. The sightseeing opportunities of this highway are superb and should be protected by National Scenic Byway designation.

Climate Change

NPCA supports efforts by the NPS at the NRA to address climate change and reduction of the NRA's carbon footprint through emission reductions, use of green energy, use of hybrid transmissions, photovoltaic systems, and biodegradable fuels and oils.

International Park Designation

Finally, NPCA supports the idea of an International Park designation between the North Cascades National Park Complex and one or more of the British Columbia provincial parks. This would solidify cooperation and transboundary management of the North Cascades ecosystem. Also, this could lead to greater recognition of this area and its natural and cultural resources, similar to the success of the Crown of the Continent project in Montana. NPCA is looking into the possibility of this designation.

Thank you for considering these comments and we look forward to receiving the Final GMP/EIS.

Sincerely,

Sean Smith
Northwest Policy Director
National Parks Conservation Association
Protecting Our National Parks for Future Generations
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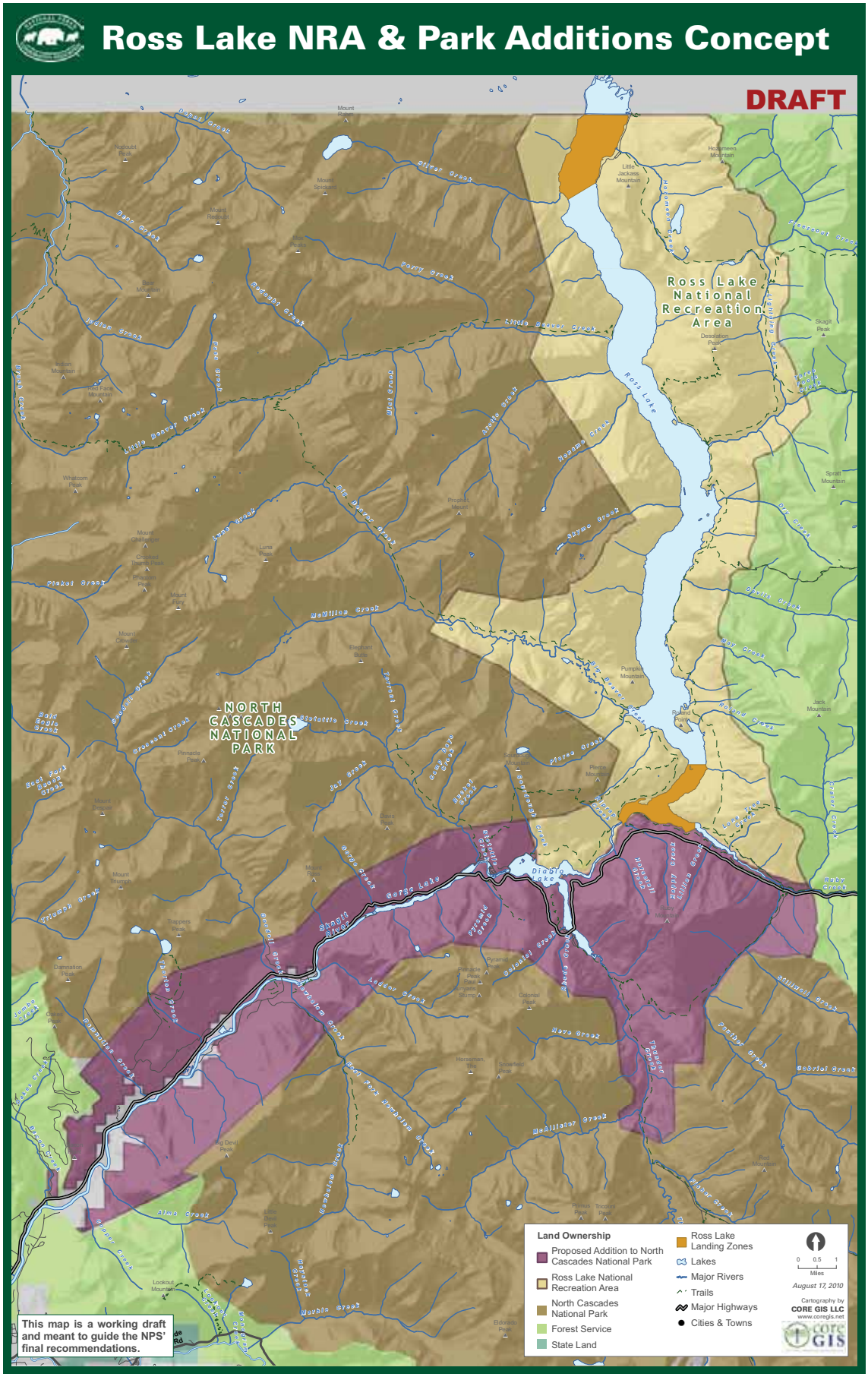
encl: Proposed boundary adjustment map


Ross Lake NRA & Park Additions Concept
DRAFT
Ross Lake National Recreation Area
NORTH CASCADES NATIONAL PARK
Ross Lake
Diablo Lake
Land Ownership
Proposed Addition to North Cascades National Park
Ross Lake National Recreation Area
North Cascades National Park
Forest Service
State Land
Ross Lake Landing Zones
Lakes
Major Rivers
Trails
Major Highways
Cities & Towns
0 0.5 1 Miles
August 17, 2010
Cartography by
CORE GIS LLC
www.coregis.net
This map is a working draft and meant to guide the NPS' final recommendations.

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 577

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

Correspondence Text

Chip Jenkins, Superintendent
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 98284-1239 September 30, 2010

Thank you for this opportunity to comment on the General Management plan review for the Ross Lake National Recreation Area. It is clear that much thought and hard work has gone into preparation of the RLNRA GMP/EIS document. We support many of the initiatives that are proposed in the management plan review, but have reservations about others. Specifically, we support Alternative B, with some modifications and additions from Alternative D. Following are specific comments on each of the alternatives. In addition, NCCC raises the issue of RLNRA boundary changes to better protect the North Cascades NPS Complex and to achieve management on an ecosystem basis. At a minimum, the Final RLNRA GMP EIS should acknowledge the lack of ecosystem-based boundaries and assess the continuing impacts on Park resources and management.

General Comments Regarding All Alternatives

The North Cascades Conservation Council (N3C) supports conversion of portions of the Thunder Creek watershed to wilderness. The wild and pristine nature of this area certainly justifies it designation as wilderness.

N3C also supports full protection of grizzly bear recovery core areas in the RLNRA. We believe that new roads should not be constructed in the RLNRA and that existing and future trails should be located (or relocated) to avoid core grizzly bear habitat. One proposal that should be carefully assessed in this respect is the proposed feasibility study for a connection trail between Centennia/Skyline II Trail Junction with the East Bank Trail at Hozomeen.

N3C also strongly supports inclusion of the Skagit River (Gorge Powerhouse to the RLNRA boundary), Goodell Creek, and Newhalem Creek in the US Wild and Scenic River System. Designation of the Skagit River for its "recreation" values and Goodell and Newhalem Creeks for their "wild" values seems appropriate.

We were substantially disappointed to find that Thunder, Fisher, Ruby, and Big Beaver Creeks were not included in the Wild and Scenic River System under this management plan review. These streams certainly have the wild and scenic characteristics that should qualify them for designation and Wild and Scenic Rivers.

Comments on Alternative A

N3C believes that the No-Action alternative is not appropriate for the RLNRA Management Plan review. Increased knowledge and changes on the ground have created new opportunities as well as responsibilities for modified management of the RLNRA.

We were especially concerned about provisions that allow continued hunting in the "natural zone" within the RLNRA. Hunting is not compatible with the management goal for the "natural zone" which states that the area should "remain unaltered by human activity." Clearly, hunting will substantially alter wildlife populations in the "natural zone."

Comments on Alternative B

N3C supports the selection of Alternative B, with a few modifications as discussed below.

We believe that the existing reservation system for recreation in the North Cascades National Park Complex is cumbersome and discourages park use. We support creation of an on-line reservation system for all areas of the RLNRA (and the North Cascades National Park). However, to discourage spurious reservations, it would be good if the system required a confirmation within two days before use and that a portion of the recreation sites be set aside for on-site reservation.

N3C opposes all motorized recreation on Ross Lake. We support maximum protection for soundscapes in the RLNRA and the park as a whole. Concomitantly, we urge that where feasible, that lights be shielded or placed so that they are not visible from the side or above at long distances. Protecting the night sky is a Wilderness value. The proposed inventory and subsequent efforts to mitigate impacts is the right direction for management.

We specifically oppose the use of Ross Lake for float plane landings. We would also like to see bans on all forms of motorboat use and water skiing on Ross Lake. Float plane and motor boat use are wholly incompatible with and substantially compromise backcountry and wilderness experiences in the RLNRA. We understand the need for limited administrative use of motorized boats by Seattle City Light and by the National Park Service. One either existing or potential use of watercraft is not explicitly addressed. This is

the live aboard "Waterbagoes" that occupy many reservoirs in the Southwest. It may be impractical to transport and use such craft on Ross Lake but it may not stop people from trying. Such use would certainly be incompatible with the management objectives set out. NCCC would like to see this use strictly limited if permitted at all when . It is not clear to NCCC what would control the introduction of an additional water taxi service on Ross Lake ? it seems to be folded in with the concession contract and operational plan. If that is true, then it would be helpful to have stronger indications of how the service would be operated and how it would affect the Ross Lake experience in the Draft EIS.

In summary re: boating on Ross Lake , the vagueness of management controls, e.g., control number of boats by maintaining the existing capacity of boating infrastructure/ NPS would establish horsepower, boat size , an/or speed limits, etc. is disconcerting as these are the kinds of details that need to be addressed in a General Management Plan. NCCC is generally in support of the directions proposed but we would have liked to see more detail. Will these details be addressed in future Management Plans?

N3C supports an upgrade of recreation amenities, especially for youth and families, along the highway corridor. Creating opportunities for youth recreation should be one of the most important goals of the RLNRA. This upgrade should include much more visible entry portals on the east and west ends of the RLNRA, a new visitor center in Marblemount, reasonable signage to direct visitors to amenities, several new front-country trials (Goodell Creek landslide, Happy Creek falls, and Stetattle Creek spur trail), and additional campground sites.

N3C is strongly opposed to investing $6,100,000 in construction of a new two-lane bridge to reach the existing visitor center behind the Newhalem campground. These funds could much better be spent creating a new visitor center in Marblemount. As you are aware, N3C opposed the siting of the Newhalem Visitor center precisely because of its lack of access and the difficulty of maintaining year round access not to mention the environmental impacts of road building and construction. Instead of trying to overcome these obstacles, the Newhalem Visitor Center should be phased out and the site restored.

The more visible and accessible visitor center in Marblemount would be used by far more visitors and would provide far more opportunity for educating North Cascades visitors on the recreation amenities and conservation values of the North Cascades. Placement of the visitor center in Marblemount would also create the potential for public-private partnerships that could substantially improve the economies of Marblemount and other gateway communities in the Skagit Valley.

At Hozomeen it is important to maintain the National Park character of the site. It is a remote an beautiful site but threatens to become a variously named "Winnebago flat/Volkswagon Flat" Signage should reflect the actual names given to the area and efforts should continue to be made to keep the use and design consistent with the best the NPS can offer. Present direction from the GMP DEIS is "The campground at Hozomeen would be rehabilitated and provide a more organized and traditional campground experience." NCCC strongly supports this direction. In addition, NCCC encourages the NPS to continue to advise its Canadian counterparts to not pave the road as this will definitely change the nature of the visitor experience.

The proposals to expand safety zones around trails and provide education on the presence of hunters are wholly inadequate for protecting RLNRA visitors from hunting accidents. Given the desired and expected increase in family-friendly recreation in the RLNRA, hunting should be banned in all areas of the RLNRA.

Specific reference is made with respect to potential land exchange or other arrangements in the Diablo

Townsite, e.g., Hollywood/Reflector Bar. NCCC supports continued negotiations to determine if alterations in ownership and management are appropriate. If necessary, NCCC would be willing to consider support for legislation making these changes. However, of prime consideration would be maintaining and improving the possibility of public access to Diablo Lake shoreline in the Reflector Bar area consistent with public safety. This perspective differs from the "separation of use" goal outlined in the document. It appears to NCCC that the administration and maintenance facilities are concentrated away from the shoreline. Public access is severely limited by the placement of the road except for at Gorge CG.

The statement that "The Washington State Department of Fish and Wildlife would continue to regulate fishing (or hunting) in Ross Lake NRA" (p. 95) implies that the NPS does not have any role in fish management (or hunting except ensuring public safety). This is contrary to what we understand to be the case at present. NPS has a significant role to ensure non-impairment of resources. The NPS played a very active role in defining fish mitigation arrangements in Skagit Project Relicensing. NCCC believes it necessary for the NPS to take a stronger role in oversight of fish management in light of the transboundary management issues with Canada and the need to think of changing fish management needs as the reservoir system ages (less nutrients available). What is the NPS goal of fish management of fisheries? What about management of hunting where mountain goat numbers have plummeted in the North Cascades?

Why does the RLNRA Management call for no lead in hunter's ammunition but not the same for anglers?[The American Fisheries Society new policy white paper calls for banning of lead shot, etc. in fishing].

Comment on Alternative C

As indicated above, N3C strongly believes that float plane landings and take-offs on Ross Lake are incompatible with the backcountry and wilderness experiences that impacted by the very loud sounds associated with float planes.

Comments on Alternative D

N3C supports some of the proposed changes under Alternative D and would like to see these incorporated into the final management plan.

We support movement of the Wilderness Information Center to State Route 20, particularly to the Marblemount area where it could be combined with a new visitor center.

We strongly support the research and monitoring that are currently being conducted by the North Cascades National Park and enthusiastically support additional resources for wildlife research and monitoring in the RLNRA and North Cascades National Park.

Comments on RLNRA and North Cascades National Park Boundary Changes

N3C believes that the current North Cascades National Park boundaries are inadequate for preserving, restoring, and managing biodiversity within NOCA and especially RLNRA. Critically important alpine and subalpine areas should be added to help assure recovery of wolf, grizzly bear, wolverine, and mountain goat populations. Essential low elevation forest and headwater stream habitats should be added to help support recovery of spotted owl, marbled murrelet, Chinook salmon, and bull trout populations.

Park expansion would also support conservation of plant diversity, wetlands, amphibians, small mammals, and song birds.

We recommend that the following areas be added to the North Cascades National Park.
- All of the Bacon Creek watershed that is managed by the Forest Service.
- All of the Cascade River watershed north of the river that is managed by the Forest Service.
- The block of Forest Service land north of Baker Lake from the current park boundary on the east to Swift Creek and Shuksan Creek on the west.
- The block of Forest Service land north of Shuksan Mountain, including Goat Mountain, Mt. Sefrit, Mt. Larrabee, Tomyhoi Peak, and low elevation wetlands along the Nooksack River.
- All of the RLNRA, with the exception of the FERC area around Ross Lake and State Route 20.
- All of the Skagit River watershed managed by the Forest Service east of the Park to the North Cascades crest.
- All of the Forest Service lands in the upper Methow River watershed above Lost River, Early Winters, and Wolf Creek

NCCC looks forward to continued dialogue with NOCA and its consultants on this important management planning process. If we can amplify or clarify comments made in this letter, please do not hesitate to contact us.

Sincerely,

Jim Davis and David Fluharty on behalf of the N3C Board
3621 NW 64th St
Seattle, WA 98107
206 783-9340

1667

NORTH CASCADES INSTITUTE
810 State Route 20, Sedro-Woolley, WA 98284
360-854-2599 www.ncascades.org

PEPC # 833

Chip Jenkins, Superintendent
North Cascades National Park
810 State Route 20
Sedro-Woolley, WA 98284

Comments on Ross Lake General Management Plan

Thank you for the opportunity to comment on the Ross Lake General Management Plan. North Cascades Institute strongly supports Alternative B – the preferred alternative, although we note that the items that most directly affect the Institute and our educational programs in the National Park and Ross Lake NRA are similar throughout Alternatives C and D as well.

We would like to comment on the following specific items, which we believe impact education programs in the Ross Lake NRA.

SEAP 8

1. We support the partial ban on float plane operations on Ross Lake, and urge the park to consider a ban on Diablo Lake as well. While we have limited experience with float plane operations in NOCA, I have experience with them in Alaska where they may pose a real danger to students in canoes and kayaks, especially under windy and low visibility conditions.

BOUND 3

2. We encourage the Park to consider changes in boundaries between the NRA and the Park proper, to increase the Park's footprint along the Highway 20 corridor and the west bank of Ross Lake. Even though the administrative units are managed similarly, the increase in Park size here would be of great benefit, and not result in any significant loss of public use.

HIKE 2

3. We support the proposed Thornton Lake loop trail. This would provide additional educational opportunities for the public, as would the suggested Diablo Lake loop trail that was not included in any of the proposed alternatives.

WILD 2

4. We support the increase in the Thunder Creek Wilderness Area. This would bring more of the park into wilderness designation and is important element of the Stephen Mather Wilderness.

FACL 3

5. We support moving the Marblemount Ranger Station, or at least a Visitor Contact station to the highway. In the longterm, ease of visitor access to the superb information provided by the Wilderness Information Center, will continue the trend of educated and informed visitors to the wilderness. Having a Park presence on Highway 20 would be the Park presence more visible and improve access for bicyclists as well.

MZONE 1

6. The change in Frontcountry Zone management to include the Environmental Learning Center makes good sense and is in keeping with how we perceive our presence at the Learning Center within the NRA.

CONNECTING PEOPLE, NATURE AND COMMUNITY THROUGH EDUCATION SINCE 1986

Thank you for the opportunity to comment. I appreciate the excellent work that NOCA staff have done over the past several years to make this report as thorough as possible.

Sincerely,

Saul Weisberg

Saul Weisberg
Executive Director

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 13

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Correspondence Information

Status: Reviewed	Park Correspondence Log: 28
Date Sent: 08/26/2010	Date Received: 08/26/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

August 26, 2010

Superintendent, attn: Ross Lake NRA Draft GMP/EIS
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 90284

Re: Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement

Dear Superintendent Jenkins:

The Aircraft Owners and Pilots Association (AOPA) represents the general aviation interests of 410,000 members, more than two-thirds of the nation's pilots ? including 12,061 of our members in the state of Washington. On behalf of our membership, AOPA is committed to ensuring the future viability of and general aviation access to our public lands and waters. To that end we submit the following comments on the Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement (GMP/EIS).

AOPA is opposed to the preferred alternative, Alternative B, because it severely limits seaplane access to the Lake by restricting seaplane activity to the extreme northern and southern reaches of Ross Lake.

Anecdotal evidence provided to us by pilots who use the lake as well as NPS staff is that seaplane usage occurs on the average of 12 to 24 operations per year and that there is no history of complaints about seaplanes. Seaplane use of the recreational area has never been excessive and there is no data indicating a significant increase in use is likely over the life of the new management plan.

One of the consequences of limiting seaplanes to the north and south ends of the lake is the denial of access to seaplane friendly campsites. The best suited campsites are those with a north facing dock that protects the aircraft from the southerly swells on the lake. By not allowing seaplanes access to the central portion of the lake the number of campsites with north facing docks is dramatically reduced.

Seaplane pilots and visitors to the national parks recognize the need for all users to enjoy their experiences. Normal operating procedures for seaplane pilots include flying friendly to avoid creating disturbances by reducing power settings after takeoff, minimizing over flights and keeping a sharp lookout for other vessels and people on the water. These flying friendly procedures are also known as noise abatement procedures and are a voluntary way of ensuring that other visitors to the NRA are not excessively bothered by the sounds of normal seaplane operations. Seaplane pilots as well as land plane pilots overflying Ross Lake are asked to remain at least 2,000 above ground level while overflying charted National Park Service areas in accordance with FAA Advisory Circular 91-36, Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas. Incorporating these procedures in to the seaplane access policy would be acceptable and AOPA is willing to assist the NPS in working with other stakeholders to help craft sensible procedures.

Normal seaplane operations while in the approach, landing and taxiing phases are made at very low power settings and do not generate a significant amount of sound. In fact, the phase of flight that generates the most amount of sound is during takeoff and studies show that the sound levels exceed the federally accepted residential noise threshold of 65 dBA day-night average sound level (Ldn) for less than 60 seconds. By that measure, Alternative B would restrict seaplane access to the lake because of less than half an hour of noise over the course of an entire year.

Even as NPS contemplates limiting seaplane access, we note that motorboats are currently allowed in both the front country and back country management zones according to Table 4-1 of the draft GMP/EIS. We suggest that since seaplanes operate on or near the water in a specific manner and for much shorter periods of time than motorboats, seaplanes should enjoy the same access as motorboats do under the preferred alternative. AOPA respectfully requests that change to the preferred alternative so that current seaplane access is maintained.

In summary, AOPA supports continuing the current access seaplanes have to Ross Lake and respectfully requests that the limitations on seaplane access contained in the preferred alternative be removed as they are the equivalent of swatting at a mosquito with a sledge hammer.

Thank you for the opportunity to provide comments on the draft general management plan and environmental impact statement. If we can be of further assistance please contact us at 301-695-2200.

Sincerely,

Gregory Pecoraro
Vice President
Airports and State Advocacy

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 700

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 08/26/2010	Date Received: 08/26/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

Folks:

Thank you for taking the time to review the comments provided. The Recreational Aviation Foundation supports the continued access to Ross Lake via float-plane. In the reviewing the information we find no reason that the continued use of the lake by float-plane should not be continued. We have submitted comments that outline in more detail our reasons, but the short version is we believe the float-plane access has not created any detrimental effects to the lake or the area. We would appreciate your consideration for the aviation community.

Thank you,
John McKenna
President
Recreational Aviation Foundation

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 721

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

Dear Sir,

On behalf of the 8400 members of the Seaplane Pilots Association, this is to request that you make no changes to the current seaplane access to Ross Lake.

Very few seaplanes land on Ross Lake therefore their environmental footprint is nearly non-existent. What little noise they do make, which occurs on takeoff from the lake, is of short duration an diminishes rapidly as they leave the area. Seaplanes are not like Jet Skis (Personal Water Craft), which make continuous noise as they travel around the lake. Seaplanes typically operate at the center of the lake when they arrive and depart, and when near the shoreline, they are in the displacement mode and travel very slowly at very low power and minimal noise.

It is very unlikely that there will be any significant increase in the number of seaplanes landing on Ross Lake in the future since the seaplane fleet is not growing and is not forecast to grow in the future.

Please consider these comments in your deliberation and again we request that you make no changes to the current policies regarding seaplanes on Ross Lake.

Best regards,
Walter Windus, Chairman
Seaplane Pilots Association

PEPC Project ID: 16940, DocumentID: 34698
Correspondence: 495

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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

September 30, 2010
Skagit Audubon Society
P.O. Box 1101
Mount Vernon, WA 98273

Superintendent
Attn: Ross Lake NRA Draft GMP/EIS
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 98284

Dear Superintendent Jenkins,

We appreciate your sending Skagit Audubon Society the newsletters and CD for the Ross Lake National Recreation Area Draft General Management Plan and Environmental Impact Statement. This letter contains the comments of Skagit Audubon's Board on these documents.

In most respects, Skagit Audubon supports the selection of Alternative B as the Preferred Alternative. We support its recognition of Ross Lake NRA's significance as a gateway to wilderness; its emphases on resource protection and on inventory and monitoring using the National Park Service's "vital signs" approach; and its call for enhanced interpretation and education by the NPS and its partners.

The mission of Skagit Audubon is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity. We know that the National Park Service is charged with providing for people's enjoyment of the park's resources and doing so in a manner that leaves those resources unimpaired. Our comments are offered in light of that challenging charge and in relation to Audubon's purposes.

We are aware that recreational rock climbing has been taking place for some years in Newhalem Gorge, and perhaps also elsewhere in the NRA, and that there have been impacts. Extensive coverage of moss and other plants has been stripped off; rocks as large as boulders have been moved to improve sites for rock climbing, sometimes with the help of mechanical devices; and protection has been drilled into rock faces. We view this type of resource damage as regrettable as well as illegal, but the damage having been done and the push for allowed climbing areas continuing, we agree with the idea of establishing designated places for this activity, preferably where existing damage cannot be practically repaired. We do nonetheless assume that a thorough environmental assessment with opportunity for public comment will precede the designation of such climbing areas and that implementation will include education about the preservation part of the NPS mandate in addition to enforcement. Our concern is, of course, that impacts to the natural environment be minimized and that areas associated with scarce habitats or species not be designated for rock climbing.

The draft GMP/EIS includes a good description of the problems confronting Colonial Creek Campground and Goodell Creek Campground from their location in geo-hazard zones. Some of us have witnessed the results of debris flows and floods in Colonial Creek Campground multiple times. Since the hazardous events, in the form of floods and debris flows, occur during the off-season the threat to public safety appears to be minimal. We agree with Alternative B's approach of trying to replace storm damaged facilities at non-hazard areas nearby but not rebuilding them within the hazard zones. At one point in Volume I of the plan, the possibility is raised of replacement campground development near the Ag Ponds west of Newhalem. This is an area well-known to birders for its avian diversity and nesting species rare west of the Cascades; for example, American Redstart, Veery, and others. On page 234 of Volume II in the Wild & Scenic River Eligibility analysis, the document notes the unusual quality and abundance of the type of habitat here (cottonwood overstory). Any decision about development in the Ag Ponds vicinity should be preceded by a thorough study of the species dependent on that habitat, the particular areas they use, and their ability to withstand the impacts of development.

We note here that we support inclusion of the NRA's reach of the Skagit River below Gorge Powerhouse as well as Newhalem Creek and Goodell Creek in the Wild and Scenic River System. This designation will increase recognition of their important values and, in the case of the Skagit, promote cohesive management with the U.S. Forest Service in its responsibility for the Skagit below the Recreation Area.

Another wildlife-related concern we have with the Preferred Alternative pertains to statements about the acceptability of a reduction in the percentage of Core Area in the Recreation Area's Grizzly Bear Management Units. We support the restoration of Grizzly Bears to the North Cascades Ecosystem and urge the National Park Service to be active with its partner agencies in preparing the E.I.S. needed before implementing a recovery plan. In the meanwhile, we think a cautious approach is necessary in adding development, including more miles of high use trails in these Bear Management Units. In response to public interest and the possibility of increased visitation, Alternative B calls for adding some trails generally in the State Route 20 corridor. If the proposed routes are not within prime Grizzly Bear habitat bear biologists might consider them as not constituting decreases in Core Area, and these new trails would be acceptable. However, the same might not be true for the mentioned reroute of the Thornton Lakes Trail or a new cross-border trail near Hozomeen. The draft GMP notes that recovery has proceeded well

in the Northern Continental Divide and Greater Yellowstone Ecosystems with a lower percentage of Core Area, but, even if this statement about percentages in the Rockies is accurate as written, we are unwilling to assume that the North Cascades Ecosystem provides equivalent habitat for the bear and its recovery. We note and strongly support "Guiding Principle No. 1" (Volume I, page 42) which states that "North Cascades NPS Complex strives to use science in making informed decisions." One of the things we like about Alternative B is its call, building on this principle, for continued inventory, monitoring, and research to provide a scientific basis for management decisions. We strongly support a careful, science-based approach to siting any new development, including trails, in Ross Lake NRA in the interests of resource protection and restoration and fulfillment of the NPS mission. The restoration of the Grizzly Bear to the North Cascades is too important to allow a reduction in Core Area on the assumption that recovery will proceed here as it has in the Northern Rockies. We support no net-loss of Core Area in quality habitat for Grizzly Bears.

We appreciate the attention paid in the draft GMP/EIS to the natural soundscape of the Recreation Area. It is noted that at many places in the portion of the NRA that is part of the Stephen Mather Wilderness, vehicular noise from State Route 20 can be heard as can the sounds of aircraft. If people are hearing this noise, so too is wildlife with probable effects on natural behavior. Reference is made in Volume II, page 132, to the effects of loud vehicular noise on wildlife. We support the idea of working with Washington State to enforce present limits on such noise, and we urge the NPS to pursue stricter limits if, once enforced, the present ones insufficiently dampen the sounds of traffic.

Concern about the effects of noise on wildlife as well as on the experience of the great majority of Ross Lake visitors prompts us to request that you change the management zoning of Alternative B for Diablo and Ross Lakes to that shown for Alternative C. That is, almost all of both lakes should be zoned Backcountry, and seaplane use should not be permitted. While seaplane landings can be quite quiet, they would certainly in other ways disturb waterfowl, such as Common Loons, that accumulate on Ross Lake off Hozomeen late in the season. Some of us have seen 15 or more of this Washington State-listed sensitive species at one time within the area where Alternative B would allow seaplanes to land. We are concerned too about the high-decibel sound of seaplanes on takeoff and the effects this would have on many species, as well as visitors, over a large area of Diablo and Ross Lakes. Allowing seaplane use contradicts the plan's intent of preserving a quiet, near-wilderness experience and goes against the NPS mission of preserving wildlife in its natural condition in the national parks. Given the potential for federally listed species such as Spotted Owls and even Marbled Murrelets on Ross Lake, such disturbance could constitute "take" under the Endangered Species Act. We urge you to revise the Preferred Alternative to not allow use of Diablo or Ross Lakes by seaplanes.

Considering boats on Diablo and Ross Lakes, we support the plan's intent of encouraging the use of human-powered watercraft, retaining the ban on so-called personal watercraft (e.g. Jet Skis), and implementing limits on the horsepower and speed of boats while also requiring environmentally friendly engines (4-stroke or other appropriate clean technology).

We note that Alternative B calls for a ban on lead-based ammunition by hunters and lead-based tackle by people fishing in the recreation areas. Lead in the environment has devastating effects on waterfowl that ingest it from bottom sediments while feeding, and we strongly support banning it as described. We have also addressed this concern to the Washington Department of Fish & Wildlife, which we know shares jurisdiction related to these activities in the Recreation Area.

We strongly support NPS action to further Gray Wolf restoration in Washington State and restoration to the North Cascades of the Fisher as well as preservation of all other special status wildlife. Thanks to the

efforts of NPS staff and of other agencies and organizations further down the Skagit, there is a very extensive database of information on the importance of the Skagit to Bald Eagles. Skagit Audubon members have participated in the collection of this data over the years. We note that the discussion of the Bald Eagle in Volume II at page 39 does not mention the eagle nesting activity of recent years on the point just north of Little Beaver along Ross Lake's western shore. This is notable given the apparent absence of breeding Bald Eagles from the lake for many years.

In Volume II, on page 103, we find the statement: "It is assumed that demand for hunting within Ross Lake NRA would remain relatively constant under the No Action Alternative." At many other points in the draft GMP/EIS (e.g. page 105) the assumption is stated that park visitation will increase in proportion to population growth in western Washington and British Columbia. Why would not this assumption of visitation increase also pertain to hunter numbers under all the plan's alternatives? Greater population could well mean more hunters as well as more hunting areas lost to development or other factors and, hence, more hunting pressure in Ross Lake NRA.

Lastly, we are happy to see the emphasis on cooperation across agency and international boundaries in the management and protection of the area's natural and cultural resources. We think that this would be facilitated by some adjustment of boundaries, taking steps, for example, to redraw Ross Lake NRA's and North Cascades National Park's boundaries along topographic divides and to include creeks, such as Bacon Creek, in their entirety. We support designation of the Potential Wilderness acreages in Big Beaver and Thunder Creeks to full wilderness status. We feel this is particularly important in the Big Beaver Valley as an additional protection for the Research Natural Area there. We also support further institutionalizing the working relationship between the NPS and B.C. Parks by the designation of some type of international park. Being aware of some of the history of the previous attempt to do this, we understand the necessity of another organization taking the lead.

We who live in northwest Washington are immensely fortunate to have a National Recreation Area and National Park upstream, protecting an area whose wild beauty we so enjoy. As people interested in natural history, a very important part of our enjoyment depends upon the habitats, flora, and fauna which the National Park Service is mandated to protect. With the modifications and approaches suggested above, this plan can serve well in carrying out Ross Lake NRA's purpose. We appreciate all the work that has gone into the plan's preparation.

Thank you for the opportunity to comment.

Sincerely,

Timothy Manns
President, Skagit Audubon Society

PEPC Project ID: 16940, DocumentID: 34698
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Correspondence Information

Status: Reviewed	Park Correspondence Log:
Date Sent: 09/30/2010	Date Received: 09/30/2010
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form

Notes:

Correspondence Text

(Note: a signed, hard copy will be mailed with the same text as the following)

September 30, 2010

Skagit Environmental Endowment Commission
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Seattle, WA 98124-4023

Superintendent
Attn: Ross Lake NRA Draft GMP/EIS
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 98284

Dear Superintendent Jenkins,

We appreciated the opportunity which the July 24th open house at the North Cascades Visitor Center provided the Skagit Environmental Endowment Commissioners to learn about the Ross Lake National Recreation Area Draft General Management Plan. Many of the commissioners submitted comments at

the topical stations that day, and during our subsequent meetings at the Environmental Learning Center we discussed aspects of the plan. This letter presents the consensus comments of the Commissioners.

We note the many references in this document to the relationship between the National Park Service (NPS) and the Skagit Environmental Endowment Commission (SEEC). We appreciate the recognition of the Commission's purpose and the importance of its relationship to the park administration in accomplishing their mutual goals. The following comments are offered in the spirit of supporting this well-grounded and long established relationship.

Selection of the Preferred Alternative -
For the most part the Commission agrees with the National Park Service's selection of Alternative B as the Preferred Alternative. The focus on trans-boundary cooperation in the Commission's purpose motivates us to prefer Alternative C's thematic emphasis on the National Recreation Area's (NRA) role in ecosystem management across boundaries. We note, however, that this emphasis, by policy, also applies within Alternative B. Volume I of the plan, at page 42, includes as a "Guiding Principle" inherent to Ross Lake NRA management "Trans-boundary Ecosystem Management," specifically mentioning SEEC and British Columbia Ministry of Environment. Alternative B with its thematic emphasis on the NRA as a gateway to wilderness is compatible with one of the Commission's principal purposes stated in the 1984 High Ross Treaty: "To conserve and protect wilderness and wildlife habitat." We also support Alternative B because it provides the best balance of protecting and preserving natural and cultural resources while adapting to increased visitation, maintaining the experience which visitors value in Ross Lake NRA, and enhancing present educational and interpretive services.

Soundscape and Motors -
We note that a high percentage of public comments call for Ross and Diablo Lakes to continue to provide an experience of quiet and lower-speed recreation using small and preferably non-motorized watercraft in a wilderness or near wilderness setting. One of the primary interpretive themes presented in Volume I (p.18) expresses this well: "The mountain wilderness serenity of Ross Lake attracts visitors to this unique, largely undeveloped reservoir." We further note and support the Desired Conditions for Natural Soundscapes on page 25: "Noise from management or recreational uses is minimized to provide a high-quality visitor experience and protect biological resources and processes that involve natural sounds ?Visitors have opportunities to experience and understand natural soundscapes." In Volume II, at page 10, the statement is made that, "The NPS recognizes natural sounds as inherent components of the resources it is required to protect under the Organic Act," implying that non-natural sounds which mask or interfere with natural ones should be minimized.

Given the volume of noise produced by seaplanes at takeoff we find permitting them to land on Ross and Diablo Lakes incompatible with these goals and the experience desired by the great majority of lake visitors. For these reasons, we prefer the Ross and Diablo Lake zoning under Alternative C (maps pages 101-105), designating almost all of both lakes as "Backcountry" and very little as "Frontcountry." Allowing seaplane use on these lakes permits the dramatic imposition of the experience of a very few people on the quiet recreation of everyone else over a considerable area. The description of the Backcountry Zone as including "areas that are dominated by natural conditions where recreational opportunities would focus on providing a sense of remoteness and immersion in nature within a mountainous wilderness setting" is the most appropriate one for these lakes if the present visitor experience is to be maintained and enhanced. We also urge the NPS to minimize its administrative use of helicopters and to prepare a management plan for scenic overflights governing their use of the airspace to minimize adverse effects on visitors seeking the special experience of quiet and remoteness Ross Lake particularly offers.

While there are presently very few seaplane landings on either Diablo or Ross, designating zones where this activity is permitted may encourage more such use and will concentrate it where it will affect the greatest number of people. While the developed area of Hozomeen is reasonably labeled "Frontcountry" because of its road access and facilities, the long unpaved road and wild surroundings enable visitors to experience it as a remote place. The noise of seaplane engines will work against maintaining this experience. For similar reasons, it is also important to do as described in Alternative B and restrict horsepower, boat size, and/or speed limits for boats on all lakes in the recreation area and continue to oppose any future proposal to pave the road to Hozomeen.

We would note here that seaplane noise is also likely to disrupt wildlife. In late summer Common Loons, a Washington State-listed sensitive species (Vol. II, p.41), congregate in the northern part of the lake, as some of us have personally observed, and would certainly be disrupted by seaplanes landing and taking off. Finally, it is inconsistent with regulations about private aircraft everywhere else in North Cascades National Park Service Complex to allow their landing in any part of the NRA. No where else in the Complex are private aircraft landings permitted except at the state-licensed airstrip in Stehekin and on Lake Chelan, where seaplanes provide access to a community without road connections.

Alternative B proposes a permit system for seaplane landings within the indicated frontcountry zones of Diablo and Ross Lakes. If allowing seaplane use of these lakes remains in the General Management Plan, we urge that the permit system include provisions to minimize noise at takeoff, effects on wildlife, and effects on visitors who have come to these lakes for an experience of quiet. We also assume that the permit system will address the safety of the general public in the vicinity of aircraft operations and of the pilots and their passengers in areas where stumps are just below the water's surface and driftwood is common. We note that Code of Federal Regulations 36 2.17(a)(2) (prohibiting "operating or using aircraft under power on the water within 500 feet of locations designated as swimming beaches, boat docks, piers, or ramps, except as otherwise designated") as written would have to be modified to permit seaplane operators to use the same docks and swimming areas available to boaters or new facilities would have to be provided specifically for seaplane use. Alternative B calls for expanding sound monitoring (Vol. II, p.124), which we support as needed to determine the effectiveness of noise reduction needs and strategies in Ross Lake NRA.

To maintain the type of experience Ross and Diablo Lakes presently offer, we support a continued ban on personal watercraft and Alternative B's proposed ban on (p.94) recreational activities that involve towing people behind boats.

We note that the plan addresses traffic noise associated with State Route 20 and its audibility at many places in the wilderness and backcountry portions of Ross Lake NRA. We support the determination to work with Washington State in pursuing enforcement of present regulations on maximum allowable noise limits and urge the NPS to support strengthening these if enforcement inadequately reduces noise. We also urge the NPS to pursue an educational approach to reducing noise levels through automobile associations, RV clubs, and motorcyclist organizations.

Facilities in Geohazard Areas -
Alternative B calls for replacing facilitates damaged by natural causes in less vulnerable areas nearby, if possible, or elsewhere in the NRA, with the goal of no net loss of capacity. We agree that it would be pointless to restore storm-damaged portions of vulnerable campgrounds such as Colonial Creek and Goodell Creek camps rather than increasing capacity at Newhalem Creek Campground or other places. Any re-siting should be planned to minimize loss of old growth forest, as in the vicinity of Newhalem

Creek Campground, or of cottonwood overstory forest, cited in the plan as a habitat particularly important for nesting bird species uncommon west of the Cascades. The latter would be a concern if development were planned for the Ag Ponds area west of Newhalem.

Diablo Townsite Land Exchange -
The draft GMP extensively addresses the idea of exchanging land in Diablo Townsite to give Seattle City Light control of Reflector Bar and the NPS control of the area known as Hollywood. The reasons for this proposed exchange are sound. Hollywood housing has helped alleviate shortages with the park staff and that of North Cascades Institute and would be useful in the future. However, we are concerned that if the determination is made to add the Hollywood buildings to the National Register of Historic Places the NPS would acquire a great expense in maintaining more structures than may serve a useful purpose. We realize it is possible to remove National Register listed structures, but we know that doing so is not a simple matter. Some structures in Hollywood could serve as overnight visitor lodging, but the real need, as stated in the plan, is for a safe place to establish campsites to replace those that are vulnerable and likely to be lost at Goodell and Colonial Creek Campgrounds. Due to space limitations, retaining all the present buildings would preclude developing a campground, and there are few, if any, acceptable alternative locations in the Recreation Area. We are also aware of the large financial burden the NPS would acquire for maintaining and possibly replacing utilities infrastructure at Hollywood. We note and support the reference in the plan to Seattle City Light retaining responsibility for this infrastructure. Because of these concerns, we support a focused planning/feasibility effort to determine whether the Hollywood structures can be preserved and managed at an affordable cost. If their continued maintenance and use are deemed impractical, then this specific plan should consider alternatives that may or may not include a small campground.

Grizzly Bear Core Area Management -
On page 71 of Volume I, "Grizzly Bear Core Area Management," it is stated that Core Area for the 6 Bear Management Units in Ross Lake NRA presently ranges from 82% to 92%, and that the North Cascades Ecosystem Interagency Grizzly Bear Management interim guidelines call for no net loss of Core Area. The draft GMP argues that because these percentages are greater than in the Greater Yellowstone and the Northern Continental Divide Ecosystems, where Grizzly Bear recovery is meeting success, it would be acceptable to reduce the percentage in Ross Lake NRA by adding new trails. We support a more conservative approach that does not assume the ability of the North Cascades Ecosystem to recover Grizzly Bears to be equivalent to that of the other mentioned recovery zones.

We read in the draft GMP that in their comments many members of the public support additional trails for day hikes in the State Route 20 corridor. Our understanding of the determination of the Core Area of Bear Management Units is that it involves considering quality of habitat as well as calculations of trail mileage, levels of visitor use, and other numerical factors. New trails in lower quality habitat relatively close to such developments as State Route 20 may not affect Core Area in any significant way. We urge that in high quality habitat every effort be made to keep the total mileage of high use trails, as defined by the Grizzly Bear Committee Taskforce Report referenced at Volume I, page 71, at or below the present number. For the same reasons and for compliance with the Wilderness Act, we support the closing and restoration of the furthest half-mile of the Thornton Lakes Trailhead Road within the Stephen Mather Wilderness. The mentioned moving of the Thornton Lakes Trail to a new location and the possibility of a trans-boundary trail near Hozomeen would require careful analysis by bear biologists for potential effects on Grizzly Bear recovery. If the Hollywood area of Diablo Townsite were to become a focus of visitor activity, there would be increased use of the Stetattle Creek Trail. It would improve people's experience of this trail to upgrade its condition and to modify it to end at a scenic view or other feature rather than simply fading out as now. These changes and simply increased use of the Stetattle Creek Trail would also

require careful consideration of the implications for grizzly recovery.

We urge the NPS to be as proactive as possible in advancing Grizzly Bear recovery in the North Cascades in cooperation with adjacent land management agencies on both sides of the international border and to continue managing human activities, such as camping, with bears in mind.

Other Wildlife Issues and Programs -
In furtherance of SEEC's purposes, the Commission supports the park's inventory and monitoring program using the vital signs approach to continually improve park management through a greater reliance on scientific information to guide decision-making (Vol. II, page 43).

In Volume II, at page 31, in the section describing Bald Eagles in Ross Lake NRA we note the absence of reference to the eagle nest active in recent years along the west shore of Ross Lake just north of Little Beaver.

We support Alternative B's proposed ban on the use of lead-based ammunition and lead fishing tackle (pages 147 ? 148). These lead products have had a devastating if unintentional effect on waterfowl such as Trumpeter and Tundra Swans in western Washington ingesting lead as they feed.

We appreciate the emphasis which the preferred alternative places on maintaining and expanding the role of interpretation and environmental education in Ross Lake NRA both by the National Park Service and its partner organizations such as North Cascades Institute (NCI) and Seattle City Light, both individually and in cooperation. We support the emphasis on incorporating the results of cultural and natural science research into interpretive and educational programs with an ecosystem preservation focus wherever possible. The Commission's on-going financial support for both NPS interpretation, particularly in partnership with B.C. Parks, and for the Institute's Mountain School program exemplifies the Commission's similar point of view. We would note the opportunity for cooperation with the Hope Mountain Centre for Outdoor Learning, some of whose programs take place in the upper Skagit Watershed in Canada including the Hozomeen vicinity.

Woody Debris on Ross Lake -
Finding a solution for the management of woody debris on Ross Lake has been a focus of the Commission's attention. We support the statement in Alternative B (p.174) calling for research into how best to manage this woody debris, keeping organic matter in the aquatic system. An effective solution will reduce the hazard to boaters while also avoiding the environmental impacts of previous practices.

Air and Water Quality -
We support Alternative B's call for pursuing redesignation of the Class II Airshed within Ross Lake NRA to a Class I Airshed consistent with adjacent national park and forest lands (p.92). Air quality is an important aspect of both visitor experience in the recreation area and protection of its resources. As population grows regionally and internationally, the threat posed by deteriorating air quality will increase. We note that in Volume II, "Impacts from Alternative B ? Air Quality" on page 122 the effects of a change to Class I are not described.

We also note and support Alternative B's proposal to require that all boat engines on the lakes be 4-stroke, the new direct injection two-stroke, or have equivalent lower emission technology, which will have beneficial effects on both air and water quality.

We are happy to see that the document at many points addresses climate change and that this park is

playing a significant role in documenting related impacts, educating the public about these, and striving to reduce impacts from its own operations.

Water quality continues to be a particular focus of the Commission's attention, and we appreciate the summary on this topic in Volume II (p.18ff), including the map "Water Quality Risk of Watersheds Draining into Ross Lake NRA," which includes the entire upper watershed. This map effectively draws attention to the threats to water quality originating in the U.S. and those in Canada. Consistent with its purpose, the Commission continues to focus attention on monitoring threats from development and mining and to seek ways of addressing these threats before they mature and urging cleanup of existing problem areas, such as the Azurite Mine.

This focus also relates to the Commission's interest in the American Alps Legacy Project as it pertains to Ross Lake NRA. While as mentioned in the draft plan the present working relationship between the National Park Service and the U.S. Forest Service is effective at protecting lands in the Skagit Watershed, this may not always be the situation in the future. Boundaries following hydrologic divides would provide for simpler and more consistent management in the long run. The draft acknowledges that Seattle City Light no longer intends to develop facilities envisioned many decades ago, yet those early plans had a large effect on the location of the NRA boundaries. Because the reality on which those boundaries were based has changed, it is appropriate to thoroughly re-evaluate the boundaries and modify them as needed to reflect current needs and expectations. Though it may be functioning at the moment, the status quo is grounded on ideas and plans now obsolete. Boundary evaluation does not necessarily need to be part of the GMP, but the plan should explicitly allow for it. We support the intention stated in the plan to administratively designate the area of potential wilderness in Thunder Creek as fully part of the Stephen Mather Wilderness.

International Boundary Issues -
We note the emphasis Alternative B places on recreational enhancements consistent with maintaining the present type of experience available to Ross Lake NRA visitors. In particular, we appreciate the intent to pursue the creation of a trail link with Skagit Valley Provincial Park (p.91), which accords with one of the goals given the Commission in the High Ross Treaty: "To connect, if feasible, Manning Provincial Park and the North Cascades National Park by a trail system."

We note that on page 47 of volume I in the section titled "Planning Issues and Concerns" the three items under "International Boundary Issues" are in part addressed elsewhere in the draft GMP. There is later reference to a preference, which we support, for not paving the road to Hozomeen (p.91). Alternative B's call for replacing the present Hozomeen ranger station with a more adequate facility that would also provide interpretation and allow for cooperative staffing with B.C. Parks pertains to the issue of the character of the entry into the U.S. (p.91). We support this proposal. We strongly support the statement urging the NPS to undertake collaborative planning with B.C. Parks on the list provided of specific operational issues and trans-boundary resource topics, such as wildland fire, forest health, and resource protection. The final item in the boundary issues list is the idea of international park designation to promote cooperative management. We note that this concept is discussed on page 194 in the section "Actions Dismissed From Further Consideration" based on the reasoning that there has long been a working relationship between Canadian and U.S. land managers in this area. The statement is made that dismissing further consideration of the idea in the GMP does not preclude other entities from working on such a proposal. Some form of international park designation seems a logical evolution of the established trans-boundary working relationship.

We appreciate the opportunity to comment on this plan which is of great importance in the Commission's

pursuit of its mandated goals.

Sincerely,

Kenneth Wilcox Peter Kennedy
U.S. Co-chair Canadian Co-chair

Washington Seaplane Pilots Association
c/o Bruce Hinds, President
10719 Olympiad Dr.,
Port Orchard, WA 98366

September 30, 2010

Chip Jenkins, Superintendent

North Cascades
National Park Service Complex
7280 Ranger Station Road
Marblemount, WA 98267

Dear Chip:

Thank you for the opportunity to comment on the National Park Service's Draft Management Plan for the Ross Lake National Recreation Area.

We would like to express the support of the Washington Seaplane Pilots association for Alternative A, unless Alternative B was modified to accept continued full access by seaplanes to Ross Lake.

There are many reasons we believe the restrictions on Seaplanes in Alternative B would not be beneficial. Following is support and rationale for our recommendation as well as a summary of our perspective.

Background and Rationale

There are virtually no campsites within the proposed seaplane accessible areas which would provide safe overnight tie-up for a plane for camping. Seaplanes require a north facing dock (at Ross Lake) to limit the south swell. The north end of the lake is inaccessible much of the spring and early summer. Furthermore, there is a stump line which could prove hazardous. The unintended consequence is that it would likely create a corridor of planes crossing the length rather than just landing at a specific campsite. In the end, it probably wouldn't help with noise reduction.

It is important to note that Ross Lake is 22 miles long and approximately 1 to 2 miles wide. If, for example, one were to land at Devil's Junction, it is unlikely that any other campsite would even hear the plane arrive. In my personal experience camping at Ross a couple year ago, several parties came to greet us and stated they never heard or saw us come in. Only one party heard us arrive, and they along with the others were very pleased to see us there. In fact, at least a dozen people have told me how pleased they were to see us travel there by floatplane. They stated that floatplanes were "such a historical northwest tradition."

There are only a limited number of campsites on the entire lake which are well suited for float planes. So under the current full-access situation, multiple seaplanes could use the lake at one time and it is likely that they wouldn't see or hear the other plane(s). There are only about 5 campsites which are definitely acceptable for overnight camping via seaplane. They are Cougar Island, McMillan, Spencer's, May Creek (Possibly), Devil's Junction, Cat Island, Little Beaver and Silver Creek (possibly).

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It is also a safety issue to try to limit access to a small area of the lake. Wind and weather can be unpredictable complications. Landing and departure must always be into the wind. Limiting access to such a small area would present safety challenges.

Seaplanes are a classic part of the history of the northwest. Furthermore, they are part of the history of Ross Lake. Wayne Dameron, the founder of the Ross Lake resort, accessed the lake for many years via his float planes. Via his Aeronca Sedan he first located the lake and later accessed the resort in his Cessna 195.

Seaplanes provide access to a segment of the population which would not otherwise be able to access Ross. They provide a means of access for the elderly and the handicapped unable to readily access the lake by other methods.

Few, if any, noise complaints have been raised by visitors or anyone else. Only about 20 to 30 floatplanes visit Ross each year. It has been suggested that the concern is that large numbers of seaplanes will visit Ross. This concern was raised in the 1980's and was never realized. Since that time there are much fewer seaplanes operating in the United States and fewer seaplane rated pilots overall.

In terms of total noise signature, powerboats cause considerably more noise and if they are allowed continued access, then so should seaplanes. The FAA and federal agencies measure noise on total sound impact which takes into account the duration of the sound. With the federal standard, floatplanes are well under the total noise production of the powerboats.

Seaplanes are often mentioned in the same "motorized usage" sentence as jet-skis and motorboats; however, they differ vastly in use, pollution levels, and overall noise output. Seaplanes are a mode of transportation used to access recreational opportunities on the lake. And seaplanes only produce noise (louder than a motorboat) when taking off, which doesn't last more than 20 to 30 seconds. The total sound impact in a year is no more than 4 to 5 minutes on any one area of the lake. Most visitors I have met have stated that they have rarely, if ever, seen or heard a seaplane on the lake.

A noise abatement policy can greatly reduce the noise and make it nearly unheard except in a limited area. We recommend that the NPS publish a noise abatement policy to address and manage noise from seaplanes.

Seaplanes pollute less than any motor boats. Engine exhaust does not enter the water. And seaplane pilots are good stewards of the parklands. We typically take out more than we bring in.

A permit system limiting seaplane access is unnecessary and may be costly and difficult to administer. An online reservation system could be helpful, particularly if it identified campsites which are best suited for seaplanes. Seaplanes (as well as boaters) often need flexibility due to schedule and weather changes. The current telephone based system works well and is cost effective.

Seaplanes don't require additional infrastructure. Whereas the Ross Lake parking lot is capacity constrained in the summertime, floatplanes don't require automobile parking in restricted areas.

Seaplane pilots are responsible, conscientious, and formally trained wilderness visitors. They are federally licensed, legally bound to not consume alcohol while flying, and required to complete recurrent

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training every two years. Few other Ross Lake guests are held to such rigorous conduct and training standards.

The charter for National Recreation Areas stipulates that "Such areas should be readily accessible at all times, for all-purpose recreational use." Limiting seaplane use is not consistent with this requirement.

Summary Recommendations

In summary, the WSPA requests that seaplane access remain as it is today and has been since the inception of Ross Lake.

Whereas an electronic reservation system would be acceptable, we do not support arbitrary limits for permitting of seaplane access. It is unnecessary and would only serve to restrict a segment of the population.

We do support the creation of a seaplane noise abatement policy in order to address concerns about noise and to minimize any impact.

I personally, and on behalf of the Washington Seaplane Pilots Association, recommend keeping seaplane access as it is today.

Sincerely,

Stephen Ratzlaff
Board Member
Washington Seaplane Pilots Association

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Chip Jenkins, Superintendent
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SEP 30 RECD

September 30, 2010

Submitted via E-mail and Hard-Copy

RE: Comments on the Draft General Management Plan/ Environmental Impact Statement for Ross Lake National Recreation Area

Dear Chip:

The Wilderness Society (TWS) is pleased to submit these comments regarding the Draft General Management Plan/Environmental Impact Statement for Ross Lake National Recreation Area ("Ross Lake Draft GMP" or "Draft Plan"). Overall, we support Alternative B as the Preferred Alternative and are very supportive of the recommendations for Wild and Scenic Designation of the 11-mile upper Skagit River segment and Goodell and Newhalem Creeks.

Founded in 1935, The Wilderness Society is one of the nation's oldest and largest not for profit conservation organizations. Our mission is to protect wilderness and inspire Americans to care for our wild places. Toward this end, we work in partnership with local communities, businesses, conservation organizations and local citizens to find solutions for the preservation and stewardship of our national public lands. Representing more than 500,000 members and supporters nationwide and more than 20,000 members and supporters in Washington State, TWS has long been involved in land management issues throughout the state.

TWS has launched an initiative to focus attention on the North Cascades. This landscape stretches from the I-90 corridor on the south to the Canadian border and from Puget Sound to the eastern extent of the watersheds draining off the Cascade crest. The Wilderness Society and its partners envision the North Cascades as a celebrated national treasure, where recreational opportunities are enhanced and well-planned, where local communities are vibrant and sustainable, and where this unique landscape is preserved for generations to come.

This vast, largely intact ecosystem is capable of supporting healthy populations of wide-ranging wildlife. It has the highest concentration of glaciers in the continental U.S., and the clear, cold rivers fed by those glaciers contribute much of the fresh water that flows into Puget Sound to the west and the Columbia River to the east. These river systems support populations of endangered wild salmon, provide water for people and agriculture, and yield hydroelectric power that supports a significant element of the region's economy. The North Cascades also boast some of the best wildland recreation the Pacific Northwest has to offer. Additionally, this region is facing challenges associated with increasingly

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expanding human populations and global climate change. For these reasons, TWS is working to protect and restore the North Cascades region so its wildlands sustain vibrant, healthy human and natural communities resilient to the impacts of climate change and other challenges.

TWS works to ensure that recreation on federal lands is increasingly ecologically and economically sustainable and is contributing to the public's health, well being and support for wild public lands. Direct experience is what inspires people to care for wild places, and recreation is an important source of such inspiration. This is why The Wilderness Society seeks to engage with all who visit and cherish our public lands. We envision deep, broad, and varied constituencies – traditional and new together – working to promote widespread and sustainable enjoyment of natural places. Only by doing so can we ensure in a democracy the public support for protecting America's public lands for all time to come – and ensure at the same time that all future Americans will be able to enjoy these experiences that we hold so dear.

Ross Lake National Recreation Area (NRA) provides a spectacular setting for Americans to experience our public lands. From the whitewater rafting on the Skagit, to viewing the largest concentration of wintering bald eagles in the lower 48, hiking in glacial cirques and hanging valleys in Goodell Creek, rock climbing at the Newhalem Crags, viewing the most glaciated headwaters of the Skagit watershed from a highway pullout, standing on the viewing platform in front of Newhalem Creek waterfall, backcountry camping with young children in remote boat-accessible campgrounds, kayaking on Ross Lake and boating on Diablo Lake, Ross Lake NRA provides a plethora of high quality recreational opportunities accessible to those with a broad cross section of skills and abilities. Ross Lake NRA is clearly a national treasure worthy of our appreciation, conservation, and enjoyment.

1. Support for Alternative B as the Preferred Alternative – an appropriate and commendable plan for Ross Lake National Recreation Area

Ross Lake National Recreation Area was established by Congress on October 2, 1969 "in order to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters" (82 Stat. 926) (Public Law 90-544). The purpose of Ross Lake National Recreation Area is to complement North Cascades National Park and conserve the scenic, natural, and cultural values of the Upper Skagit River Valley and surrounding wilderness, including the hydroelectric reservoirs and associated developments, for outdoor recreation and education.

Alternative B provides commendable direction of the management of Ross Lake NRA as an integral part of the North Cascades National Park Complex that is consistent with the authorizing language above. TWS supports the proposed increased recreation infrastructure in the front-country lands of the NRA that would expand day-use and overnight recreational opportunities for a range of abilities and interests. We are very excited to see the proposal for redesigned and constructed entrances – currently most visitors to Ross Lake are not aware that they are visiting lands managed byNPS. Clearly defined and celebrated entrances will enhance this awareness, appreciation, and support for the purpose and public ownership of these lands. We support NPS's approach in Alternative B to additional recreation

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infrastructure, including trials, campgrounds, and upgrades to visitor center facilities and parking opportunities. The plan balances the need for appropriate recreation with long-term stewardship of natural resources.

The natural resource management components of Alternative B provide appropriate direction for resource protection, and we are pleased with the comprehensive and collaborative approach North Cascades National Park has taken with regards to coordinating beyond their borders with adjacent land managers. This includes engaging Canada, the Forest Service, and gateway communities to the North Cascades. We particularly appreciate the leadership that NPS proposes to continue to play with regard to climate change. We appreciate the proposed combination of monitoring and allowing natural disturbance regimes room to operate while locating recreation infrastructure in places least likely to interfere. Additionally, the North Cascades National Park Complex represents a core of high quality, intact habitat within the North Cascades grizzly bear recovery zone. As such, we are pleased that the Draft Plan will protect Core Areas for grizzlies according to the recommendations of the North Cascades Ecosystem Interagency Grizzly Bear Management Subcommittee. The Invasive Plant Management Plan, including collaborating with adjacent landowners and jurisdictions, is essential to the long-term stewardship of Ross Lake NRA.

The Preferred Alternative also includes the necessary investment in interpretation and public education so that the scientific research and stewardship actions of the NPS can be well communicated and better understood by the public. Beyond just doing the right thing, the plan proposes to teach the visitors about those research results and stewardship actions and why they are important. This is a critical component of the Preferred Alternative. We are pleased to see the emphasis on leveraging partnerships throughout the Draft Plan. We specifically recommend that the NPS collaborate with the Forest Service to make the most of interpretive opportunities at the spectacular Washington Pass Overlook. This location presents an ideal place to highlight an east-side entrance/exit and the collaboration between the different land managers.

We support the provision, common to all alternatives, to close Thornton Lakes Road at the wilderness boundary. This is necessary to comply with the 1964 Wilderness Act. Additionally, we support the approach outlined in the Plan that would rehabilitate the one mile of closed road, formalize a parking lot and trailhead at the wilderness boundary in an existing disturbed area, and maintain and upgrade trail access to Thornton Lakes, and to determine whether a different trail design would enhance the trail experience to Thorton Lakes.

Regarding the Diablo townsite, we support the general concept of reallocation of ownership as described in Alternative B as it appears to be in the best interest of the public. As referenced in Alternative B, the public should be appropriately compensated for any discrepancy in land value. Additionally, we have a concern about the impact on the access of the trailhead that currently comes out of Reflector Bar. We want to be sure that this access will be maintained even if the NPS no longer owns the land. If that is not possible in its current location, we request that the trailhead be relocated on NRA land or that the trail experience be recreated elsewhere in the NRA.

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Ross Lake NRA offers world-class recreational opportunities, including unique forms of both land and water-based recreation. These activities are incredibly important to connecting people to nature, but do take a toll on natural resources and the number of participants does impact the quality of the experience. We advise the NPS to take a comprehensive approach where there is a need to address social and ecological capacity. In such cases, we recommend that an initial analysis be conducted to determine the resource capacity of the land to support a given use (be it boating, rock climbing, etc.). This analysis should represent the boundaries within which the use can be managed. Next, a needs assessment which looks at the social demand for a particular activity should be conducted. Management goals should then be set so as to provide equitable access to the activity within the underlying capacity of the land. We applaud the outlined approach included in the Draft Plan on page 182 which addresses user capacity in a way that can incorporate the steps and achieve the goals of our above recommendations.

TWS has successfully partnered with North Cascades National Park, the Access Fund, Washington Trails Association and a local youth climbing team to conduct restoration work along a sports climbing access path in Ross Lake NRA for the past several years. The NRA clearly presents attractive locations for additional climbing activity. We applaud the approach proposed to identify clearly defined Climbing Management Areas within the NRA. The transparency and clear communication of the process and the proposed dialogue with stakeholders and the general public are forward thinking and provide a good example of recreation planning proposed right. Again we emphasize the appropriate application of resource capacity and equitable division of access within this process.
Beyond this, we specifically call out our support for the following provisions of the Preferred Alternative:

1. The advanced reservation option – which would allow some advance planning on both the part of visitors and the NPS
2. Identification of a potential stock campsite in the frontcountry zone – pack and saddle stock users are traditional and historic users of public lands and we support finding an appropriate place to accommodate their use within the NRA
3. Recommended designation of the North Cascades Highway as a National Scenic Byway – this would bring additional recognition and funding opportunities to the management of this area
4. Prohibition of lead-based ammunition for hunting – evidence indicates that lead-based ammunition causes significant environmental damage and that alternatives are readily available
5. The administrative designation of the Thunder Creek Potential Wilderness Area as an addition to the existing Stephen Mather Wilderness as part of the National Wilderness Preservation System

2. Support for Wild and Scenic River Recommendations

We appreciate the quality work that was done on the eligibility and suitability analyses for Wild and Scenic River designation and we applaud the NPS for undergoing these analyses. We support the recommendations of 11 miles of the Skagit River (from the Gorge Powerhouse downstream to the boundary of Ross Lake NRA) as well as the recommendations of Goodell Creek and Newhalem Creek and the proposed classifications of all three entities. We appreciate that additional analyses regarding the eligibility of Bacon Creek, Thunder Creek/ Fisher Creek, Ruby Creek, Big Beaver Creek, Little

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Beaver Creek, and Lightening Creek were not possible, but their need in the future is acknowledged in the Draft Plan. Additionally, we acknowledge that there are several other creeks for which insufficient data are available, but the Draft Plan acknowledges that they could be revisited at such time when more data exist.

The designation of the upper Skagit River would complete the main-stem Skagit River designation from Sedro-Woolley to the beginning of the Skagit Hydroelectric Project near the town of Newhalem. This would allow for opportunities for holistic management of the river system. This system, which is the largest river draining into Puget sound, is the most glaciated in the lower 48 states, is home to seven species of anadromous fish and supports the largest population of wintering bald eagles in the lower 48, is a magnificent jewel of Washington State and we are excited about the ability to leverage the holistic planning and resource potential of its full designation.

3. Additional Specific Comments

Beyond our strong support for Alternative B and the Wild and Scenic River recommendations, we have the following comments:

- We are perplexed about the statement that there will be no net increase of trails in wilderness – the purpose and need of this policy is unclear. Again, we suggest that the approach of a resource capacity combined with a social needs assessment be combined to explore whether there exists demand for more trails in wilderness and, if so, whether the natural resources have the capacity to offer any additional opportunities.
- Although the Draft Plan does not propose any internal or external boundary changes, we want to be clear that TWS does not support converting any of the Ross Lake NRA lands into National Park. We are not aware of any clear management benefits that such boundary changes would accomplish. Additionally, NRA designation allows for continued hunting and hiking with dogs. As current data does not indicate that either activity is causing resource management concerns, the original legislative intent and direction for the NRA lands should remain as it has since its designation in 1968.

Again, we applaud the work in the Draft Plan and strongly support Alternative B with the additional recommendations noted. We look forward to working with you to make implementation of the Ross Lake GMP a success. Please feel free to contact me at 206-624-6430 ext 226 or cwilkerson@twsnw.org to discuss the content of this letter.

Sincerely,

Cynthia Wilkerson

Cynthia Wilkerson
Washington Program Manager

Wilderness. Pass It On.

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Pacific Northwest Region

#32

Aug 19, 2010

SEP 13 REC'D

Superintendent Chip Jenkins
North Cascades National Park Complex, 810 State Route 20
Sedro-Woolley, WA 98284-1239

Dear Superintendent Jenkins,

I support the National Park Service's intent to provide enhanced visitor opportunities while ensuring the long-term stewardship of the North Cascades National Park Complex ecosystem and wilderness. Therefore, I strongly support Alternative B of the Ross Lake National Recreation Area (NRA) Draft General Management Plan (GMP)/Environmental Impact Statement (EIS), with one modification.

Specifically, I support the transfer of the area identified as "Wilderness Zone" from the NRA to the national park proper, except for the land around Ross Lake, which should continue to be included in the NRA. Please reflect this boundary adjustment in the Final GMP/EIS.

Thank you for considering my comments.

Sincerely,

Mr. Daniel Steward
810 19th Ave
Seattle, WA 98122-4724
(206) 329-0127

454

Sep 4, 2010

Superintendent Chip Jenkins
North Cascades National Park Complex, 810 State Route 20
Sedro-Woolley, WA 98284-1239

SEP 13 RECD

Dear Superintendent Jenkins,

I support the National Park Service's intent to provide enhanced visitor opportunities while ensuring the long-term stewardship of the North Cascades National Park Complex ecosystem and wilderness. Therefore, I strongly support Alternative B of the Ross Lake National Recreation Area (NRA) Draft General Management Plan (GMP)/Environmental Impact Statement (EIS), with one modification.

Specifically, I support the transfer of the Highway 20 corridor, including the areas identified as Frontcountry Zone, Backcountry Zone, Wilderness Zone, and Skagit River Zone to the national park. The Hydroelectric Zone would remain part of the Ross Lake NRA. Please reflect this boundary adjustment in the Final GMP/EIS.

Thank you for considering my comments.

Sincerely,

Mr. Zak Ryersbach
PO Box 1281
Telluride, CO 81435-1281

Walking the shore at Diablo Lake. Photo Courtesy of David Snyder.

Welcome

You are now in the Appendices. Here are the topics you can read about:

Appendix A: Legislation

Appendix B: Analysis of Boundary Adjustment and Land Protection

Appendix C: Pertinent Laws, Policies, and Procedures

Appendix D: Skagit Wild and Scenic River Studies

Appendix E: Statement of Findings for Floodplains and Wetlands

Glossary

Selected Bibliography

Preparers and Consultants

Appendices

Appendix A: Legislation

Enabling Legislation- PL 90-544, 2 October 1968
Washington Park Wilderness Act 1988 PL 100-668, 16 November 1988

Cooperation of Federal agencies.

(b) The Department of Defense, the Department of Transportation, the Interstate Commerce Commission, the Federal Communications Commission, the Federal Power Commission, and other Federal agencies having jurisdiction or control over or information concerning the use, abandonment, or disposition of roadways, utility rights-of-way, or other properties which may be suitable for the purpose of improving or expanding the national trails system shall cooperate with the Secretary of the Interior and the Secretary of Agriculture in order to assure, to the extent practicable, that any such properties having values suitable for trail purposes may be made available for such use.

AUTHORIZATION OF APPROPRIATIONS

SEC. 10. There are hereby authorized to be appropriated for the acquisition of lands or interests in lands not more than $5,000,000 for the Appalachian National Scenic Trail and not more than $500,000 for the Pacific Crest National Scenic Trail.

Approved October 2, 1968.

Public Law 90-544

AN ACT

October 2, 1968
[S. 1321]

To establish the North Cascades National Park and Ross Lake and Lake Chelan National Recreation Areas, to designate the Pasayten Wilderness and to modify the Glacier Peak Wilderness, in the State of Washington, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

State of Washington. Certain recreation areas.

TITLE I—NORTH CASCADES NATIONAL PARK

Establishment.

SEC. 101. In order to preserve for the benefit, use, and inspiration of present and future generations certain majestic mountain scenery, snow fields, glaciers, alpine meadows, and other unique natural features in the North Cascade Mountains of the State of Washington, there is hereby established, subject to valid existing rights, the North Cascades National Park (hereinafter referred to in this Act as the "park"). The park shall consist of the lands, waters, and interests therein within the area designated "national park" on the map entitled "Proposed Management Units, North Cascades, Washington," numbered NP–CAS–7002, and dated October 1967. The map shall be on file and available for public inspection in the office of the Director, National Park Service, Department of the Interior, and in the office of the Chief, Forest Service, Department of Agriculture.

TITLE II—ROSS LAKE AND LAKE CHELAN NATIONAL RECREATION AREAS

Establishment.

SEC. 201. In order to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo, and Gorge Lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, there is hereby established, subject to valid existing rights, the Ross Lake National Recreation Area (hereinafter referred to in this Act as the "recreation area"). The recreation area shall consist of the lands and waters within the area designated "Ross Lake National Recreation Area" on the map referred to in section 101 of this Act.

SEC. 202. In order to provide for the public outdoor recreation use and enjoyment of portions of the Stehekin River and Lake Chelan, together with the surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, there is hereby established, subject to valid existing rights, the Lake Chelan National Recreation Area (hereinafter referred to in this Act as the "recreation area"). The recreation area shall consist of the lands and waters within the area designated "Lake Chelan National Recreation Area" on the map referred to in section 101 of this Act.

TITLE III—LAND ACQUISITION

SEC. 301. Within the boundaries of the park and recreation areas, the Secretary of the Interior (hereinafter referred to in this Act as the "Secretary") may acquire lands, waters, and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that he may not acquire any such interests within the recreation areas without the consent of the owner, so long as the lands are devoted to uses compatible with the purposes of this Act. Lands owned by the State of Washington or any political subdivision thereof may be acquired only by donation. Federal property within the boundaries of the park and recreation areas is hereby transferred to the administrative jurisdiction of the Secretary for administration by him as part of the park and recreation areas. The national forest land within such boundaries is hereby eliminated from the national forests within which it was heretofore located.

SEC. 302. In exercising his authority to acquire property by exchange, the Secretary may accept title to any non-Federal property within the boundaries of the park and recreation areas and in exchange therefor he may convey to the grantor of such property any federally owned property under his jurisdiction in the State of Washington which he classifies as suitable for exchange or other disposal.

The values of the properties so exchanged either shall be approximately equal, or if they are not approximately equal the values shall be equalized by the payment of cash to the grantor or to the Secretary as the circumstances require.

SEC. 303. Any owner of property acquired by the Secretary which on the date of acquisition is used for agricultural or single-family residential purposes, or for commercial purposes which he finds are compatible with the use and development of the park or the recreation areas, may, as a condition of such acquisition, retain the right of use and occupancy of the property for the same purposes for which it was used on such date, for a period ending at the death of the owner or the death of his spouse, whichever occurs later, or for a fixed term of not to exceed twenty-five years, whichever the owner may elect. Any right so retained may during its existence be transferred or assigned. Any right so retained may be terminated by the Secretary at any time after the date upon which any use of the property occurs which he finds is a use other than one which existed on the date of acquisition. In the event the Secretary terminates a right of use and occupancy under this section, he shall pay to the owner of the right the fair market value of the portion of said right which remains unexpired on the date of termination.

TITLE IV—ADMINISTRATIVE PROVISIONS

SEC. 401. The Secretary shall administer the park in accordance with the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1–4), as amended and supplemented.

SEC. 402. (a) The Secretary shall administer the recreation areas in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment; and (3) such management, utilization, and disposal of renewable natural resources and the continuation of such existing uses and developments as will promote or are compatible with, or do not significantly impair, public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment. In administering the recreation areas, the Secretary may utilize such statutory authorities pertaining to the administration of the national park system, and such statutory authorities otherwise available to him for the conservation and management of natural resources as he deems appropriate for recreation and preservation purposes and for resource development compatible therewith.

(b) The lands within the recreation areas, subject to valid existing rights, are hereby withdrawn from location, entry, and patent under the United States mining laws. The Secretary, under such reasonable regulations as he deems appropriate, may permit the removal of the nonleasable minerals from lands or interest in lands within the rec-

reation areas in the manner prescribed by section 10 of the Act of August 4, 1939, as amended (53 Stat. 1196; 43 U.S.C. 387), and he may permit the removal of leasable minerals from lands or interests in lands within the recreation areas in accordance with the Mineral Leasing Act of February 25, 1920, as amended (30 U.S.C. 181 et seq.), or the Acquired Lands Mineral Leasing Act of August 7, 1947 (30 U.S.C. 351 et seq.), if he finds that such disposition would not have significant adverse effects on the administration of the recreation areas.

41 Stat. 437; 60 Stat. 950. 61 Stat. 913.

(c) All receipts derived from permits and leases issued on lands or interests in lands within the recreation areas under the Mineral Leasing Act of February 25, 1920, as amended, or the Acquired Lands Mineral Leasing Act of August 7, 1947, shall be disposed of as provided in the applicable Act; and receipts from the disposition of nonleasable minerals within the recreation areas shall be disposed of in the same manner as moneys received from the sale of public lands.

(d) The Secretary shall permit hunting and fishing on lands and waters under his jurisdiction within the boundaries of the recreation areas in accordance with applicable laws of the United States and of the State of Washington, except that the Secretary may designate zones where, and establish periods when, no hunting or fishing shall be permitted for reasons of public safety, administration, fish and wildlife management, or public use and enjoyment. Except in emergencies, any regulations of the Secretary pursuant to this section shall be put into effect only after consultation with the Department of Game of the State of Washington.

(e) The Secretary shall not permit the construction or use of any road within the park which would provide vehicular access from the North Cross State Highway to the Stehekin Road. Neither shall he permit the construction or use of any permanent road which would provide vehicular access between May Creek and Hozomeen along the east side of Ross Lake.

TITLE V—SPECIAL PROVISIONS

SEC. 501. The distributive shares of the respective counties of receipts from the national forests from which the national park and recreation areas are created, as paid under the provisions of the Act of May 23, 1908 (35 Stat. 260), as amended (16 U.S.C. 500), shall not be affected by the elimination of lands from such national forests by the enactment of this Act.

58 Stat. 737; 64 Stat. 87.

SEC. 502. Where any Federal lands included in the park or recreation areas are legally occupied or utilized on the effective date of this Act for any purpose, pursuant to a contract, lease, permit, or license issued or authorized by any department, establishment, or agency of the United States, the Secretary shall permit the persons holding such privileges to continue in the exercise thereof, subject to the terms and conditions thereof, for the remainder of the term of the contract, lease, permit, or license or for such longer period of time as the Secretary deems appropriate.

SEC. 503. Nothing in this Act shall be construed to affect adversely or to authorize any Federal agency to take any action that would affect adversely any rights or privileges of the State of Washington in property within the Ross Lake National Recreation Area which is being utilized for the North Cross State Highway.

SEC. 504. Within two years from the date of enactment of this Act, the Secretary of the Interior and the Secretary of Agriculture shall agree on the designation of areas within the park or recreation areas or within national forests adjacent to the park and recreation areas needed for public use facilities and for administrative purposes by the Secretary of Agriculture or the Secretary of the Interior, respectively. The areas so designated shall be administered in a manner that is mutually agreeable to the two Secretaries, and such public use facilities, including interpretive centers, visitor contact stations, lodges, campsites, and ski lifts, shall be constructed according to a plan agreed upon by the two Secretaries.

SEC. 505. Nothing in this Act shall be construed to supersede, repeal, modify, or impair the jurisdiction of the Federal Power Commission under the Federal Power Act (41 Stat. 1063), as amended (16 U.S.C. 791a et seq.), in the recreation areas.

49 Stat. 863.

Appropriation.

SEC. 506. There are hereby authorized to be appropriated such sums as may be necessary to carry out the purposes of this Act, but not more than $3,500,000 shall be appropriated for the acquisition of lands or interest in lands.

TITLE VI—WILDERNESS

Pasayten Wilderness. Designation. 78 Stat. 890. 16 USC 1131 note.

SEC. 601. (a) In order to further the purposes of the Wilderness Act, there is hereby designated, subject to valid existing rights, the Pasayten Wilderness within and as a part of the Okanogan National Forest and the Mount Baker National Forest, comprising an area of about five hundred thousand acres lying east of Ross Lake, as generally depicted in the area designated as "Pasayten Wilderness" on the map referred to in section 101 of this Act.

(b) The previous classification of the North Cascades Primitive Area is hereby abolished.

Glacier Peak Wilderness, boundary extension.

SEC. 602. The boundaries of the Glacier Peak Wilderness, an area classified as such more than thirty days before the effective date of the Wilderness Act and being within and a part of the Wenatchee National Forest and the Mount Baker National Forest, subject to valid existing rights, are hereby extended to include portions of the Suiattle River corridor and the White Chuck River corridor on the western side thereof, comprising areas totaling about ten thousand acres, as depicted in the area designated as "Additions to Glacier Peak Wilderness" on the map referred to in section 101 of this Act.

Map and legal description, filing with congressional committees.

SEC. 603. (a) As soon as practicable after this Act takes effect, the Secretary of Agriculture shall file a map and legal description of the Pasayten Wilderness and of the Glacier Peak Wilderness, as hereby modified, with the Interior and Insular Affairs Committees of the United States Senate and House of Representatives, and such descriptions shall have the same force and effect as if included in this Act: *Provided*, *however*, That correction of clerical or typographical errors in such legal descriptions and maps may be made.

(b) Upon the filing of the legal descriptions and maps as provided for in subsection (a) of this section the Pasayten Wilderness and the additions to the Glacier Peak Wilderness shall be administered by the Secretary of Agriculture in accordance with the provisions of the Wilderness Act and thereafter shall be subject to the provisions of the Wilderness Act governing areas designated by that Act as wilderness areas, except that any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this Act.

SEC. 604. Within two years from the date of enactment of this Act, the Secretary of the Interior shall review the area within the North Cascades National Park, including the Picket Range area and the Eldorado Peaks area, and shall report to the President, in accordance with subsections 3(c) and 3(d) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1132 (c) and (d)), his recommendation as to the suitability or nonsuitability of any area within the park for preservation as wilderness, and any designation of any such area as a wilderness area shall be accomplished in accordance with said subsections of the Wilderness Act.

Area review; report to the President.

Approved October 2, 1968.

Public Law 90-545

AN ACT

October 2, 1968
[S. 2515]

To establish a Redwood National Park in the State of California, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to preserve significant examples of the primeval coastal redwood (Sequoia sempervirens) forests and the streams and seashores with which they are associated for purposes of public inspiration, enjoyment, and scientific study, there is hereby established a Redwood National Park in Del Norte and Humboldt Counties, California.

Redwood National Park, Calif. Establishment.

SEC. 2. (a) The area to be included within the Redwood National Park is that generally depicted on the maps entitled "Redwood National Park," numbered NPS–RED–7114–A and NPS–RED–7114–B, and dated September 1968, copies of which maps shall be kept available for public inspection in the offices of the National Park Service, Department of the Interior, and shall be filed with appropriate officers of Del Norte and Humboldt Counties. The Secretary of the Interior (hereinafter referred to as the "Secretary") may from time to time, with a view to carrying out the purpose of this Act and with particular attention to minimizing siltation of the streams, damage to the timber, and assuring the preservation of the scenery within the boundaries of the national park as depicted on said maps, modify said boundaries, giving notice of any changes involved therein by publication of a revised drawing or boundary description in the Federal Register and by filing said revision with the officers with whom the original maps were filed, but the acreage within said park shall at no time exceed fifty-eight thousand acres, exclusive of submerged lands.

Boundaries.

Publication in Federal Register.

(b) The Secretary is authorized to acquire by donation only all or part of existing publicly owned highways and roads within the boundaries of the park as he may deem necessary for park purposes. Until such highways and roads have been acquired, the Secretary may cooperate with appropriate State and local officials in patroling and maintaining such roads and highways.

SEC. 3. (a) The Secretary is authorized to acquire lands and interests in land within the boundaries of the Redwood National Park and, in addition thereto, not more than ten acres outside of those boundaries for an administrative site or sites. Such acquisition may be by donation, purchase with appropriated or donated funds, exchange, or otherwise, but lands and interests in land owned by the State of California may be acquired only by donation.

(b) (1) Effective on the date of enactment of this Act, there is hereby vested in the United States all right, title, and interest in, and the right

Public Law 100-668
100th Congress

An Act

To designate wilderness within Olympic National Park, Mount Rainier National Park, and North Cascades National Park Service Complex in the State of Washington, and for other purposes.

Nov. 16, 1988
[S. 2165]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Washington Park Wilderness Act of 1988".

Washington Park Wilderness Act of 1988.
16 USC 90 note.

TITLE I—OLYMPIC NATIONAL PARK WILDERNESS

SEC. 101. DESIGNATION.

(a) WILDERNESS.—In furtherance of the purposes of the Wilderness Act (16 U.S.C. 1131 et seq.; 78 Stat. 890), certain lands in the Olympic National Park, Washington, which—

16 USC 1132 note.

(1) comprise approximately eight hundred and seventy-six thousand six hundred and sixty-nine acres of wilderness, and approximately three hundred and seventy-eight acres of potential wilderness additions, and

(2) are depicted on a map entitled "Wilderness Boundary, Olympic National Park, Washington", numbered 149/60,051A and dated August 1988,

are hereby designated as wilderness and therefore as components of the National Wilderness Preservation System. Such lands shall be known as the Olympic Wilderness.

SEC. 102. WOLF CREEK POWERLINE.

The Secretary is authorized to upgrade, maintain and replace, as necessary, the Wolf Creek underground powerline to Hurricane Ridge: *Provided,* That to the extent practicable, such maintenance and operation shall be conducted in such a manner as to remain consistent with wilderness management.

SEC. 103. PAYMENT TO CLALLAM COUNTY.

Appropriation authorization.

There is hereby authorized to be appropriated not to exceed $155,000 to the Secretary of the Interior to make a payment to the Clallam County Historical Society and Museum of Port Angeles, Washington, to compensate the Society for its possessory interest in the National Park Service Visitor Center, Pioneer Memorial Museum, Olympic National Park, Washington. Upon relinquishment by the Clallam County Historical Society of all interests and use in the facility, the Secretary of the Interior shall make payment to the Clallam County Historical Society and acceptance of payment shall be considered full and just compensation for the Society's participation in the construction of the Pioneer Memorial Museum.

SEC. 104. GENERAL PROVISIONS.

16 USC 256b.

(a) MISDEMEANOR PENALTIES.—Section 3 of the Act of March 6, 1942 (56 Stat. 136; 16 U.S.C. 256(b)) is revised by deleting all after the phrase "or situated therein," and inserting the following: "shall be deemed guilty of a class B misdemeanor in accordance with provisions of title 18 of the United States Code.".

(b) FORFEITURE OF PROPERTY.—Section 4 of the Act of March 6, 1942 (56 Stat. 135; 16 U.S.C. 256c) is hereby revised to read as follows:

"SEC. 4. All guns, bows, traps, nets, seines, fishing tackle, clothing, teams, horses, machinery, logging equipment, motor vehicles, aircraft, boats, or means of transportation of every nature or description used by any person or persons or organizations within the limits of the park when engaged in or attempting to engage in killing, trapping, ensnaring, taking or capturing such wild birds, fish or animals, or taking, destroying or damaging such trees, plants, or mineral deposits contrary to the provisions of this Act or the rules and regulations promulgated by the Secretary of the Interior shall be forfeited to the United States and may be seized by the officers in the park and held pending prosecution of any person or persons or organization arrested under or charged with violating the provisions of this Act, and upon conviction under this Act of such persons or organizations using said guns, bows, traps, nets, seines, fishing tackle, clothing, teams, horses, machinery, logging equipment, motor vehicles, aircraft, boats, or other means of transportation of every nature and description used by any person or persons or organization, such forfeiture shall be adjudicated as a penalty in addition to the other punishment prescribed in this Act. Such forfeited property shall be disposed of and accounted for by and under the authority of the Secretary of the Interior: *Provided*, That the forfeiture of teams, horses, machinery, logging equipment, motor vehicles, aircraft, boats, or other means of transportation shall be in the discretion of the Court.".

(c) TECHNICAL CORRECTIONS TO BOUNDARIES.—The Act of November 7, 1986 (Public Law 99-635; 100 Stat. 3527) revising the boundaries of Olympic National Park is hereby amended as follows:

16 USC 251n.

(1) In section 1(a)(2) after "48 degrees 23 minutes north and 47 degrees" strike "38" and insert in lieu thereof "34".

(2) In section 1(a)(2) after "all surveyed and unsurveyed islands", insert ", above the point of lowest low tide,"; and at the end of the paragraph, strike "north;" and insert "north: *Provided*, That such lands as are identified in this paragraph shall continue to be open to fishing and to the taking of shellfish in conformity with the laws and regulations of the State of Washington;".

Fish and fishing.

(3) In section 1(b) after "numbered 149/60,030A, sheets 1 through" strike "10" and insert in lieu thereof "9";

16 USC 251n note.

(4) In section 2(a) after "within section 15, township", strike "15" and insert in lieu thereof "24";

(5) In section 2(a) after "*Provided, however*, That the Secretary of Agriculture shall" strike "not"; and

16 USC 251n note.

(6) Section 4 is renumbered as section 5 and a new section 4 is inserted as follows:

"SEC. 4. Effective upon acceptance thereof by the State of Washington, the jurisdiction which the United States acquired over

those lands excluded from the boundaries of Olympic National Park by this Act is hereby retroceded to the State.".

SEC. 105. KALALOCH VISITOR CENTER.

The Secretary is directed to complete a study for the location of a year round visitor center in the Kalaloch area of Olympic National Park. Such study shall include the location, size and cost estimates for the design, planning and construction of the visitor center and support facilities. The study shall be submitted to the Committee on Interior and Insular Affairs of the United States House of Representatives and to the Committee on Energy and Natural Resources of the United States Senate by March 1, 1989. The Secretary is authorized to construct such visitor center subject to the appropriation of funds.

TITLE II—NORTH CASCADES NATIONAL PARK SERVICE COMPLEX WILDERNESS

SEC. 201. DESIGNATION.

(a) WILDERNESS.—In furtherance of the purposes of the Wilderness Act (16 U.S.C. 1131 et seq.; 78 Stat. 890), certain lands in the North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area, Washington, which— 16 USC 1132 note.

(1) comprise approximately six hundred and thirty-four thousand six hundred and fourteen acres of wilderness, and approximately five thousand two hundred and twenty-six acres of potential wilderness additions, and

(2) are depicted on a map entitled "Wilderness Boundary, North Cascades National Park Service Complex, Washington", numbered 168-60-186 and dated August 1988,

are hereby designated as wilderness and therefore as components of the National Wilderness Preservation System. Such lands shall be known as the Stephen Mather Wilderness.

SEC. 202. HYDROELECTRIC PROJECTS.

Section 505 of the Act of October 2, 1968 (82 Stat. 930; 16 U.S.C. 90d-4) is amended as follows: strike "in the recreation areas", and insert in lieu thereof "in the lands and waters within the Skagit River Hydroelectric Project, Federal Energy and Regulatory Commission Project 553, including the proposed Copper Creek, High Ross, and Thunder Creek elements of the Project; and the Newhalem Project, Federal Energy and Regulatory Commission Project 2705, within the Ross Lake National Recreation Area; the lands and waters within the Lake Chelan Project, Federal Energy and Regulatory Commission Project 637; the Company Creek small hydroelectric project at Stehekin within the Lake Chelan National Recreation Area; and existing hydrologic monitoring stations necessary for the proper operation of the hydroelectric projects listed herein".

SEC. 203. LAND ACQUISITION FOR ADMINISTRATIVE FACILITIES.

Section 301(a) of the Act of October 2, 1968 (82 Stat. 927; 16 U.S.C. 90b) is hereby amended to add a new subsection as follows:

"(b) The Secretary is hereby authorized to acquire, with the consent of the owner, lands outside of the authorized boundaries of North Cascades National Park Service Complex for the purpose of

construction and operation of a backcountry information center not to exceed five acres. The Secretary of the Interior is further authorized to acquire with the consent of the owner, lands for the construction of a headquarters and administrative site or sites, for the North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area not to exceed ten acres. The lands so acquired shall be managed as part of the park.".

SEC. 204. AUTHORIZATION OF APPROPRIATIONS.

There are hereby authorized to be appropriated to the Secretary of the Interior such sums as may be necessary to complete the land acquisitions authorized pursuant to section 203 of this Act.

SEC. 205. RENEWABLE NATURAL RESOURCE USE IN RECREATION AREAS.

Section 402(a) of the Act of October 2, 1968 (82 Stat. 928; 16 U.S.C. 90c-1) is hereby amended to read as follows:

"The Secretary shall administer the recreation areas in a manner which in his judgment will best provide for (1) public outdoor recreation benefits and (2) conservation of scenic, scientific, historic, and other values contributing to public enjoyment. Within that portion of the Lake Chelan National Recreation Area which is not designated as wilderness, such management, utilization, and disposal of renewable natural resources and the continuation of existing uses and developments as will promote, or are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic, or other values contributing to public enjoyment, are authorized. In administering the recreation areas, the Secretary may utilize such statutory authorities pertaining to the administration of the national park system, and such statutory authorities otherwise available to him for the conservation and management of natural resources as he deems appropriate for recreation and preservation purposes and for resource development compatible therewith. Within the Ross Lake National Recreation Area the removal and disposal of trees within power line rights-of-way are authorized as necessary to protect transmission lines, towers, and equipment;": *Provided,* That to the extent practicable, such removal and disposal of trees shall be conducted in such a manner as to protect scenic viewsheds.".

SEC. 206. MINERAL RESOURCE USE IN RECREATION AREAS.

16 USC 90c-1.

Section 402(b) of the Act of October 2, 1968 (82 Stat. 928; 16 U.S.C. 90c-1b) is hereby amended to read as follows:

"The lands within the recreation areas, subject to valid existing rights, are hereby withdrawn from all forms of appropriation or disposal under the public land laws, including location, entry, and patent under the United States mining laws, and disposition under the United States mineral leasing laws: *Provided, however,* That within that portion of the Lake Chelan National Recreation Area which is not designated as wilderness, sand, rock and gravel may be made available for sale to the residents of Stehekin for local use so long as such sale and disposal does not have significant adverse effects on the administration of the Lake Chelan National Recreation Area.".

TITLE III—MOUNT RAINIER NATIONAL PARK WILDERNESS

SEC. 301. DESIGNATION.

16 USC 1132 note.

(a) WILDERNESS.—In furtherance of the purposes of the Wilderness Act (16 U.S.C. 1131 et seq.; 78 Stat. 890), certain lands in the Mount Rainier National Park, Washington, which—

(1) compromise approximately two hundred and sixteen thousand eight hundred and fifty-five acres of wilderness, and

(2) are depicted on a map entitled "Wilderness Boundary, Mount Rainier National Park, Washington", numbered 105–20,014A and dated July 1988,

are hereby designated as wilderness and therefore as components of the National Wilderness Preservation System. Such lands shall be known as the Mount Rainier Wilderness.

SEC. 302. BOUNDARY ADJUSTMENTS.

16 USC 110c.

(a) PARK BOUNDARY ADJUSTMENTS.—The boundaries of the Mount Rainier National Park as established in the Act of March 2, 1899 (30 Stat. 993), as amended; (16 U.S.C. 91–110b), are further revised to add to the Park approximately two hundred and forty acres, and to exclude from the park approximately thirty-one and one-half acres, as generally depicted on the map entitled "Mount Rainier National Park Proposed 1987 Boundary Adjustments", numbered 105–80,010B and dated January 1987, which shall be on file and available for public inspection in the Washington office of the National Park Service, United States Department of the Interior and at Mount Rainier National Park.

Public information.

(b) FOREST BOUNDARY ADJUSTMENT.—The boundaries of the Snoqualmie National Forest and of the Gifford Pinchot National Forest, are hereby revised to include in the Snoqualmie National Forest approximately thirty-one and one-half acres, to exclude from the Snoqualmie National Forest approximately thirty acres, and to exclude from the Gifford Pinchot National Forest approximately two hundred and ten acres, as generally depicted on a map entitled "Mount Rainier National Park Proposed 1987 Boundary Adjustments", numbered 105–80,010B, and dated January 1987, which shall be on file and available for public inspection in the Washington, District of Columbia office of the Forest Service, United States Department of Agriculture and at the Snoqualmie and Gifford Pinchot National Forests.

Public information. District of Columbia.

(c) ADMINISTRATION OF PARK LAND.—(1) Federal lands, and interests therein formerly within the boundary of the Snoqualmie National Forest and the Gifford Pinchot National Forest, which are included within the boundary of the Mount Rainier National Park pursuant to this Act are, subject to valid existing rights, hereby transferred to the administrative jurisdiction of the Secretary of the Interior for administration as part of the Park, and shall be subject to all the laws and regulations of the Park.

(2) The Secretary of the Interior is authorized to accept either concurrent or exclusive jurisdiction over lands and waters included within Mount Rainier National Park by this Act. The Secretary shall notify in writing the Governor of the State of Washington of the acceptance of any such jurisdiction ceded to the United States by the State. The existing exclusive Federal jurisdiction, where it exists

in the Park, shall remain in effect until such time as the Secretary and the Governor shall agree upon the terms and conditions of concurrent legislative jurisdiction for said Park pursuant to section 320(i) of the Act of October 21, 1976 (90 Stat. 2741).

Gifts and property.

(3) AUTHORIZATION OF LAND ACQUISITION.—The Secretary of the Interior is authorized to acquire from willing sellers by donation, purchase with donated or appropriated funds, exchange, bequest, or otherwise all non-Federal lands, waters, and interests therein included within the boundary of the Mount Rainier National Park pursuant to this Act.

(d) ADMINISTRATION OF FOREST LAND.—(1) Federal lands, and interests therein formerly within the boundary of the Mount Rainier National Park, which are excluded therefrom and are included within the boundaries of the Snoqualmie National Forest pursuant to this Act are, subject to valid existing rights, hereby transferred to the administrative jurisdiction of the Secretary of Agriculture for administration as part of the Forest, and shall be subject to all the laws and regulations applicable to the National Forest System.

(2) For the purposes of section 7 of the Land and Water Conservation Fund Act of 1965 (78 Stat. 903, as amended; 16 U.S.C. 460l-9), the boundaries of the Snoqualmie National Forest and the Gifford Pinchot National Forest, as modified pursuant to this Act, shall be treated as if they were the boundaries of those national forests on January 1, 1965.

(3) Effective upon acceptance thereof by the State of Washington, the jurisdiction which the United States acquired over those lands excluded from the boundaries of the Mount Rainier National Park by this Act is hereby retroceded to the State.

SEC. 303. PARADISE POWERLINE.

The Secretary is authorized to upgrade, maintain and replace as necessary, the Paradise powerline from Longmire to Paradise: *Provided,* That to the extent practicable, such maintenance and operation shall be conducted in such a manner as to protect scenic viewsheds.

TITLE IV—GENERAL ADMINISTRATIVE PROVISIONS

(a) ADMINISTRATION.—(1) Subject to valid existing rights, the wilderness areas designated under titles I, II, and III of this Act shall be administered by the Secretary of the Interior in accordance with the provisions of the Wilderness Act governing areas designated as wilderness, except that reference to the Secretary of Agriculture shall be deemed, where appropriate, to be a reference to the Secretary of the Interior, and any reference to the effective date of the Wilderness Act shall be deemed, where appropriate, to be a reference to the effective date of this Act.

(2) Lands designated as potential wilderness additions shall be administered by the Secretary of the Interior insofar as practicable as wilderness until such time as said lands are designated as wilderness. Any lands designated as potential wilderness additions, upon publication in the Federal Register of a notice by the Secretary of the Interior that all uses thereon that are inconsistent with the Wilderness Act have ceased or that non-Federal interests in land

Federal Register, publication.

have been acquired, shall thereby be designated as wilderness and managed accordingly.

(3) Congress does not intend that wilderness areas designated under this Act lead to the creation of protective perimeters or buffer zones around such wilderness areas. The fact that nonwilderness activities or uses can be seen or heard from areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area.

(b) MAP AND DESCRIPTION.—(1) As soon as practicable after the effective date of this Act, the Secretary of the Interior shall file maps of the wilderness areas and legal descriptions of its boundaries with the Committee on Energy and Natural Resources of the United States Senate, and the Committee on Interior and Insular Affairs of the United States House of Representatives. Such maps and legal descriptions shall have the same force and effect as if included in this Act, except that correction of clerical and typographical errors in the maps and legal descriptions may be made. Such maps and legal descriptions of the boundaries shall be on file and available for public inspection in the office of the Director of the National Park Service, Department of the Interior, and in the office of the appropriate Superintendent.

Public information.

(2) Boundaries adjacent to paved and unpaved roads shall be drawn as narrowly as is practicable to allow for necessary maintenance and repairs to existing roads. Such boundaries should not, in general, exceed two hundred feet from the centerline of paved roads and one hundred feet from the centerline of unpaved roads: *Provided, however,* That larger boundaries may be drawn only as the Secretary deems necessary to exclude from the wilderness existing developments, improvements, and structures adjacent to existing roads, as well as areas needed to maintain and repair existing roads: *Provided further,* That to the extent practicable, undeveloped areas adjacent to all roads shall be managed as if designated as wilderness.

TITLE V—MISCELLANEOUS PROVISIONS

SEC. 501. WILD AND SCENIC RIVERS.

Section 3(a), paragraph (60), of the Wild and Scenic Rivers Act, which designates the Klickitat River in the State of Washington as a component of the National Wild and Scenic Rivers System, is amended to add the following sentence at the end of the paragraph:

16 USC 1274.

"The boundaries of the designated portions of the Klickitat River shall be as generally depicted on a map dated November, 1987, and entitled 'Klickitat National Recreation River, River Management Area: Final Boundary', which is on file in the office of the Chief, Forest Service, Washington, District of Columbia.".

District of Columbia.
16 USC 1274.

SEC. 502. RESERVATION OF WATER RIGHTS.

Subject to valid existing rights, within the areas designated as wilderness by this Act, Congress hereby expressly reserves such water rights as necessary, for the purposes for which such areas are so designated. The priority date of such rights shall be the date of enactment of this Act.

Approved November 16, 1988.

LEGISLATIVE HISTORY—S. 2165 (H.R. 4146):

HOUSE REPORTS: No. 100-961 accompanying H.R. 4146 (Comm. on Interior and Insular Affairs).
SENATE REPORTS: No. 100-512 (Comm. on Energy and Natural Resources).
CONGRESSIONAL RECORD, Vol. 134 (1988):
Sept. 26, H.R. 4146 considered and passed House.
Oct. 18, considered and passed Senate, amended. S. 2165 considered and passed Senate.
Oct. 19, S. 2165 considered and passed House.

Appendix B: Analysis of Boundary Adjustment and Land Protection

The 1978 National Parks and Recreation Act (16 USC 1a-7(b)), and NPS Management Policies 2006, mandate consideration of potential modifications to the external boundaries of National Park Service units when developing or updating general management plans. Therefore, as part of the planning process for the Ross Lake NRA General Management Plan, the planning team cast a broad look at lands adjacent to Ross Lake NRA, and within the boundaries of the NRA but presently owned and managed by Seattle City Light.

In accordance with NPS Management Policies 2006, the NPS considered whether any boundary adjustments would be necessary to:

- protect significant resources and values, or to enhance opportunities for public enjoyment related to park purposes; or
- address operational and management issues, such as the need for access or the need for boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads; or
- otherwise protect park resources that are critical to fulfilling park purposes.

All recommendations for boundary changes must also meet the following two criteria:

- the added lands will be feasible to administer considering their size, configuration, and ownership; costs; the views of and impacts on local communities and surrounding jurisdictions; and other factors such as the presence of hazardous substances or exotic species.
- other alternatives for management and resource protection are not adequate.

Proposed Additions to the Park Boundary and Other Adjustments

Using these criteria, the NPS concluded that under present circumstances, the Diablo Townsite is the only area that could be recommended for a possible boundary adjustment. If Seattle City Light determines that Hollywood is no longer necessary for hydropower operations in the future, the NPS would work to acquire that land. The NPS interest in Hollywood is to ensure the long-term protection of resources within the legislated boundary of Ross Lake NRA, prohibit inappropriate or incompatible development within Ross Lake NRA, and provide future opportunities for adaptive reuse of the site including future administrative and potential public use. If the land is acquired, a site plan with additional analysis would be developed to determine its future use. At the request of SCL, the NPS could ~~proposes a land exchange or purchase by which the NPS would~~ acquire the "Hollywood" area (approximately 44 acres) of Diablo Townsite ~~in exchange for disposing of the "Reflector Bar" (approximately 25 acres) area or granting an interest or giving greater control therein to Seattle City Light~~.

~~Land control within Diablo presently runs counter to the NPS and Seattle City Light's management and operational needs. Hollywood is owned by Seattle City Light, and the land within the Reflector Bar area is owned by the National Park Service (most of the improvements are owned by Seattle City Light). To reconcile this control disparity, and complement the operation needs of both NPS and Seattle City Light, the NPS proposes to exchange the federal land at Reflector Bar or grant an interest or give greater control therein for Seattle City Light land at Hollywood. The end result would enable Seattle City Light to consolidate their operations at Reflector Bar (where their powerhouse, maintenance facility, sewer treatment plant, warehouse, housing and other administrative facilities are presently located), and authorize the NPS to acquire Hollywood and potentially reconfigure the area to improve and enhance recreational opportunities and visitor services.~~

The land acquisition authority provided by the enabling legislation for Ross Lake NRA clearly states that lands of the State of Washington and its political subdivisions "may be acquired only by donation " (The North Cascades Act, Public Law 90-544, Section 301). Seattle City Light is a division of the City of Seattle, a municipal corporation of the State of Washington. A plain reading of the statute presently precludes the possibility of a direct land exchange with an equalization payment or purchase between NPS and Seattle City Light. Legislation authorizing the acquisition of ~~exchange or disposal of~~

~~Reflector Bar (or an interest therein) for~~ Hollywood would be needed.

The following sections include a description of Diablo Townsite and analysis of boundary adjustments using the above criteria. This review is included as supporting documentation for the management alternatives presented in Chapter 4 of this general management plan, which include a recommendation for boundary adjustment contingent upon SCL's interest in a sale or exchange of Hollywood. This general management plan does not address the legislative requirement to provide a cost estimate for the boundary adjustment, nor does it include the relative priority for acquisition. However, the legislative proposal for the boundary adjustment and accompanying support materials would meet both of these requirements.

Description of Diablo Townsite

Diablo Townsite is located along the upper reach of Gorge Lake, near the confluence of Stetattle Creek and the Skagit River (now Gorge reservoir). Diablo is one of two "company towns" originally built by Seattle City Light during construction of the Skagit River Hydroelectric Project. The area was remote and isolated, with access only by trail and railway, and the towns provided the lodging and services needed to support large construction crews. Today the towns continue to provide housing, as well as the maintenance, and administrative facilities needed to support operation of the Project.

Diablo Townsite presently consists of two distinct areas that are operated and managed by Seattle City Light: a housing area, informally known as "Hollywood," and a hub of hydroelectric operations known as "Reflector Bar," which includes Diablo Powerhouse and an array of support facilities, as well as a few houses. Diablo Townsite also serves as a trailhead for the popular Sourdough Mountain trail, and the Stetattle Creek trail. Gorge Campground, a small campground on the shores of Diablo Lake, is also located immediately adjacent to Diablo Townsite on a spit of land adjacent to Stetattle Creek.

Hollywood

The Hollywood housing area encompasses approximately 12 acres of land, including 25 houses and additional outbuildings. The Hollywood housing area is part of a 43.56-acre parcel of land owned in fee by Seattle City Light (See Figure 4.7). Prior to complete acquisition by Seattle City Light in 1929, the Hollywood area was known as "Cedar Bar" or "Cedar Flat." It was flat and fertile, and strategically located along the Skagit River Trail or "Goat Trail," a notoriously treacherous trade route through the Skagit River Gorge that was historically used for mining activity in the Thunder Creek and Ruby Creek drainages (Luxenberg, 1986).

Cedar Bar was settled in 1898 by Lucinda Davis and her children. The 43-acre parcel was patented in 1918 under the Homestead Act of 1862. They built and operated a small farm and popular roadhouse known as the Davis Ranch which catered to miners and tourists visiting the region. In 1927, Seattle City Light acquired by condemnation a portion of the 43-acre parcel. Seattle City Light acquired the rest of the parcel by condemnation in 1929 for $15,000 to enable further expansion of the Skagit River Hydroelectric Project.

Following acquisition, Seattle City Light used the various structures associated with the Davis Ranch to house employees and guests. Over time, the original Davis Ranch structures fell into disrepair and were torn down. In 1937, Seattle City Light began development and expansion of housing in the area. Twenty houses were planned, but only five houses were actually constructed. The Hollywood area remained as a partially built housing area primarily for Seattle City Light employees until 1952, when a number of new houses were built and the original street plan was modified. The present development configuration in Hollywood largely reflects this early 1950's development.

In 1989 and 1996, several buildings and structures in Diablo Townsite were listed as contributing resources on the National Register of Historic Places. In 2010, Seattle City Light had the National Register nomination updated to evaluate the historical significance and eligibility of the remaining buildings, structures, sites, and landscape elements associated with the Skagit River Hydroelectric Project in Diablo Townsite. The nomination includes 47 contributing resources in Diablo Townsite.

~~The newer houses in Hollywood are now more than 50 years old, which is one criterion for potential listing on the National Register of Historic Places. Seattle City Light is presently evaluating whether or not these houses are eligible for listing. Only one of the five Hollywood houses from the 1930's remains today, and it is listed on the National Register (NPS, 1996). All that remains of the Davis ranch today is the old Davis Powerhouse, a small~~

wooden structure that provided hydroelectric power to the Davis Ranch and served as the first hydroelectric plant on the Skagit River (Luxenberg, 1986). The Davis Powerhouse has been relocated from its original location on Cedar Bar, and there is some uncertainty as to whether it is the original structure or a reconstruction. Nonetheless, it too is more than 50 years old and although it lacks historic setting, feeling, and association (Luxenberg, 1986), it may now be eligible for listing as a historical icon (Luxenberg, pers. comm. July 17, 2009). Another structure that may also be eligible for listing is the Stetattle Creek Bridge, a single-span Pratt truss steel bridge that may be associated with the 1930's, but a determination requires further documentation (Jesse Kennedy, NPS Cultural Resources Specialist, pers. comm.).

Reflector Bar

The Reflector Bar area lies east of and just upstream from Hollywood along the shoreline of the Skagit River and just downstream from Diablo Dam. The approximately 25-acre area includes several notable historic structures, including a prominent 50,000-gallon water tower constructed in 1934, and the historic Diablo Powerhouse. There are also several residences dating back to 1952 (constructed in conjunction with the Hollywood housing of that era), a school building that now serves as a cookhouse, museum, and administrative office; a waiting area for the incline lift; and maintenance buildings.

In contrast to Hollywood, within which the land and structures are owned by the City of Seattle, the land surrounding and including Reflector Bar has always remained within the federal domain, although Seattle City Light owns most of the structures. Today the land is presently under the jurisdiction of the National Park Service as part of Ross Lake NRA. The land is also within the boundary of the Skagit River Hydroelectric Project, and subject to the jurisdiction of the Federal Energy Regulatory Commission for power production purposes.

Over the years, Seattle City Light has increasingly automated its operation on the Skagit River Hydroelectric Project. Increased automation has resulted in a reduced need on the part of Seattle City Light for employee housing, and a desire to divest itself of the Hollywood area and consolidate facilities onto Reflector Bar and the Newhalem Townsite. The National Park Service, in turn, has a need for relatively level, geologically stable, and motor vehicle accessible land that has been previously disturbed by development to accommodate future recreational needs and to facilitate better access to existing trails. The current configuration of Hollywood is confusing for visitors, presents limitations for access, and raises certain aesthetic concerns. Acquisition of the Hollywood area would help the National Park Service address these concerns, and respond to public demand for more recreational opportunities.

Seattle City Light would continue to use Reflector Bar as a base of operations for Diablo Dam, and for broader functions that support the whole Skagit River Hydroelectric complex. The NPS would use Hollywood to support and possibly enhance various visitor services for Ross Lake NRA, including overnight accommodations.

Boundary Adjustment Criteria

The following section addresses several criteria that must be considered for boundary adjustments in accordance with §3.5 of NPS Management Policies 2006.

1. Significant Resources or Opportunities for Public Enjoyment Related to the Purpose of Ross Lake National Recreation Area

Hollywood

The Hollywood area provides significant opportunities for public enjoyment in light of its readily accessible location along the North Cascades Highway Corridor. The Hollywood area presently provides several recreational facilities and amenities including (1) the Sourdough Mountain trailhead; (2) the Stetattle Creek trailhead; (3) a portion of the Gorge Campground and boat launch; and (4) access to Diablo Dam trail (which enables a loop hike of Sourdough Mountain). The Hollywood area is flat and relatively stable geologically because it has been filled in and protected from flooding by a levee along the right bank of Stetattle Creek.

The Hollywood area is readily accessible from the North Cascades Highway, and a primary point of departure for the Sourdough Mountain Trail and Stetattle Creek Trail. The Hollywood area also provides immediate access to the shoreline of Gorge Reservoir, and lies adjacent to the small but popular Gorge Campground and boat launch for Gorge Lake. Hollywood's sunny, southern exposure provides spectacular views of the South Unit of North Cascades National Park, including the prominent

massifs of Colonial Peak, Pyramid Peak and Ruby Peak. While there are other similar areas within the NRA with favorable topographic characteristics (such as alluvial terraces such as in the vicinity of the Visitor Center), they are generally characterized by mature or old-growth forest, are relatively if not completely undisturbed by previous development, and not as readily accessible to the North Cascades Highway Corridor.

Reflector Bar

Reflector Bar is used almost exclusively by Seattle City Light for administrative and operation of the Skagit River Hydroelectric Project. The only exception to this is public use of Diablo Dam trail; use of this trail would continue regardless of ownership. The Reflector Bar area is essentially a light industrial complex of hydroelectric facilities. The NPS does not lightly consider divesting itself of property, particularly property that has always been in the public domain, such as Reflector Bar. The NPS would divest itself of Reflector Bar only if necessary as part of acquiring Hollywood, since this area has greater existing and future recreational opportunities.

2. Operational and Management Issues Related to Access and Boundary Identification or Other Natural Features

Hollywood

The Hollywood area presently provides access to the popular Sourdough Mountain trail and the low elevation Stetattle Creek trail—one of only a few trails within Ross Lake NRA that provides year round hiking opportunities. Both trailheads suffer from adverse access-related issues. The Sourdough Mountain Trailhead provides access to the very popular Sourdough Mountain Lookout, one of three National Register-listed historic lookouts within North Cascades NPS Complex. The trailhead is presently difficult to find, parking is limited and not clearly delineated or distinct from the Hollywood residential area, and there are no other basic trailhead amenities such as a picnic area or restroom for visitors. Conditions surrounding the Stetattle Creek trailhead are similar. Although the trailhead is slightly less difficult to find and parking is more clearly identified, the first leg of the trail follows a constructed levee that separates and protects the Hollywood housing development from flooding. Traversing this section of trail imparts a sense of walking through a series of backyards in a suburban development. This approach feels incongruous compared to the other popular front country trails within Ross Lake NRA. The NPS is working with Fee acquisition of Hollywood from Seattle City Light would provide the NPS with a significant opportunity to improve parking, access and circulation, upgrade visitor amenities and enhance the aesthetics of the trailhead areas.

However, single agency management and jurisdiction of the area could be more efficient for long-term maintenance and operations.

Reflector Bar

The operational and administrative uses of Reflector Bar by Seattle City Light require management of the area exclusively for the purposes of power production. This is a longstanding and customary use that dates back to the inception of the Skagit River Hydroelectric Project. Seattle City Light, the Federal Energy Regulatory Commission, and the Department of Homeland Security are presently concerned about protection of the facilities that support power production. To reduce security concerns, these agencies are moving to reduce public access to Reflector Bar. The National Park Service is also concerned about ensuring protection of these facilities, as well as ensuring basic public safety by keeping visitors away from the hydroelectric industrial zone. The most efficient and enduring means of meeting these goals would be for the NPS to either divest itself of Reflector Bar to enable fee-simple ownership by Seattle City Light, grant an easement over Reflector Bar, or use a different mechanism to provide Seattle City Light with greater, near-exclusive control.

3. Protection of Park Resources and Fulfillment of Park Purpose

Hollywood

Ross Lake NRA was established "…to provide for the public outdoor recreation use and enjoyment of portions of the Skagit River and Ross, Diablo and Gorge lakes, together with the surrounding lands, and for the conservation of the scenic, scientific, historic and other values contributing to public enjoyment of such lands and waters…" The Hollywood area is strategically suited for enabling recreational use of the lands and waters within Ross Lake NRA given its close proximity to Gorge and Diablo reservoirs and to low- and high elevation hiking opportunities.

NPS acquisition of the Hollywood Area would further fulfill the purpose of Ross Lake NRA by providing options to enhance frontcountry visitor services and amenities in support of recreation. For example, the area could be used to construct an additional campground to respond to increases in camping demand. It could also help to offset loss of campground capacity in other areas should severe weather events, such as flooding, require abandonment of other campgrounds such as Colonial Creek Campground. The specter of climate change, including the potential for increased storm frequency and severity (University of Washington Climate Impacts Group, 2009), renders the Hollywood area disproportionately significant for future sustainable development because it is relatively stable geologically and protected from flooding. In fact, the record flood of October 2003 had no impact on the area, but caused substantial damage to other important recreational use sites, including Goodell Creek Campground and Colonial Creek Campground—the most popular campground in the NRA. Relocating or expanding camping, picnicking and related frontcountry development in Hollywood would also help to protect the natural resources of Ross Lake NRA because the area has been previously disturbed by development and does not contain notable natural resources such as old-growth forest.

Acquisition of the Hollywood Area would also help to protect, preserve and interpret the historic and cultural significance of the area's association with homesteaders, such as the Davis family who first settled the area when it was called Cedar Bar. Similarly, acquisition of the Hollywood area would also contribute to visitor understanding and appreciation of the role the housing area provided during construction of Diablo and Ross Dams and subsequent operation of the Skagit River Hydroelectric Project. The sole remaining house from the1930's era (referred to as H-6 or "Resource #34") housing development in Hollywood is listed on the National Register of Historic Places. ~~The Hollywood housing area was not considered eligible for listing as a historic district in the mid-1990's but may be eligible today as all the houses are now more than 50 years old. Seattle City Light is presently pursuing a determination of National-register eligibility. Should the present Hollywood development be deemed eligible, then this finding would add another layer of historical significance to the site.~~ Acquisition of Hollywood by the National Park Service would help to contribute further to preserving and interpreting the historic resources that are significant to Ross Lake NRA.

Finally, comments received during public scoping presented a common theme of requesting limited if any new development in Ross Lake NRA. Most commenters suggested they would like to see development remain at or near current levels to protect the natural resources of the area and to prevent over-use. Acquisition of Hollywood and some form of adaptive use of the area would fulfill the spirit and intent of these requests because the area is already developed; it could be put to some form of adaptive use without harming other areas in Ross Lake NRA that have not been previously disturbed.

~~***Reflector Bar***~~

~~The enabling legislation for Ross Lake NRA specifically indentifies Ross, Diablo and Gorge Lakes as fundamental resources for outdoor recreational use and enjoyment. To protect these resources, and to promote their recreational use and enjoyment, safe and secure administration of the Reflector Bar area is needed. This goal could be achieved by transferring ownership of or granting an easement over the area to Seattle City Light, or using a different vehicle for giving Seattle City Light almost exclusive, complete control of this area.~~

4. Feasibility to Administer the Lands Added through Boundary Adjustment

Acquisition of Hollywood would enable easier administration of the area for several reasons. The NPS is presently constrained by the current patterns of development, access, and use of the Hollywood area because it is owned by Seattle City Light and managed primarily for the purposes of supporting hydropower production. ~~The Stetattle Creek and Sourdough Mountain trails have been poorly situated among these existing uses (as previously described in response to criterion #2). As a result, the present trailhead conditions are challenging to administer. These challenges are increasing as security concerns have recently prompted Seattle City Light to install a gate along the entrance road leading to Diablo Powerhouse. The gate blocks access to the closest parking for the Sourdough Mountain trailhead, and will undoubtedly add further confusion to visitors seeking to find the trail.~~ The entire area lies within the Federal Energy Regulatory Commission (FERC) boundary for the Skagit Hydroelectric Project, so in addition to being owned by Seattle City Light, FERC retains jurisdiction over the area and their oversight adds another layer of administrative complexity. Should Seattle City Light and FERC

agree to NPS acquisition, then the whole area would be substantially easier for the NPS to manage for recreational purposes.

The NPS is concerned about the life cycle costs associated with the existing housing and the utility systems. If an acquisition ~~exchange~~ were authorized, the NPS would request that Seattle City Light continue to provide utilities (power, water, and sewer). ~~The existing buildings in Hollywood would need to be evaluated to assess their condition, including their potential historic significance. It is possible that over the long-term, the most financially viable action would be to remove some or all of the houses in Hollywood, and reconfigure the area for camping and/or as a possible location for concession lodging. Other options would be to use the area to expand the park-based environmental educational programs or to support science and research. Future needs for the educational programming may be for staff housing, participant lodging, classrooms and other support facilities. Regardless of the various options, the general vision would hold that this previously disturbed area, with its existing utilities, would be used to provide various visitor services.~~ A condition assessment of the property and facilities would be completed prior to completing a land acquisition ~~exchange~~ of the Hollywood area with Seattle City Light.

5. Protection Alternatives Considered

Options for protection of the area include accepting the limitations and maintaining the status quo, ~~exchanging the Hollywood Area for Reflector Bar,~~ or entering into additional agreements with Seattle City Light to better enable recreational access, use and administration of Diablo Townsite. ~~The NPS and Seattle City Light presently prefer the concept of a land exchange or purchase of Hollywood; and providing greater control to Seattle City Light of Reflector Bar through disposal, easement, or other means, to reconcile the somewhat incompatible demands of hydropower production and recreation.~~

Other Geographic Areas Considered but Rejected for Boundary Adjustment

North Cascades National Park

The NPS dismissed from consideration changing the designation of Ross Lake NRA to North Cascades National Park. Ross Lake NRA was created as a separate unit primarily to accommodate Seattle City Light's existing and proposed hydroelectric developments. These hydroelectric facilities (three large dams and reservoirs) have dramatically altered the natural landscape and hydrologic systems of the Skagit River and its tributaries. Congress also created Ross Lake NRA to enable enjoyment of a wider variety of recreational activities, including hunting and hiking with pets that are prohibited in North Cascades National Park. Neither activity is creating a notable resource management or public safety concern.

The "National Park" name is generally associated with large areas with a variety of resources where natural resources are largely unaltered or in their natural state. "National Parks" that do have large scale hydroelectric facilities were established in the early years of the national park system, such as Yosemite and Grand Teton, and before the "National Recreation Area" designation came into common naming practice. When North Cascades NP and Ross Lake NRA were designated in 1968, areas with reservoirs were generally named "National Recreation Areas," such as Bighorn Canyon NRA (1966) and Whiskeytown-Shasta-Trinity NRA (1972). Congress chose to designate the area a "National Recreation Area" based on its significant resources, existing hydroelectric facilities, and range of superlative recreational opportunities.

The NPS dismissed consideration to expand the boundary of Ross Lake NRA into either the north or south units of North Cascades National Park. Such an expansion would reduce the area of the National Park proper, detract from the purposes and significance of the National Park, and afford no additional benefits to the resources and values of Ross Lake NRA.

Northeastern Skagit River Watershed

The vast majority of lands immediately adjacent and external to Ross Lake NRA largely include lands within North Cascades National Park (to the north and south) and USDA Forest Service lands to the east in the Okanogan-Wenatchee National Forest. The geographic scope of lands considered to the east of Ross Lake NRA included the North Cascades Highway corridor up to and including Washington Pass, and adjacent U.S. Forest Service lands that comprise the watershed for the Skagit River. The overall area considered included approximately 208,390 acres.

The specific rationale for focusing on these geographic areas included (a) responding to public comments that requested consideration of such an expansion of Ross Lake NRA; (b) consideration of U.S. Forest Service-administered lands along the highway corridor for access as an eastern gateway to the NRA; and (c) consideration of the Skagit River watershed as a logical geographic boundary for ecological purposes, recognizing that drawing boundaries along ecological lines such as watersheds helps to protect and conserve various ecological functions and values. Another element that influenced this evaluation was the administrative history of the establishment of the North Cascades NPS Complex, including the North Cascades Study Report and the joint recommendations from the Secretaries of Agriculture and Interior (December 29, 1965, Statement of Secretary of Agriculture and Secretary of Interior).

The North Cascades Highway corridor to the east of Ross Lake NRA traverses a non-wilderness corridor administered by the U.S. Forest Service primarily for recreational purposes. Although this area is not designated as wilderness, recreational activities similar to those that occur within Ross Lake NRA are the primary form of use. In certain areas, however, more resource-intensive and/or exploitative activities, such as mining, continue to occur. The past adverse impacts of mining in particular still linger. For example, one past mining site, the Azurite Mine located approximately 7 miles east of Ross Lake NRA in headwaters of the Ruby Creek watershed, is now a Superfund site due to heavy metal contamination (MFG, Inc., 2008). The impacts of mining pose both present and reasonably foreseeable future threats to the resources and values of Ross Lake NRA, especially with respect to water quality and wilderness values.

In contrast to mining, the predominant recreational uses in this area involve various generally benign recreational activities such as hiking, horseback riding and mountaineering that are compatible with purposes of Ross Lake NRA. In addition, the U.S. Forest Service operates and maintains a seasonal facility at Washington Pass with various visitor services, including restrooms and interpretive information that complement and enhance public use and enjoyment of Ross Lake NRA. There are, however, other more intrusive recreational activities such as off-road snowmobile use (such as illegal use in wilderness) that are contrary to purposes and values of Ross Lake NRA. Nonetheless, on the balance the NPS has preliminarily concluded that given (a) the paucity of potential threats from ongoing or emerging land uses (notwithstanding mining); (b) the broader protections afforded by the Pasayten Wilderness; and (c) the U.S. Forest Service's track record for administering the area primarily for conservation purposes, renders consideration of a boundary expansion to the east of Ross Lake NRA unnecessary at this time.

Lower Bacon Creek Watershed

The landscape contiguous to the west of Ross Lake NRA primarily includes U.S. Forest Service lands within the lower Bacon Creek watershed. The Bacon Creek drainage is an ecologically significant area for many reasons in light of its proximity to the North Cascades Complex and the adjacent Diobsud Creek Wilderness. While the upper portion of the watershed is protected within the confines of North Cascades National Park, substantial portions of the lower Bacon Creek watershed are presently under U.S. Forest Service jurisdiction. Past land uses such as logging and road construction have substantially modified the area, and future adverse uses such as further logging and road construction and maintenance could cumulatively and adversely affect the ecological integrity of the area. Moreover, the lower Bacon Creek watershed has been specifically identified as an ecologically significant yet unprotected area within the Puget Sound basin that needs additional protection in light of its importance as habitat for various anadromous species of fish such as salmon (Lombard, 2007).

In addition to the lower Bacon Creek watershed there is also a smaller amount of private land and land owned by the City of Seattle along the Skagit River to the south of Ross Lake NRA. The Wild and Scenic River corridor along the Skagit River affords adequate and compatible protections to some of these lands, although these protections are constrained geographically to within ¼ mile of the Skagit River and generally do not apply to private land. Outside the Wild and Scenic River corridor, the adjacent landscape is generally less protected than the lands within Ross Lake NRA. In spite of these gaps in protection, the NPS believes that a boundary expansion to increase protection of the ecologically significant Bacon Creek watershed or adjacent lands along the Skagit River is not justified because other alternatives for management and resource protection presently exist. Specifically, the U.S. Forest Service will be revising in 2012 the forest plan for Mount Baker Snoqualmie National Forest, including the

lands within the lower Bacon Creek watershed. This pending planning effort will provide an opportunity for the U.S. Forest Service to address present concerns in accordance with the spirit and intent of ecosystem management.

The NPS recognizes that Ross Lake NRA and the North Cascades NPS Complex would continue to lack boundaries clearly aligned along ecosystem lines. This lack of an ecosystem-based boundary with a single agency administrator means conservation of the greater North Cascades ecosystem requires a commitment among multiple agency partners, including the NPS, to coordinate and cooperate in a broader conservation vision. Interagency ecosystem management can be more challenging and less efficient than single-agency administration and management, and lack of commitment or engagement of any one agency partner has the potential to inhibit conservation efforts. The GMP alternatives address this concern by calling for increased collaboration and cooperation with the U.S. Forest Service and Canadian agencies for interagency and transboundary ecosystem management.

Appendix C: Pertinent Laws, Policies, and Procedures

The federal laws, executive orders, and policies and procedures applicable to the National Park System and preparation of this general management plan are listed in the following table.

Federal Laws Applicable to the National Park System

Abandoned Shipwreck Act of 1987
Acid Precipitation Act of 1980
Act amending the act of October 2, 1968 (commonly called the Redwoods Act)
Act of August 8, 1953
Act of February 21, 1925
Act of June 30, 1864
Act of June 5, 1920
Act of March 1, 1872
Act of May 26, 1930
Administrative Dispute Resolution Act
Administrative Procedures Act
Airport and Airway Development Act of 1970
Airports In or Near National Parks Act
Alaska National Interest Lands Conservation Act of 1980
Alternative Dispute Resolution Act
American Battlefield Protection Act of 1996
American Folklife Preservation Act of 1976
American Indian Religious Freedom Act
Americans with Disabilities Act of 1990
Antiquities Act of 1906
Archeological and Historic Preservation Act of 1974
Archeological Resources Protection Act of 1979
Architectural Barriers Act of 1968
Arizona Desert Wilderness Act (contains NPS boundary study provisions)
Bald and Golden Eagles Protection Act
Clean Air Act
Coastal Barrier Resources Act
Coastal Zone Management Act of 1972
Comprehensive Environmental Response Compensation and Liability Act (commonly referred to as CERCLA or the Superfund Act)
Department of Transportation Act of 1966
Disposal of Materials on Public Lands (Material Act of 1947)
Emergency Planning and Community Right-to-Know Act of 1986
Endangered Species Act of 1973
Endangered Species Conservation Act of 1969
Energy Independence and Security Act of 2007
Energy Supply and Environmental Coordination Act of 1974
Estuary Protection Act
Farmland Protection Policy Act
Federal Advisory Committee Act
Federal Aviation Act of 1958
Federal Cave Resources Protection Act of 1988
Federal Coal Leasing Amendments Act of 1976
Federal Insecticide, Fungicide, and Rodenticide Act
Federal Land Policy and Management Act
Federal Power Act of 1920
Federal Water Pollution Control Act (commonly referred to as Clean Water Act)
Federal Water Power Act
Federal Water Project Recreation Act
Fish and Wildlife Coordination Act
Flood Disaster Protection Act of 1973
Food Security Act of 1985 (Sodbuster Law)
Forest and Rangeland Renewable Resources Planning Act of 1974
Freedom of Information Act
General Authorities Act, October 7, 1976
General Mining Act of 1872
Geothermal Steam Act Amendments
Geothermal Steam Act of 1970
Grand Canyon National Park Enlargement Act
Historic Sites Act of 1935
Intergovernmental Cooperation Act of 1968
Lacey Act of 1900
Land and Water Conservation Fund Act of 1965
Magnuson-Stevens Fishery Conservation and Management Act
Management of Museum Properties Act of 1955
Marine Mammal Protection Act of 1972
Marine Protection, Research, and Sanctuaries Act of 1972 (commonly known as Ocean Dumping Act
Migratory Bird Conservation Act
Migratory Bird Treaty Act
Mineral Leasing Act for Acquired Lands
Mineral Leasing Act of 1920 (commonly referred to as Mineral Leasing Act or Mineral Lands Leasing Act)
Mining in the Parks Act
National Environmental Policy Act of 1969
National Flood Insurance Act of 1968
National Historic Preservation Act
National Park Service Concession Management Improvement Act of 1998

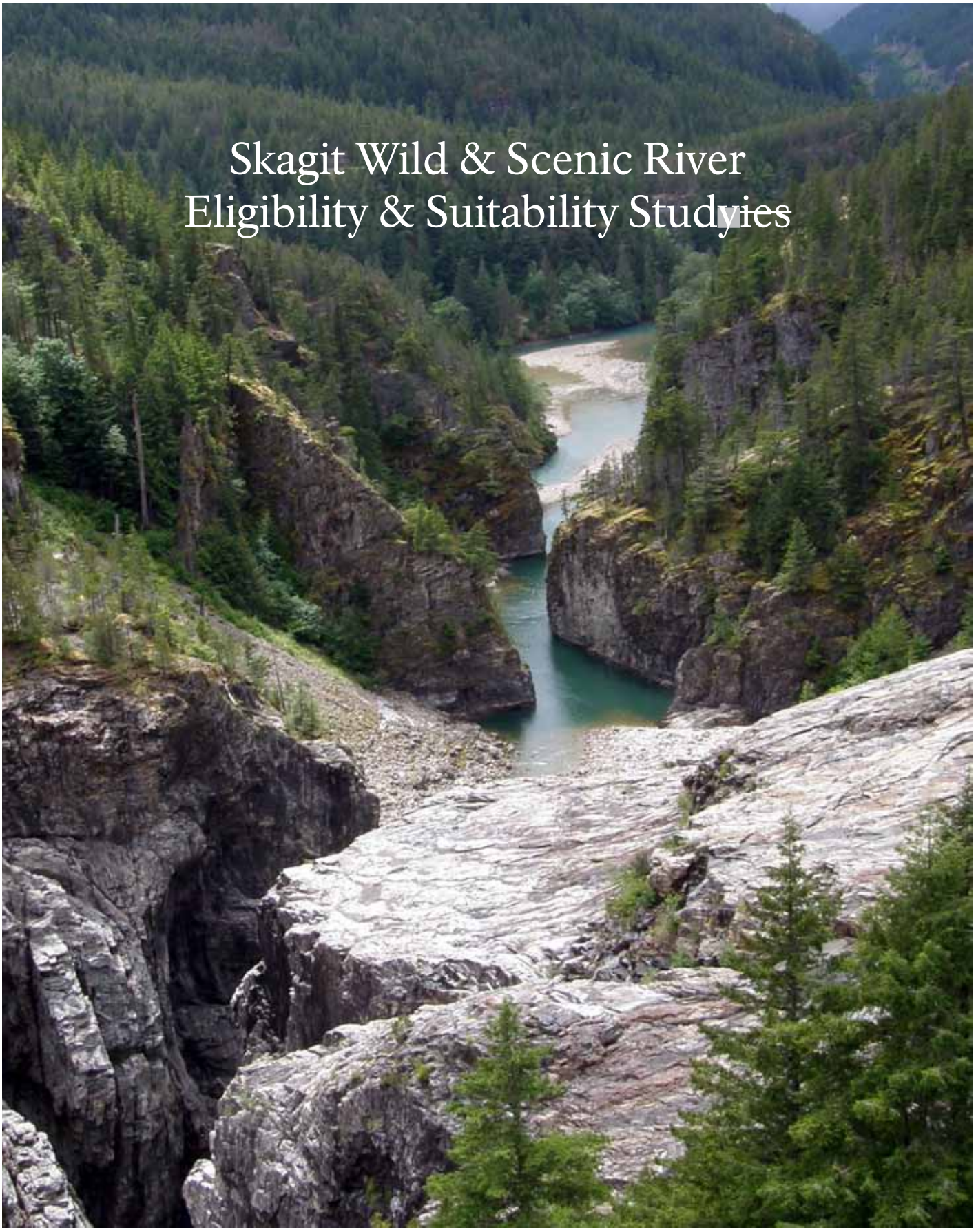
National Park Service Omnibus Management Act of 1998
National Park System Concessions Policy Act
National Park System General Authorities Act (Act to Improve the Administration of the National Park System), August 18, 1970
National Park System New Areas Studies Act
National Parks Air Tour Management Act of 2000
National Parks and Recreation Act, November 10, 1978
National Parks Overflights Act of 1987
National Trails System Act
National Trust Act of 1949
National Wildlife Refuge System Administration Act of 1966
Native American Grave Protection and Repatriation Act
Negotiated Rulemaking Act of 1990
Noise Control Act of 1972
NPS Organic Act
Outdoor Recreation Coordination Act of 1963
Outer Continental Shelf Lands Act
Park System Resource Protection Act
Parks, Parkways, and Recreational Programs Act
Payment in Lieu of Taxes Act
Public Buildings Cooperative Use Act of 1976
Rehabilitation Act of 1973
Reorganization Act of March 3, 1933
Reservoir Salvage Act of 1960
Resource Conservation and Recovery Act of 1976
Revised Statute 2477, Right-of-Way across Public Lands
Rivers and Harbors Appropriation Act of 1899
Safe Drinking Water Act
Soil and Water Resources Conservation Act of 1977
Surface Mining Control and Reclamation Act of 1977
Surface Resources Use Act of 1955
Surface Transportation Assistance Act of 1982
Tax Reform Act of 1976
Toxic Substances Control Act
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
Urban Park and Recreation Recovery Act of 1978
Water Resources Planning Act of 1965
Watershed Protection and Flood Prevention Act
Wild and Scenic Rivers Act
Wilderness Act
Wildfire Disaster Recovery Act of 1989

Executive Orders Applicable to the National Park System

Executive Order 11514: Protection and Enhancement of Environmental Quality
Executive Order 11593: Protection and Enhancement of the Cultural Environment
Executive Order 11644
Executive Order 11987: Exotic Organisms, 42 FR 26949, Revoked by Executive Order 13112
Executive Order 11988: Floodplain Management
Executive Order 11990: Protection of Wetlands
Executive Order 12003: Energy Policy and Conservation
Executive Order 12088: Federal Compliance with Pollution Control Standards
Executive Order 12372: Intergovernmental Review of Federal Programs
Executive Order 12898: General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
Executive Order 13006: Locating Federal Facilities on Historic Properties in our Nation's Central Cities
Executive Order 13007: Indian Sacred Sites
Executive Order 13089: Coral Reef Protection
Executive Order 13112: Invasive Species.
Executive Order 13158: Marine Protected Areas
Executive Order 13175: Consultation and Coordination with Indian Tribal Governments
Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
Executive Order 13352: Facilitation of Cooperative Conservation
Executive Orders 11989 (42 FR 26959) and 11644 (37 FR 2877): Offroad Vehicles on Public Lands
Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance

Policies and Procedures Applicable to the National Park System

Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act
Historic Preservation Certifications Pursuant to the Tax Reform Act of 1976, the Revenue Act of 1978, the Tax Treatment Extension Act of 1980, and the Economic Recovery Tax Act of 1981
National Park Service Management Policies 2006
Policies on Construction of Family Housing for Government Personnel
Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory


Skagit Wild & Scenic River
Eligibility & Suitability Studyies

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Executive Summary

This study report evaluates the eligibility and suitability of the Skagit River, from Gorge Dam to the Ross Lake National Recreation Area (NRA) boundary, and its tributaries for inclusion in the Wild and Scenic River (WSR) System. This report also identifies preliminary classifications of eligible river segments. The result is a recommendation to extend WSR designation to the 11-mile segment of the Skagit River and two major tributaries.

This analysis is being conducted in conjunction with the development of Ross Lake National Recreation Area's General Management Plan. This study meets the requirement, under Section 5(d)(1) of the Wild and Scenic Rivers Act, for agencies to evaluate potential WSR rivers as part of their land management planning processes.

The Wild and Scenic Rivers Act, passed in 1968, protects the free-flowing waters of many of our nation's greatest rivers, while also recognizing the potential for appropriate use and development. It ensures the public's enjoyment of the river and its resources for present and future generations; new dams and other water resources projects that would have adverse impacts are prohibited on WSR segments.

There are three different classification types based on the existing level of human development or impact on the river –wild, scenic, and recreational. To be eligible for inclusion in this system, a river must be free-flowing and possess at least one outstandingly remarkable value (ORVs) or characteristic that is river-related and unique, rare, or exemplarily compared on a regional or national scale.

If a river is found eligible, the next step is a suitability analysis which assesses whether or not eligible segments should be included in the National WSR System. The suitability study findings are based on public input and an assessment of the ability of the river segment(s) to be managed to protect the outstandingly remarkable river values. Designation of eligible and suitable river segments into the National WSR System on NPS lands would be decided through a Congressional Act.

The Skagit River from Gorge Powerhouse to the Ross Lake NRA boundary, Goodell Creek, and Newhalem Creek were found to be eligible. They all are free-flowing. The Skagit River was found to have ORVs in the fish, wildlife, geology, history, pre-history, recreation and scenery resources. Goodell Creek was found to have ORVs in the fish, wildlife, geology, and scenery resources. ~~While~~ Newhalem Creek was found to possess ORVs in the wildlife, geology, history, pre-history, and scenery resources. The water quality of all eligible river segments was determined to be high quality. Table 1 summarizes the ORVs.

The Skagit River segment from below Gorge Dam to Gorge Powerhouse does not meet the free-flowing requirement of the WSR Act and therefore was found to be ineligible. In addition, the remaining 21 tributaries flowing into the study reach, though free-flowing, were not found to possess any ORVs, and therefore are not eligible. This assessment was based on available information through staff knowledge and literature research. Varying amounts of information were available for these creeks, with most creeks lacking thorough surveys of natural and cultural resources. Therefore, this assessment will be updated in the future if new information is found indicating the potential for a river segment to possess an ORV.

Eligible rivers or river segments were classified as recreational or wild, as listed below:
The Skagit River was classified as:

- recreational - due to the hydropower dams upstream and presence of the North Cascades Highway paralleling the river for this entire segment.

Goodell Creek was classified as:

- wild – headwaters to river mile one-half
- recreational – river mile one-half to its confluence with the Skagit River

Newhalem Creek was classified as:

- wild – headwaters to upstream of the diversion dam (river mile one)
- recreational – upstream of the diversion dam (river mile one) to its confluence with the Skagit River

The suitability analysis was primarily based on the following factors:

- The characteristics that make the river segments worthy of designation.
- The ability of NPS and its non-Federal partners to manage the river segments to protect their ORVs, water-quality, and free-flow.
- The compatibility of WSR designation with other potential uses of the river segments.
- The public's support for designation.

The upper Skagit River and the two eligible tributaries in this reach – Goodell and Newhalem creeks - were found to be suitable for WSR designation. The addition of this 11-mile upper Skagit River segment and its key tributaries would complete the Skagit WSR system from the downstream end of the Skagit Hydroelectric Project to the town of Sedro-Woolley and create more opportunities for holistic watershed management.

The support for this designation from the general public and two other land management agencies, Seattle City Light and the Washington State Department of Transportation, was overwhelming positive. Only one comment was received opposing designation. Two more comments also expressed concerns about the potential effects of WSR designation on new water resource projects, but no known proposals in the foreseeable future would be prohibited by the WSR designation.

Seattle City Light is committed to managing their lands to protect fishery and wildlife resources generally consistent with the intent of the WSR Act. The National Park Service manages the majority of the lands in the study area and manages the river system to protect the outstandingly remarkable values, water quality, and free-flowing character of the river segments.

Existing protections are in place prohibiting logging and mining, as well as limiting hydropower development. WSR designation would add additional protections from hydropower facilities and encourage natural bank protection, thus furthering regional and national goals for recovery and protection of salmon and bald eagle populations.

River segments found eligible and suitable will be managed by the National Park Service in a manner that protects their free flowing character, water quality, and ORVs as required under the WSR Act.

Designation would require the development of a comprehensive river management plan which would allow focus on the river segments and their special resources. WSR designation would also direct further protection and enhancement of natural, geological, cultural, scenic and recreation resources.

Therefore the National Park Service recommends that Congress extend the Skagit WSR designation to include this 11-mile upper Skagit segment and the two largest tributaries flowing into it.

Introduction

Purpose and Scope

This report includes the ~~draft~~ final Wild and Scenic River (WSR) Eligibility and Suitability Study findings for the Skagit River and its tributaries from below Gorge Dam to the Ross Lake National Recreation Area (NRA) boundary just upstream of Bacon Creek. In a previous eligibility study conducted by the National Park Service (NPS) in 1989, the entire segment of the Skagit River within the Ross Lake NRA was found eligible for inclusion in the National WSR System based on fishery and wildlife outstandingly remarkable values (ORVs). As a result of this initial study, the Skagit River within Ross Lake NRA is located on the Nationwide Rivers Inventory[1] list. The first purpose of this report is to update these eligibility findings based on new information and changes that have occurred since 1989 and new guidance and criteria that have been developed and adopted by the Interagency Wild and Scenic River Coordinating Council. The second purpose is to conduct a suitability analysis to determine whether or not the eligible river segments should be recommended for designation.

This WSR study area includes the Skagit River below Gorge Dam to the Ross Lake NRA boundary and the tributaries flowing into this reach. The evaluated tributaries are identified by name or by an identifying number from the Washington State Stream Catalog System. Starting upstream and moving downstream, the north tributaries are listed below:

- #1965
- Afternoon Creek
- Falls Creek
- Goodell Creek
- #1865
- Babcock Creek
- Thornton Creek
- Sky Creek
- Damnation Creek
- #1826

The south tributaries are:

- #1966
- Ladder Creek
- Newhalem Creek
- #1860
- Martin Creek
- #1857
- #1854
- #1853
- #1851

Table 1: Summary of Outstandingly Remarkable Values

Skagit River from Gorge Powerhouse to the Ross Lake NRA Boundary

Resource	Characteristics
Fish	The Skagit River system is one of the few remaining systems in the contiguous states which supports significant numbers of five native salmon species, two species of trout, and two species of char. It provides essential habitat for three federally listed species (Chinook salmon, bull trout, and steelhead) that spend a portion or all of their lives in Skagit River. It is one of the most important rivers for natural fishery stocks in Washington.
Wildlife	The Skagit River watershed has one of the greatest concentrations of bald eagles of any river in the lower 48 states. The quality and abundance of cottonwood overstory habitat make it possible for several other species (American Redstart, Verry, Lazuli Bunting, Nashville Warbler, and Red-eyed Vireo) to breed in western Washington where they are otherwise rare or not found at all.
Geology	The Skagit River watershed is the most glaciated river system in the lower 48 states, with over 300 active glaciers. Several examples of glacial processes including glaciers, cirques, horns, arêtes, and hanging valleys are found particularly in the Goodell & Newhalem tributaries. The geologic formation history, including how the river once flowed northward and the Damnation Creek erosional landslides processes which created the main-stem river rapids, contribute to the exceptional geologic characteristics.
History	The Skagit River and Newhalem Creek Hydroelectric Projects Historic Districts are river-dependent and nationally unique. For this section of the Skagit River, the town of Newhalem and Ladder Creek Falls are elements of this historic district.
Pre-history	Pre-history is an ORV because the uniqueness of the Goodell Creek site which represents six hundred years of river use and is the only site where salmon remains from prehistoric human use including teeth and head parts have been found near a river segment.
Recreation	The Skagit River offers a unique beginner-intermediate whitewater opportunity in the Northwest providing a chance for boaters of all age groups and experience levels to enjoy the river. This river segment is used by families and expert boaters alike and is an important training ground. Wildlife viewing opportunities of salmon and bald eagles contribute to the outstanding recreation experience. The river is also unique in the region because it provides boatable flows year-around when other rivers are dry.
Scenery	The Skagit River is a breathtaking scenic river with beautiful clear water, waterfalls, mountain views, and exemplary wildlife viewing opportunities.

Goodell Creek

Resource	Characteristics
Fish	Goodell Creek, known as the 'salmon headquarters', provides regionally exemplary spawning and rearing habitat for salmon.
Wildlife	Goodell Creek provides regionally unique habitat for a diversity of wildlife species including bald eagles, harlequin duck, and the American dipper.
Geology	The Skagit River watershed is the most glaciated river system in the lower 48 states, with over 300 active glaciers. Goodell Creek drains the Picket Range, one of the most rugged mountain ranges in the contiguous states. Several examples of glacial processes including glaciers, cirques, horns, arêtes, and hanging valleys are found in Goodell Creek.
Scenery	Goodell Creek begins on the vertical steps of the wilderness Picket mountain range, one of the most rugged, scenic and remote massifs in the lower 48 states. The mountain views, numerous cascades, wildlife and fishery resources, and limited human-made features make scenery an ORV for Goodell Creek.

Newhalem Creek	
Resource	**Characteristics**
Wildlife	Newhalem Creek provides regionally unique habitat for a diversity of wildlife species including harlequin duck and the American dipper.
Geology	The Skagit River watershed is the most glaciated river system in the lower 48 states, with over 300 active glaciers. Newhalem Creek showcases examples of glacial processes including glaciers, cirques, horns, arêtes, and hanging valleys.
History	The Skagit River and Newhalem Creek Hydroelectric Projects Historic Districts are river-dependent and nationally significant. Newhalem Creek Dam and Powerhouse was the first hydroelectric project constructed in the upper watershed and is an important contributing factor to the nationally unique historic district.
Pre-history	The Newhalem rockshelter, an eligible National Register site, is regionally unique and one of only a few rockshelters that have been excavated in Washington State. The rockshelter was likely created because of its proximty to the creek which was a travel corridor for Native Americans moving from Cascade Pass to the Skagit River. Remains from here included salmon and goats with some dating 1500 years old.
Scenery	The Newhalem Creek waterfall is one of the most scenic waterfalls in the North Cascades NPS Complex and rated as one of the top 100 northwest waterfalls.

- #1849
- #1843
- Alma Creek
- Copper Creek

Staff and financial resources were not available to conduct WSR analysis for all Skagit River tributaries within the North Cascades NPS Complex. The Skagit tributaries above the dams were not evaluated during this study. Bacon Creek was also not evaluated since it is outside the boundary of the Ross Lake NRA. Previous findings for these river segments are incorporated into the GMP and the GMP also directs NPS to work in cooperation with the U.S. Forest Service to update the WSR analysis for these tributaries sometime over the life of the GMP (see the GMP Alternatives Section).

The National Park Service focused on the main-stem Skagit River below the dams and the tributaries in this reach for the following reasons:

- This study was conducted as part of the General Management Plan (GMP) for Ross Lake NRA. The main-stem Skagit River segment is the only river segment entirely within the Ross Lake NRA. All the tributaries begin either in U.S. Forest Service lands or the North Cascades National Park, and then enter Ross Lake NRA before flowing into the Skagit River.
- The Skagit River downstream of the Ross Lake NRA boundary is already designated as a WSR. Inclusion of this 11-mile main-stem segment would complete designation from the downstream end of the Skagit Hydroelectric Project to the town of Sedro-Woolley.
- The dams and the Newhalem Gorge create a fish barrier and a distinctive watershed break for the upper Skagit River System. The selected study area allows a focus on salmon and other anadromous fish resources.

Skagit River Watershed

The headwaters of the Skagit River lie in British Columbia, Canada, in the North Cascades Mountains. Skagit River then flows approximately 150 miles before it empties into Puget Sound. Abundant glaciers in the surrounding jagged peaks provide stable flows that help make it the only Puget Sound tributary to host all native species of anadromous fish and attracts one of the highest concentrations of wintering bald eagles in the lower 48 states. It is the largest river draining into the Puget Sound and the third largest river on the west coast of the contiguous states. The entire Skagit River Watershed Basin covers 3100 square miles; it provides 20 percent of the flows into Puget Sound.

Wild and Scenic Rivers Act – Criteria & Process

The Wild and Scenic Rivers Act, enacted in 1968, established a system to permanently protect selected

free-flowing rivers in their natural condition for the present and future generations' enjoyment of the river. It was intended to balance the water resource development policies with river conservation and recreation goals. Rivers that are designated or included in the National WSR System receive protection from water resource projects that would have adverse affects on the river and its resources. A river can be designated as wild, scenic, or recreational. The WSR Act originally designated eight river segments and specified how others rivers were to be added. Rivers can be considered for addition into the WSR system if Congress authorizes a specific river segment studied, and Section 5(d)(1) of the WSR Act also directs federal agencies to evaluate rivers conjunction with their land management planning processes.

The three main steps involved in a WSR study are eligibility, classification, and suitability analysis. The eligibility analysis is a resource inventory and evaluation to determine if the river is free-flowing and possess one or more outstandingly remarkable value (ORV) such as fishery, wildlife, scenery, recreation, geology, or cultural resources. An ORV is defined as a river-related value that is unique, rare or exemplary within a national or regional context. Rivers that are found eligible are also classified as wild, scenic, or recreational primarily based on the level of human impact along the river and its water quality. The last step in the WSR study process is a suitability analysis which assesses whether or not eligible segments should be included in the WSR System. Suitability determination is based on an assessment of the characteristics that make the river segments worthy of designation; the ability of NPS and its non-Federal partners to manage the river segments to protect their ORVs, water-quality, and free-flow; the compatibility of wild and scenic river designation with other potential uses of the river segments; and public support and involvement. Designation of eligible and suitable river segments into the National WSR System on NPS lands would be decided through a Congressional Act.

Previous WSR Studies in the North Cascades NPS Complex

WSR eligibility studies for the North Cascades NPS Complex were completed in both 1989 and 2002. The draft 1989 eligibility report evaluated a number of river segments in the Skagit River watershed within the North Cascades NPS Complex as well as other watersheds in the North Cascades NPS Complex. The following river segments were found eligible:

- Agnes Creek/Bridge Creek
- Baker River
- Big Beaver Creek
- Chilliwack River
- North Fork Nooksack River
- Ruby Creek/Granite Creek/Canyon Creek
- Skagit River (Gorge Dam to park boundary)
- Stehekin River
- Thunder Creek/Fisher Creek

In 2002 a detailed eligibility report determined that the entire Stehekin River watershed was eligible for WSR designation.

Skagit River Management

Skagit River Hydroelectric Project & Seattle City Light Management

The Skagit River Hydroelectric Project, managed by Seattle City Light (SCL) includes three hydroelectric dams: Ross, Diablo, and Gorge Dam. The largest lake, Ross, extends 22 miles within the U.S. and its headwaters are located just across the border in Canada. The project produces 690 megawatts of power and has been in operation since 1927 under the Federal Energy Regulatory Commission's (FERC) jurisdiction; it received a 30 year relicense in 1995. The three dams are located above a natural fish barrier at Newhalem Gorge and because of this, fish passage was not required as part of their FERC license. This license was largely based on a multiparty settlement agreement and was one of the first projects in the country to successfully negotiate an agreement on river management that included protecting resources and generating hydropower. SCL received the 1998 Public Service Award from the Nature Conservancy of Washington for its environmental stewardship of the Skagit River basin. The Skagit River below the Gorge Powerhouse is managed to protect fishery resources, primarily for federally listed threatened and endangered salmon species. The hydropower accounts for a significant portion of the City of Seattle's electric power, providing 25 percent of Seattle's electrical needs.

SCL also owns property along the Skagit River to help them manage the hydropower project, Newhalem & Diablo town sites, and associated facilities. In the Skagit River study segment within a one-quarter of a mile on either side of the high water mark, SCL owns approximately 21 percent of the land.

Washington State Department of Natural Resources

The State of Washington asserts jurisdiction and ownership over approximately 480 acres of the bed of the Skagit River below the ordinary high water mark.

Skagit River Downstream & United States Forest Service Management

In 1978, Congress designated 158.5 miles of the Skagit River and its tributaries, the Sauk, Suiattle, and Cascade rivers, as wild and scenic rivers. This system is managed by the Mt. Baker-Snoqualmie National Forest and includes a mixture of public and private lands with 50 percent of the land in private ownership. The ORVs are: fish, wildlife, and scenery. The main-stem Skagit River reach begins at the Ross Lake NRA boundary and extends down to Sedro-Woolley and is designated as a recreational river. This reach is known for its salmon resources, bald eagles, and scenic boating opportunities.

National Park Service Management

The North Cascades National Park Service Complex was created in 1968 and consists of the North Cascades National Park, Ross Lake NRA, and Lake Chelan NRA. In 1988, 93 percent of the lands in the Complex were included in the Stephen Mather Wilderness. Ross Lake NRA contains the three hydroelectric dams, three reservoirs, as well as the free-flowing section of the Skagit River. The wilderness boundary is within approximately one-quarter of a mile to two miles from banks of the Skagit River. The south-side of the river below Newhalem Creek is road-less and only accessible by boat.

Eligibility Evaluation

The WSR Act has two requirements for eligibility; the river segment must be free-flowing and possess one or more outstandingly remarkable value in fish, wildlife, geological, recreational, scenic, historic, cultural, or other similar value. This section evaluates the eligibility of the Skagit River from Gorge Dam to the Ross Lake NRA boundary and the tributaries in this reach.

Free-Flowing Condition

"Free-flowing" is defined in section 16(b) of the Act as:

> . . .existing or flowing in natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures... shall not automatically bar its consideration for inclusion: Provided, that this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the National Wild and Scenic Rivers System.

Hydrology of the Skagit Watershed

The Skagit River watershed is surrounded by dramatic glacier-covered peaks which feed meltwater to the river. It begins in British Columbia, winding through forests and flowing through steep canyons, before flattening out into a broad valley as it reaches Puget Sound. High flows occur when mountain snow melts in the spring and during fall/winter rain and rain-on-snow events. Melting glaciers deliver 15 to 30 percent of summer flows, providing stable base flows during summer drought.

The Skagit River is heavily influenced by the Skagit Hydroelectric Project. The project consists of three dams and associated facilities (Ross, Diablo, and Gorge) operated together for a combined capacity of 690 megawatts (MW). The dams are all located above a natural fish barrier at Newhalem Gorge. Water is diverted at Gorge Dam, located furthest downstream, through penstocks or large pipes and this creates a two and one-half mile long bypass reach of the Skagit River. There is no minimum flow requirement in this bypass reach and it remains dry or with limited water throughout the year. Tributaries and occasional spills from the dams provide flows for this reach. The project below is operated in "peaking mode", meaning water is stored in the reservoirs and released in accordance with energy needs; the flows fluctuate on a daily and seasonal basis. The project is also managed to protect fishery resources with different flow requirements for different life stages of anadromous fish species. The flow regime is a complex, model-based arrangement with minimum and maximum flows as well as ramping rates designed to meet the needs for fishery resources while also maximizing

hydroelectric power operations. While the flows are managed for hydropower generation and to protect fishery resources, they do not mimic the natural hydrography. The Settlement Agreement for relicensing this hydroelectric project was considered a national model for river conservation and outlined several key environmental and recreational improvements including:

- Releasing flows to meet the important life stage needs of salmon and steelhead trout
- Reducing daylight downramping rates to reduce stranding of salmon fry
- Funding habitat acquisition and restoration of estuary areas to help restore Chinook salmon and bull trout
- Acquiring lands for important wildlife habitats
- Providing annual funding for environmental research, studies, and monitoring
- Providing funding for cultural resource mitigation
- Funding the development of the Environmental Learning Center on Diablo Lake
- Rehabilitating recreation facilities

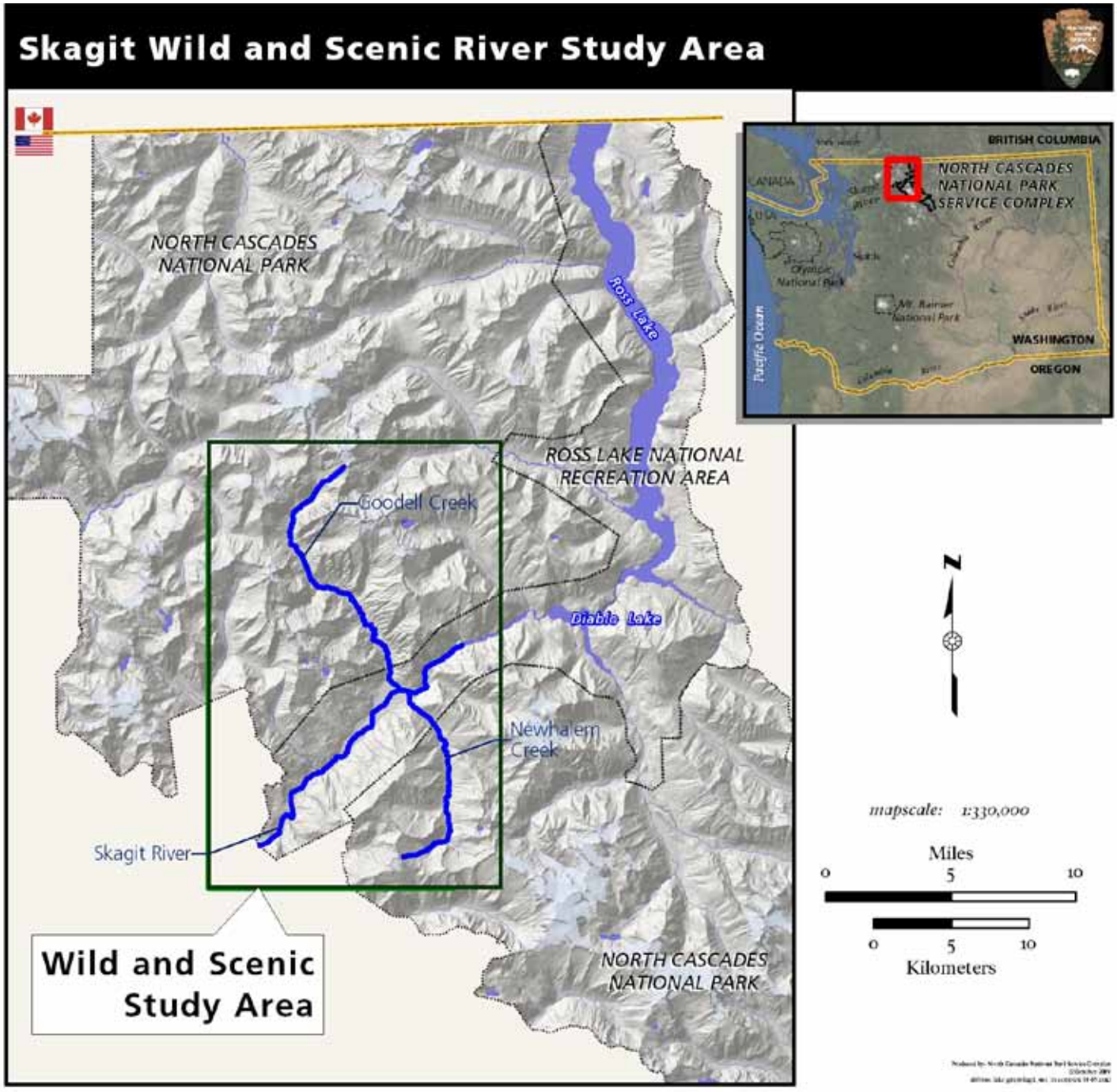


Figure 1. Skagit Wild and Scenic River Study Area

SCL also owns and operates a small hydroelectric project on Newhalem Creek. This project consists of a ten foot high diversion dam, penstocks, and a powerhouse. This 2.3 MW hydroelectric project diverts water from Newhalem Creek, which then is used for generation and returned to the Skagit River via a man-made channel. The project has been in place since 1921 and was originally built to provide power to Newhalem town site while the construction of the Skagit River hydropower projects was underway. The project was relicensed in February 1997. Minimum flows vary by different times of the year to protect the fishery resources. Ramping rates also limit flow fluctuations. Salmon are prevented from going up the tailrace channel by a concrete barrier put in place as a requirement of the last license.

River Bank Alteration and Shoreline Development

The North Cascades Scenic Highway parallels the Skagit River through the study area. Efforts to protect the road include riprap in several short segments constructed during the State Department of Transportation's maintenance operations. In the segment below the powerhouse to Ross Lake NRA boundary approximately three miles or 15 percent of the shoreline contains some kind of modification. This includes rip-rap located on the north-side of the river. There are four bridges spanning the Skagit River:

- a vehicle bridge right below the powerhouse (RM 94.2)
- a pedestrian bridge directly below the powerhouse (RM 94.12)
- a pedestrian bridge in Newhalem (RM 93.75)
- a vehicle bridge to the NPS Visitor Center (RM 93)

There is also an old bridge abutment at RM 86. In addition, there are two powerlines in the study area vicinity. The highway also crosses the Skagit River tributaries on the north side including Goodell, Babcock, Thornton, Damnation, and other unnamed creeks.

The Skagit River is often referred to as the 'Emerald Skagit' due to its clear blue green water.

Flow Conditions of Specific River Segments

Segment 1. Gorge Dam to Gorge Powerhouse (RM 96.63 to RM 94.18)

There is no minimum flow in this 2.5 mile reach and it remains dry or with limited water much of the year. Water from Gorge Dam is piped through penstocks to generate hydroelectric power and released below the Gorge Powerhouse. Tributaries including Afternoon, Falls, and other unnamed creeks, as well as occasional spills, feed this reach. The flow regime does not support flow-dependent ORVs or water quality requirements; therefore this reach does not meet the definition of free-flowing.

Segment 2. Gorge Powerhouse to Ross Lake NRA Boundary (RM 94.18 to RM 83.1)

The flows are returned to the river at the Gorge Powerhouse, and the Skagit again becomes a powerful river. As mentioned in the Skagit River hydrology section above, the river flows are managed by the hydropower dams. While the flow regime is not natural, they are managed to protect and enhance significant fishery resources. Once reservoirs fill in spring, summer runoff in the river becomes more natural. This reach meets the free-flowing requirements of the WSR Act.

Tributaries

The headwaters of the tributaries of the Skagit River in this reach are located in the North Cascades National Park; their river segments enter Ross Lake NRA in their lower stretches and then drain into the Skagit River. The tributaries are fed by glaciers and contain primarily natural banks. There is one low-head dam and hydropower facility on Newhalem Creek which is not operated in the dry summer months to allow for protection of natural resources. The presence of a low-head dam does not automatically bar a river segment from inclusion in the WSR system. This diversion was found to not significantly impact the free-flow character of the river system. The other tributaries are free of dams and have limited human made features such as rip-rap and bridge crossings. Therefore, all of the tributaries of the Skagit within the study area were found to meet the free-flowing requirement of the WSR Act.

Outstandingly Remarkable Values

The second criteria that a river must meet to be eligible for inclusion in the WSR System is that it must possess one or more Outstandingly Remarkable Values (ORVs). The Interagency Wild and Scenic Council's technical report, "The Wild and Scenic River Study Process", provides guidance on evaluating eligibility and identifying ORVs. This is the current guidance used by all four agencies that make up the council – the NPS, Bureau of Land Management (BLM), United States Fish and Wildlife Service (USFWS), and USFS; this report adheres to this guidance as well.

An ORV is defined as a river-dependent feature that is unique, rare, or exemplary at a comparable regional or national level. Typically, a "region" is defined on the scale of an administrative unit, a portion of a state, or an appropriately scaled physiographic or hydrologic unit. To be considered river-dependent, a value must be located in the river or on its immediate shorelands and contribute substantially to the functioning of the river ecosystem or owe its location or existence to the presence of the river. A determination of whether or not a river area contains ORVs is based on the professional judgment of the interdisciplinary study team utilizing criteria set forth in the WSR Interagency Council's technical paper.

Fish

The Interagency WSR Council's guidance for outstandingly remarkable fish resources are:

- Fish values may be judged on the relative merits of either fish populations or habitat – or a combination of these river-related conditions.
- Populations: The river is nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federal or state listed or candidate threatened endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.
- Habitat: The river provides exceptionally high quality habitat for fish species indigenous to the region of comparison. Of particular significance is habitat for wild stocks and/or federal or state listed or candidate threatened endangered or sensitive species. Diversity of habitats is an important consideration and

could, in itself lead to a determination of outstandingly remarkable.

The Skagit River system is one of the few remaining systems in the contiguous states which supports significant numbers of five native salmon species, two species of trout, and two species of char, and several racial sub-groups or stocks. These include six Chinook stocks (spring, summer, and fall), pink salmon, coho salmon, chum salmon, and sockeye salmon; summer and winter run steelhead; sea run cutthroat trout; and Dolly Varden and bull trout. Of these stocks, all season-specific Chinook, sockeye, coho, and steelhead species are under review by state and federal agencies for potential listing under the Endangered Species Act. The Skagit is also one of the few rivers, in the lower 48 states, supporting a natural fishery. The system's fishery produces an average of 2,210,000 anadromous fish each year. Of this number, about 500,000 return to spawn; the balance is harvested by commercial and sport fishermen or by natural predators in the Pacific Ocean. These numbers of fish represent a significant percentage of the Puget Sound anadromous fish harvest (approximately between 20 percent and 30 percent).

The study reach of the Skagit River provides some of the most important salmon and steelhead spawning habitat in the Skagit River basin. This section is highly conducive to the migration, spawning and rearing of both anadromous and resident fish. Factors contributing to the high-quality water in the Skagit include high dissolved oxygen content, relatively low nutrient level, low bacterial content and relatively cool temperatures.

Endangered Species Act Listed Species

Three species of fish are listed under the federal Endangered Species Act in the Skagit system: Chinook salmon, bull trout, and steelhead trout.

Chinook Salmon - The Puget Sound Chinook Salmon Evolutionarily Significant Unit was listed as a threatened species on March 24, 1999 by the National Marine Fisheries Service under the federal Endangered Species Act. Chinook salmon stocks originating from the Skagit River have been in a long-term decline. Chinook catches in the Skagit terminal area have declined since at least 1935; ranging from 40,000 to 50,000 in the 1930s, dwindling down to annual catches of a few thousand or even hundreds during the 1990s. Return/spawner rates have been below average since brood year 1983. Since about 1984, upper Skagit summer Chinook have made up an increasing percentage of the total escapement. Prior to 1984, approximately 60 percent of the summer and fall production unit escapement was comprised of upper Skagit summer Chinook, yet, since that time, upper Skagit summer Chinook have averaged about 75 percent of the total summer and fall production unit escapement.

This section of the Skagit River primarily supports all fresh water life history stages (egg, fry, juvenile rearing, and adult spawning) of one of the six separate Skagit Chinook populations (upper Skagit summer Chinook). Upper Skagit River summer Chinook spawn in the Skagit main-stem and its tributaries upstream of the Sauk River, primarily from September through early October. Genetic analyses have shown that upper Skagit summer Chinook is significantly differentiated from other Skagit Basin Chinook populations. Along with the main-stem Skagit, Goodell Creek provides critical habitat for Chinook salmon.

Bull Trout - The Coastal Puget Sound Distinct Population Segment of bull trout was listed as a threatened species under the Endangered Species Act on November 1, 1999 by the U.S. Fish and Wildlife Service. The Puget Sound Management Unit consists of eight core areas, each supporting one or more local populations of bull trout and their habitat. The Coastal-Puget Sound Distinct Population Segment of bull trout occurs in a unique ecological setting because it supports the only known anadromous forms of bull trout in the contiguous United States.

This section of the Skagit River is part of the Lower Skagit core area and supports bull trout that exhibit anadromous, fluvial and resident life history patterns. Three local populations (Bacon Creek, Goodell Creek and Newhalem Creek) spend a portion of their lives in this section of river. The population trend of the lower Skagit bull trout is stable to increasing. In addition to the main-stem, Goodell Creek and the lower portions or Alma and Newhalem Creek provide critical habitat for bull-trout.

Steelhead Trout -The Puget Sound Distinct Population Segment of steelhead was listed as a threatened species under the federal Endangered Species Act on May 11, 2007 by the National Marine Fisheries Service.

This section of the Skagit River supports all fresh water life history stages (egg, fry, juvenile rearing, and adult spawning) of both summer and winter

steelhead. In 2002 the Main-stem Skagit/tributaries winter steelhead was rated as depressed due to a long-term negative trend in escapements since 1992 and a short-term severe decline in 2000 and 2001.

Conclusion
This section of the Skagit River drainage is one of the few remaining river systems in the contiguous states which support significant numbers of all five species of salmon, two species of trout, and two species of char. It is one of the most important river systems in Washington for salmon. The three federally listed species: Chinook salmon, steelhead trout, and bull trout use this section for spawning and rearing. In addition to the main-stem, Goodell Creek is important for salmon and bull trout. The quality of the habitat, abundance and variety of wild anadromous and resident fish, and the presence of three federally listed species in this section of the Skagit River and Goodell Creek contribute to the determination of ORV with regard to "fish".

The fishery habitat and use is limited in the other tributaries due to the steep terrain and barriers present, therefore "fish" was not found to be an ORV for the remaining tributaries.

Wildlife

The Interagency WSR Council's guidance for outstandingly remarkable wildlife is:

> Wildlife values shall be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat - or a combination of these conditions.
>
> - Populations: The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique, and/or populations of federal or state listed or candidate threatened, endangered and sensitive species. Diversity of species is an important consideration and could in itself lead to a determination of outstandingly remarkable.
> - Habitat: The river or area within the river corridor provides exceptionally high quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for federal or state listed or candidate threatened, endangered and sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Surrounded by several million acres of designated wilderness, the Skagit River corridor provides essential habitat for a diverse array of wildlife species. Over 60 species of mammals, 125 bird species, 12 amphibians, and four reptile species inhabit the study segment and corridor. These lands are home to animals that require large tracks of land to survive, such as grizzly bears and gray wolves.

The Skagit River corridor, with its abundance of spawning anadromous fish and mild climate, hosts the largest concentration of over-wintering bald eagles in Washington.

With its broad hardwood floodplain of black cottonwood, red alder, big leaf maple and several species of willow, the Skagit River supports bird species rare elsewhere in western Washington such as veerys, Nashville warblers, American redstarts, and lazuli buntings.

The Skagit River watershed is an important basin for salmon. Pink salmon swimming in Goodell Creek.

Kids get a close look at sockeye salmon.

Endangered Species Act Listed Species:

Within the Skagit River corridor, two mammal species are listed under the federal Endangered Species Act. These include the "endangered" gray wolf (*Canis lupus*) and the "threatened" grizzly bear (*Ursus arctos*). Two bird species, marbled murrelet (*Brachyramphus marmoratus marmoratus*) and northern spotted owl (*Strix occidentalis caurina*), are both listed as "threatened". There is also one 'Candidate' species, the fisher (*Martes pennanti*). Additionally, two 'monitor' species, both recently delisted, include bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*). Harlequin ducks are also listed as a State Species of Concern.

Gray Wolf and Grizzly Bear - These two species were listed on March 11, 1967; the gray wolf was listed as 'endangered' and the grizzly bear as 'threatened'. Both species required large tracks of undisturbed land to meet their ecological needs. Small numbers of gray wolves persist within the North Cascades, as evidenced by annual observations. The Skagit River corridor is within the North Cascades Grizzly Bear Recovery Zone and provides important spring foraging habitat for this species. The current grizzly population estimate for the North Cascades is believed to be less than 35 individuals.

Marbled Murrelet - The U.S. Fish and Wildlife Service listed the murrelet as a 'threatened' species on October 1, 1992. USFS surveys, conducted in the early 1990s, documented murrelets nesting in suitable habitat within the Skagit River watershed. Baseline surveys are currently being conducted in the Skagit River and preliminary results suggest murrelets are using the area.

Northern Spotted Owl - Listed as 'threatened' on June 26, 1990, the Northern Spotted Owl occupies mature/old-growth Douglas-fir / western hemlock forests that have multi-layered, multi-species canopies with moderate to high canopy closure. Surveys completed in 1996 by National Park Service staff documented five owl activity sites within the upper Skagit River reach. Newhalem Creek is home to two of these sites.

Bald Eagle - This species was delisted in July 2007. Occupied nests are now being monitored by federal and state agencies to ensure that the post-delisting monitoring plan goals are met and the species continues on its recovery path.

The Skagit River has one of the largest wintering bald eagle concentrations in the contiguous states. Eagles arrive in November to take advantage of the numerous spawning salmon using the Skagit. The bald eagles feed on the carcasses of salmon which die after spawning. Mild winter weather enables these eagles to continue using this area throughout the winter. They depart the Skagit River for the breeding grounds in early March.

Servheen (1975) documented the Skagit River as the most important wintering habitat for bald eagles in the continental United States. The Nature Conservancy and the NPS have monitored eagle use of the upper Skagit River since 1978. Eagle use of the river peaked in the early 1990s and has been stable since that time. The upper Skagit River continues to be an important wintering resource for this species. In addition to the main-stem, bald eagles also use the tributaries where salmon are present to forage and for night roost habitat.

Peregrine Falcon - Bjorklund (1984) surveyed suitable habitat within the Skagit River watershed. While he surveyed many highly suitable areas of breeding habitat, he did not observe any peregrines during the breeding season. Peregrines have recovered dramatically over the past two decades and were removed from Endangered Species Act protection on August 25, 1999. Washington Department of Fish and Wildlife biologists, conducting surveys of breeding habitat over the last several years, have documented four active eyries along the upper Skagit River.

Other Species of Interest

Harlequin Duck - The harlequin duck is a medium size duck who breeds on fast-flowing streams and winters along rocky coastlines in the crashing surf. It is federally listed as a species of concern and is found in the tributaries of the Skagit River watershed, including Goodell and Newhalem in this reach of the river.

American Dipper - The American dipper is North America's only truly aquatic songbird. It catches all of its food underwater in swiftly flowing streams by swimming and walking on the stream bottom. The American dipper is found in the Skagit River Watershed and prefers the tributaries, particularly Goodell and Newhalem in this river reach.

Black Swift - The black swift is the largest of Washington's swifts. Its nests are often located behind waterfalls or on damp cliffs, where the

environment is dark, wet, steep, and inaccessible to predators, and which provides the swifts with an unobstructed flyway to approach the nest. This highly specialized nesting habitat results in patchy distribution of Black Swifts. They eat insects and forage in the open sky over mountainous areas or cliffs. The North Cascades NPS Complex contains one of the greatest population concentrations of black swifts in the contiguous states. It is believed that one or two pairs may nest in the Big Devils waterfall on unnamed creek #1851.

Species that Breed in Skagit River System

There are also a number of species that breed in the cottonwood overstory in Skagit River system that are otherwise rare in Western Washington. This includes American Redstart, Veery, Lazuli Bunting, Nashville Warbler, and Red-eyed Vireo.

Conclusion

The upper Skagit River corridor has one of the largest concentrations of bald eagles in the contiguous states. In addition, the quality and abundance of cottonwood overstory habitat make it possible for several other species to breed in western Washington (American Redstart, Veery, Lazuli Bunting, Nashville Warbler, and Red-eyed Vireo) where they are otherwise rare or not found at all. Goodell and Newhalem Creeks are important tributaries in Western Washington for a diversity of wildlife species including the harlequin duck and American dipper. Therefore, "wildlife" is deemed to be an ORV in this segment of the Skagit River, Goodell Creek, and Newhalem Creek.

The Skagit River has one of the greatest concentrations of bald eagles in the contiguous United States. They spend winters here using the spawning salmon as a food source.

The study section of the upper Skagit River also provides essential habitat for a diverse array of wildlife including four listed and one candidate species. However grizzly bear, gray wolf, marbled murrelet, northern spotted owl, and peregrine falcon are not river-dependent; therefore are not ORVs.

Geology

The criteria used by the interagency WSR council states:

> The river or the area within the river corridor contains an example(s) of a geologic feature, process, or phenomena that is rare, unusual, or unique to the region of comparison. The feature(s) may be in an unusually active stage of development, represent a "textbook" example, and /or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, and other geologic structures).

The North Cascades Mountains, a relatively young range, are some of the most rugged in North America. Ice age glaciers left a legacy of jagged peaks, deep valleys, and craggy skyline profiles throughout the northern Cascades. Alpine glaciers and much larger Cordilleran ice sheets took turns shaping the watershed, with local alpine glaciers having the largest effect on the landscape. The history of the Skagit River is unusual in that geologists believe the upper river once flowed north to the Fraser River, before being captured by the lower river and draining into Puget Sound. Continental glaciers flowing south out of Canada led to the elimination of a regional divide and the stream capture resulting in the Skagit River reversing its direction. This process created the spectacular Skagit River Gorge and exposed rocks formed deep beneath the surface. Further evidence of this process in the form of gravel terraces can be found downstream of Gorge Dam. The Skagit may be a classic example of how other large rivers in the region formed, including the Columbia, Okanagan, and Fraser River systems.

Several large landslides have impounded the Skagit River in the area between Damnation and Bacon Creeks. The largest of these is the Damnation Creek landslide, which blocked the river from about 8,000 to 6,000 years ago, creating Lake Ksnea. Volcanic ash from the eruption of Mt. Mazama filled the lake Ksnea basin to thickness of forty feet. The landslides represent a unique opportunity to study slope instability as related to river erosion. Macrofossils held in deposits from landslide-dammed Lake Ksnea

represent a record of environmental changes from the distant past. Shovel spur rapids (also known as The Portage) occurs where the Skagit River cuts through the dam formed by the Damnation Creek landslide.

The Skagit River drains the most glaciated watershed of its size in the lower 48 states, containing more than 300 active glaciers. The glaciers impart a unique summer color to the river, as well as drought protection during the dry summer months. Glaciers also feed waterfalls that roar all year, unlike many parts of the Cascades, Sierras and Rocky mountains without glaciers where waterfalls are silenced after reservoirs of melting alpine snow are exhausted during summer warmth. High summer flows attract river recreationists as well as fish.

The Skagit River above Bacon Creek contains outstanding examples of alpine scenery created by the activity of glaciers. Spectacular glacial horns, arêtes, cirques and hanging valleys can be found in the gneiss and granite bedrock of the upper Skagit, particularly in Goodell Creek which includes the southern Picket Range and Newhalem tributaries.

Conclusion

The Skagit River watershed contains many exceptional geologic resources that make them an ORV including:

- the most glaciated river system in the lower 48.
- examples of glacial processes including glaciers, cirques, horns, arêtes, and hanging valleys, particularly in Goodell Creek.
- notable geologic history, particularly how the river once flowed northward and the erosional processes at Damnation creek which created this segment's river rapids, also contribute to the geologic exceptional characteristics.

Prehistoric Resources

The Interagency WSR Council's criteria states:

> The river or area within the river corridor contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must have unique or rare characteristics or exceptional human interest value(s). Sites may have national or regional importance

Snow-capped Pinnacle Peak also known as the "Chopping Block" is part of the rugged and remote Picket Mountain Range.

for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural groups for rare or sacred purposes. Many such sites are listed on the National Register of Historic Places, which is administered by the NPS.

This reach of the Skagit River possesses abundant evidence of human use spanning at least the last six millennia. The Skagit River and its tributaries were important to prehistoric people. Goodell and Newhalem Creeks in particular were important travel routes into the mountains. Twenty-two total archeological sites that have been inventoried along the river segment include nineteen pre-contact period sites and three historic period sites. At historic contact, this reach of the Skagit River was the traditional home of the Miskaiwhu band of Upper Skagits. The significance of the archeology along this reach should not be underestimated because bands like the Miskaiwhu, who dwelled up-river, in the remote interior distant from saltwater, are the most poorly documented in ethnohistoric records. Archeological investigations, however, help to correct this information void by documenting the long history of Upper Skagit bands' subsistence, settlement, and land use in the mountainous interior.

Two of the nineteen archeological sites have been formally determined to be eligible for listing on the National Register of Historic Places at local and state levels of significance. The two sites are Newhalem Rockshelter (45WH477) and Goodell Raft Launch (45WH64). Both of these sites are protected from vandalism and flooding by several hardening and armoring stabilization techniques; and both are open to public visitation and appreciation for the history they reflect and preserve.

Newhalem Rockshelter, located a short distance upstream from the mouth of Newhalem Creek, preserves evidence of hunting, butchering, and processing of animal and fish resources, particularly native mountain goats, over the last 1500 years. Currently the rockshelter remains the only excavated and evaluated rockshelter in northwest Washington State and it is one of the few archeological sites in the Northwest preserving evidence of mountain goat exploitation. The name Newhalem means 'goat-snare' because Skagit Indians drove goats off mountains and into the snares or traps located near the creek. Newhalem Creek was a travel corridor for Native Americans who moved from Cascade Pass in the mountains to the Skagit River. The shelter was likely located here due to it's proximity to the creek. Salmon remains were also found in this rockshelter.

Goodell Raft Launch, located on the banks of the Skagit River just downstream of Goodell Creek, preserves a 600 year record of Skagit Indian fishing history. This area was known for salmon and trout fishing and it was also a launching point for canoe travel. Located just downstream of Newhalem Gorge which was thought to be impassible by salmon and canoes, this site served as the head of fishing opportunities and canoe travel. The remains of several heating fires used to dry salmon, along with abundant charred salmon bones and stone tools, are stratified between Skagit River flood sands and extend to a depth of two meters below the ground surface. This site is significant for its contribution of new information about Washington State prehistory; presence of salmon remains, head parts, and teeth; and the long history and number of different time periods of use. Salmon remains have been uncovered in coastal areas, but it is unique to find remains this far up a river segment. Since salmon reach sexual maturity when they spawn and their teeth are enlarged at this time, it is very unusual to find salmon teeth. Given the quantity and quality of salmon remains, it may be possible to use the remains to distinguish among native species. This site is also unique as it represents the first site where the full manufacturing sequence of soapstone from river pebble to decorated object has been found in a single site. This site is currently used as a boat launch, continuing the long history of river-use.

It is important to note that this entire reach of the Skagit River has not been surveyed for cultural resources, particularly the roadless eastern side of this valley segment. Based on both the park's archeological predictive model and the empirical results of previous surveys, it is highly probable that more significant archeological sites remain to be found and assessed in the river corridor segment which could be eligible for the National Register of Historic Places. The NPS also intends to nominate the area of the Skagit River near the mouth of Goodell and Newhalem Creeks as a National Historic District under the National Register of Historic Places.

Conclusion
Pre-history is an ORV for the Skagit River because of the uniqueness of the Goodell Creek site which represents six hundred years of river-use and is the only river site where salmon remains from prehistoric use including teeth and head parts have been found in an interior river segment. The Newhalem rockshelter, an eligible National Register site, is also regionally unique and one of the few rockshelters that have been excavated in Washington State. Newhalem Creek was a travel corridor for Native Americans moving from Cascade Pass to the Skagit River. Salmon remains were found at the rock shelter. Therefore the Skagit River and Newhalem Creek were found to have "pre-history" as an ORV.

History

The Interagency WSR council's criteria states:

> The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare, unusual, or one-of-a-kind in the region. A historic site(s) and/or feature(s) in most cases is 50 years or older. Many such sites are listed on the National Register of Historic Places.

While explorers, fur traders, and surveyors were the first European Americans to view the upper Skagit River watershed, the first large non-native immigration into the valley came in 1877 on rumors of gold. Miners soon learned that finding the gold was the least of their problems. Difficulties in getting men and equipment in, and getting ore out, negated any potential profits. A few hardy settlers managed to establish simple homesteads in the narrow valleys. In the early 1900s, a second gold rush saw some extraction and processing operations, but these never proved profitable. Neither miners nor farmers could make much of a living along the Skagit.

The most profitable mining operations along the upper Skagit River were for talc or soapstone. The Rainbow Talc Mine was the earliest talc mine in the area. Located on the north side of the Skagit River, it used a number of ledges to extract talc and send it down river in barges. The Skagit Talc Mine was located on the south side of the river east of the Rainbow Talc Mine. The Skagit Talc mine provided talc for walkie-talkies used in World War II. This mine produced refractory bricks, finely ground powder used in cosmetics and fertilizers, and also single blocks, including a single block that formed a bathtub for a wealthy Seattle industrialist. The products of the talc mines were important for the industry of the Northwest, including logging and ship building. Talc was used as fire-resistant material to make the ovens used by the logging industry and to mark steel used to build ships. Crystal quartz was also profitably mined on the north side of the river in the early 20th century. Volcanic ash was removed by box car loads in the early 20th Century from Damnation Creek.

There were at least six homesteads located on the upper Skagit River between Bacon Creek and Newhalem. Below Bacon Creek the river valley narrowed noticeably and good bottomland was virtually non-existent. Located on high ground above the Skagit River, the present-day town of Newhalem was first developed by N.E. Goodell, an entrepreneur from Portland, Oregon who set up a store for miners in 1879. As the final outpost of civilization before the mountain wilderness, the post rapidly became known as the place to obtain lodging, or to exchange gold for food and supplies. In the 1890's, Ruby Creek had a population of 3,000 to 5,000 people, drawn by the promise of gold. Getting to the upper Skagit was very challenging and required use of a number of different methods of travel – boat, horse, and foot. Steamwheelers and canoes would travel up to the portage where the main rapids on the Skagit begin. From there, miners developed a hazardous route, the

This trail leads to an overlook of the Newhalem Rockshelter which was used by Native Americans over 1500 years ago.

Goat Trail that traveled from the portage to the mines up at Ruby Creek. The trail, which was chiseled out of granite alongside the cliff, demonstrates the harsh conditions that miners and settlers endured. The most dangerous section known as Devil's Elbow, required climbing up a 40 foot cliff on a ladder. The adventure to Ruby Creek took three days; while today the route can be driven in a half-hour. The railroad was constructed in the 1920s allowing a safer route to the upper Skagit. In 1897, much of the upper Skagit watershed lands became part of the Washington National Forest Reserve.

SCL Superintendent James Delmage Ross had seen the hydropower potential of the Skagit River as early as 1912. In 1917 SCL received a permit from the Department of Agriculture for a dam at Diablo Canyon, a six mile tunnel, and a powerhouse. Power was necessary to construct this permitted project, and Newhalem Creek was an ideal location for a small hydropower facility that could generate electricity for the larger effort. The first hydropower project to be constructed in the watershed was a small dam on Newhalem Creek that was connected by a tunnel to a powerhouse. A small Westinghouse generator was installed and in August 1921, produced power for the dam, tunnel and powerhouse construction project. A railroad was built from Rockport to Gorge Creek, a distance of 25 miles, because Ross, concerned about encroachment into the valley by private power companies, was reluctant to build a road. Between 1924 and 1952, SCL built three dams on the river; Gorge Dam was completed in 1924, Diablo Dam in 1936, and Ross Dam in 1952. Gorge Dam was later replaced with a higher dam in 1961. These dams are an important part of SCL's hydropower portfolio, producing about 25 percent of the Seattle's power needs.

Two SCL company towns were established to provide residences and communities for the hundreds of SCL employees. The company towns still exist today within the boundaries of Ross Lake NRA. The Skagit Hydroelectric and Newhalem Hydroelectric Projects are on the National Register of Historic Places as significant historic districts. The project was recognized for its innovative design and the towns Newhalem and Diablo represent rare examples of working company towns under municipal ownership. SCL has also been providing tours of the project since its inception, with thousands of people enjoying tours every year. The tours highlight the Skagit Hydroelectric Project and the Ladder Creek falls and garden. Historically, Ross collected trees and plants from around the world and planted them here. A trail was built leading visitors through the garden and close-up view of the falls.

While the idea of a North Cascade National Park was first proposed as early as 1906, the North Cascades Complex – including North Cascades National Park, Ross Lake NRA, and Lake Chelan NRA - became part of the National Park System in 1968 after a number of compromises between interests representing recreation, conservation, hydropower, and highway development.

Exploration of a highway crossing the North Cascades was first appropriated in 1895. However, the North Cascades Highway, which runs through Ross Lake NRA crossing the Cascades and connecting into Eastern Washington, was not opened until 1972. The pass still closes every winter due to high snow levels.

In the 1960's, SCL made plans to raise Ross Dam to accommodate growth in the Seattle area. Construction of a high Ross Dam would have flooded more of Canada. While at first the idea was accepted, Canadians began to object to the loss of the upper Skagit River, internationally known for trout and fly-fishing. A compromise was reached whereby SCL agreed to drop plans to raise Ross Dam in exchange for the right to buy electric power from British Columbia. A treaty between the two governments was signed in 1984 and extends to 2066.

Conclusion

The history of the upper Skagit River valley was important for mining, hydropower development, recreation and conservation. The talc mines in particular are unique and rare to the region, but not directly river-dependent. The Skagit River and Newhalem Creek Historic Districts are river-dependent and nationally exemplary. For this section of the Skagit River and its tributaries, the town of Newhalem, Ladder Creek Falls, and the Newhalem Dam and Powerhouse are all elements of this historic district. Due to the national uniqueness of the Skagit River and Newhalem Creek Historic Districts, history was found to be an ORV for the Skagit River and Newhalem Creek. Ladder Creek Falls, located just above the Gorge Powerhouse on Ladder Creek, was an important part of the historic Skagit River tours. Given its close proximity to the main-stem and its relationship to the Skagit River Historic District, Ladder Creek Falls is considered a contributing factor in determining history to be an ORV for the

main-stem Skagit River. History was considered locally significant for the other remaining tributaries and not found to be an ORV.

Recreation

In order to be considered an ORV, the recreational resource of a river must meet one of the following:

Recreational opportunities are, or have the potential to be, unique enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but not be limited to, sightseeing, wildlife observation, photography, hiking, fishing, hunting and boating.

- Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the region of comparison.
- The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.

The upper Skagit River has been a long-time favorite of fishermen, rafters, and outdoor enthusiasts. With the creation of the North Cascades National Park Service Complex in 1968, that interest increased as the area became better known both regionally and nationally.

Boating

The Skagit River provides a year-round boating opportunity. The most popular times are in August and September; however, scenic winter trips to view bald eagles are also popular. The allure of the Skagit River is its gentle flows and the spectacular scenery; a perfect environment for the first-time rafter or for families with children. The Skagit River is popular with families because of the wild nature of the surroundings, but the generally calm water flow with mild rapids. The river is rated class II-III, with most of the rapids occurring in a short section along the S curves (a.k.a. The Portage). This river segment is often used as a training ground for beginners and experts including the U.S. whitewater team. The Skagit River offers a unique beginner-intermediate run in Washington State which has more opportunities for advanced boaters. The mountain scenery and abundance of waterfowl make the Skagit an attractive nature experience. The bald eagles, present during the winter months, attract visitors seeking eagle tours. The 11-mile river run starts at Goodell Creek Campground site and concludes at the Copper Creek take-out site. Some boaters continue down the Skagit crossing into the wild and scenic stretch through Mount Baker-Snoqualmie National Forest and private land below Bacon Creek. In addition to the Goodell put-in and Copper Creek take-out sites, there is a boat-in only access site at Damnation Creek. This scenic location, along the river's edge, has been a popular stopping point for rafting parties.

The stable summer flows of the Skagit have provided a consistent opportunity for these companies to operate. As other popular white-water rivers in Washington dry-up mid-summer ending the rafting season, commercial rafters and private boaters come to the Skagit.

Fishing

The Skagit River is home to seven species of anadromous fish (five salmon species plus steelhead and cutthroat trout) and freshwater trout and char. Some fishing occurs in Ross Lake NRA, but fishing experiences in the upper Skagit River are typical of other protected areas in Washington State.

Hiking & Climbing

Several short trails offering hiking and educational opportunities are concentrated in the Newhalem area. Trails include: Sterling Munro Trail (330'), River Loop Trail (1.8 mile), "To Know a Tree" Nature Trail, (0.5 mile), Rockshelter Trail (0.75 miles), Ladder Creek Falls (0.6 mile), and "Trail of the Cedars" Nature Walk (0.3 mile). These trails follow the river or one of its tributaries and offer recreational and educational day-trip opportunities.

Rafters at the 'S' curve rapids on the Skagit River.

Longer trails/routes are found in the Goodell Creek, Newhalem Creek, and Thornton Creek watersheds. A trail along an old abandoned logging road follows Goodell Creek and its tributaries; this route is popular among mountaineers climbing the Picket Range. The lower portion of this route is also used by hikers and campers at Upper Goodell Group Campground. A view of the 2003 Goodell Creek landslide can be seen about one-mile up the river. Another trail follows an old abandoned logging road along Newhalem Creek for about four and one-half miles. This relatively flat trail ends at a backcountry campsite and is not popular or regularly maintained. The most popular trail in the study area is up the Thornton Creek drainage to Thornton Lakes. This five and two-tenths mile trail occasionally crosses Thornton Creek and provides mountain views and access to three aesthetic mountain lakes. A side route then leads to Trapper Peak, with views of the rugged Picket Range.

Camping

Newhalem Creek Campground is the largest car camping campground (130 individual sites and several group sites) in the study area and is located on the banks of the Skagit near Newhalem Creek. The campground is located near the town of Newhalem and the NPS Visitor Center, and interpretive trails provide day-trip opportunities for campers. The Goodell Creek Campground, situated in the forest on the Skagit River near the confluence with Goodell Creek, also provides car camping opportunities featuring 21 river-side campsites with scenic views. A picnic shelter and toilet are also available. Additional group campsites are found at Upper and Lower Goodell Group Campgrounds. Backcountry camping opportunities are provided at Thornton Lakes and Newhalem Creek.

Sight-Seeing

Sightseeing or driving for pleasure occurs along the North Cascades Scenic State Highway 20. In 1984, the stretch of the North Cascades Highway through the mountains was designated a U.S. Forest Service National Forest Byway and Washington State Scenic Byway. Drivers stop at overlooks to view the Skagit River and surrounding scenery.

Hunting

Some hunting also occurs in this area, primarily for deer and bear.

Canyoneering

Some canyoneering, an adventure sport that involves rappelling down creek canyons, occurs in Thornton Creek and Falls Creek. Little is known about the quality of these opportunities in the upper Skagit River Watershed.

Conclusion

The Skagit River is a regional attraction for boaters and nature lovers. Gentle flows and the spectacular scenery provide a perfect environment for the first-time rafter or for families with children. The whitewater boating run provides a high quality beginner-intermediate run. This is unique to Washington State which has many high quality advance runs, but limited beginner-intermediate runs. The mountain scenery and abundance of waterfowl make the Skagit an attractive nature experience. The reliability of flows in this reach throughout the summer, while many other rivers are too low, adds to its popularity. The Skagit River also provides a unique whitewater training area. Due to all of the reasons above, whitewater boating was found to be an ORV on the Skagit River.

Damnation Creek boat-in acccess site.

Trail of the Cedars Bridge.

Other recreational experiences in the upper Skagit River and its tributaries were either not directly river-related or were found to be typical of other recreational experiences in protected areas in Washington State; therefore they were not found to be ORVs.

Scenery

Under the Interagency WSR council's guidelines, the criteria for an outstandingly remarkable rating are:

> The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors — such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed — may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment length.

The Skagit River watershed is known for its beautiful alpine scenery. Visitors enjoy views of rugged mountains, glaciers, lush forests, spawning salmon, soaring eagles, and rushing waterfalls. The water is sparkling clear with a blue-green color caused by the abundance of glaciers feeding the river.

The lands bordering the Skagit River in this reach are surrounded by the Cascades Mountains, sometimes referred to as the "American Alps." They are managed by NPS and SCL and largely undeveloped, providing for a scenic river float featuring views of mountain glaciers and perennial glacier-fed waterfalls, pristine water, and the only remaining old growth forest along the entire main-stem of the Skagit River.

The North Cascades Highway parallels the river for the entire stretch and can be seen from the river at times when the buffer between the two narrows. In addition, two transmission lines also parallel the river, crossing the main-stem three times and all the north-side tributaries, interrupting natural views.

Goodell Creek and Newhalem Creek are the two creeks that drain u-shaped valleys in the study area; other tributaries drain v-shaped valleys with steep gradients. Goodell Creek begins in the heart of the Picket Range; one of the most rugged, dramatic, and remote ranges in the lower 48. Glaciers from the Picket Range feed this scenic cascading stream. Abundant wildlife and fish call this creek home contributing to its scenic value. This dynamic creek is known as the 'salmon headwaters,' and salmon can be spotted in its crystal clear ponds. An informal route following Goodell Creek and its tributaries is one of the approaches for climbers accessing the remote Picket Range. The roaring sound of the flowing water is enjoyed from the campsites and trail along-side the creek, contributing to the aesthetic experience. Creek modifications, due to human impacts, are limited and concentrated in the lower half mile.

A cascading aesthetic waterfall, located about three-quarters of a mile from Newhalem Creek's mouth, is rated as one of the top 100 waterfalls in the northwest by the Northwest Waterfalls website and is one of the most scenic waterfalls in North Cascades NPS Complex.

The other tributaries in the study area have a high gradient, many beginning in the mountain ranges and then draining steep valleys before reaching the Skagit River. A number of waterfalls are found in the tributaries including Big Devils Falls, Granite Gorge Falls, Thornton Falls, Ladder Creek Falls, Ladder Creek Glacier Falls, and Newhalem Creek. While very scenic, these tributaries and waterfalls are similar to numerous other waterfalls and creeks found in the North Cascades NPS Complex and surrounding area.

Conclusion

The Skagit River is a beautiful scenic river with breathtaking views of mountains, forests, fish,

Hikers along the Goodell Creek route.

wildlife, and clear water. The beautiful clear water, riparian vegetation, waterfalls, mountain views, and wildlife viewing all contribute to make scenery an ORV for the Skagit River. Goodell Creek begins on the vertical steps of the wilderness Picket mountain range, one of the most rugged, scenic and remote massifs in the lower 48 states. The mountain views, numerous cascades, wildlife and fishery resources, and limited human-made features make scenery an ORV for Goodell Creek. The Newhalem Creek waterfall, one of the best waterfalls in the North Cascades NPS Complex and rated as one of the top 100 waterfalls in the northwest, was found to be regionally unique and led to scenery being an ORV for Newhalem Creek.

Other tributaries were found to possess locally scenic features such as waterfalls, but these features were not found to be nationally or regionally unique, rare, or exemplary and thus not ORVs.

Eligibility Determination

The Skagit River from Gorge Powerhouse to the Ross Lake NRA boundary, Goodell Creek, and Newhalem Creek were found to be eligible. They all are free-flowing and possess at least one ORV.

Ineligible River Segments

The Skagit River segment from Gorge Dam to Gorge Powerhouse does not meet the free-flowing requirement and therefore is ineligible. While meeting the free-flowing requirement, the remaining tributaries were not found to possess any ORVs. This assessment was based on available information through staff knowledge and literature research. Varying information was available for these creeks, with most creeks lacking thorough surveys of natural and cultural resources. Creeks located on the south-side of the Skagit River are very difficult to access and in most cases little information was available for these creeks. Therefore, this assessment would be updated in the future if new information is found leading to a change in the analysis. The following streams were not found to possess any ORVs, and therefore are not eligible.

- Afternoon Creek
- Alma Creek
- Babcock Creek
- Copper Creek
- Damnation Creek
- Falls Creek
- Martin Creek
- Thornton Creek
- Sky Creek

and unnamed creeks

- #1826
- #1843
- #1849
- #1851
- #1853
- #1854
- #1857
- #1860
- #1865
- #1965
- #1966

Ladder Creek was also not found to be eligible. This creek is free-flowing and while Ladder Creek Falls is a contributing factor in the historic district of the Skagit River Hydroelectric project, a nationally unique historic resource, the falls is located near the mouth of the Skagit and is associated with the main-stem history ORV determination.

Ladder Creek Falls.

Classification

After determining the river's eligibility for inclusion in the WSR System, the next step is classifying the river into the appropriate category – wild, scenic, or recreational. Classification is largely based on the extent of human development at the time of designation. The three classification categories are defined in Section 2(b) as:

Wild river areas -Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic river areas - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely undeveloped, but accessible in places by roads.

Recreational river areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Elements of Classification

The Interagency WSR Council's guidelines identified water resource development, shoreline development, accessibility, and water quality as the criteria used to determine classification. Classification is an important distinction because it has a direct effect on how each designated segment is administered and whether certain activities on federally owned land within the boundaries are permissible. Classification grandfathers-in existing development, unless these land use activities are degrading the river's ORVs or water quality. Each classification permits existing development. Future developments that are compatible with the classification and carried out in an environmentally sound manner are also allowed.

Water Resource Developments

There are three hydroelectric projects on the Skagit River at Ross, Diablo, and Gorge Dams. All of these are upstream of the eligible segment (Gorge Powerhouse to Bacon Creek). There is also one small diversion dam located on Newhalem Creek that feeds the Newhalem powerhouse. The Newhalem project consists of a ten foot diversion dam, penstocks, and powerhouse. Flows are diverted from Newhalem Creek to the powerhouse and then returned to the Skagit River. The project has been in place since 1921 and was relicensed in February 1997. Minimum flows and ramping rates vary by different times of the year to protect fishery resources.

Shoreline Development

North Cascades Highway parallels the Skagit River and is a dominant feature on the landscape. Outside the road corridor, the lands surrounding the river are largely undeveloped, with most of the development concentrated above Goodell Creek (See Figure 4). There is only one small town along its banks, Newhalem, with approximately a dozen homes facing the river. There is also a sewage treatment plant that services the town of Newhalem located on the rivers' bank on the west side of the town site. Two powerlines operated by SCL parallel the river, crossing the north-side tributaries and main-stem three times. There are also four bridges spanning the river:
(1) a vehicle bridge right below the powerhouse (RM 94.2),
(2) a pedestrian bridge directly below the powerhouse (RM 94.12),
(3) a pedestrian bridge in Newhalem (RM 93.75), and
(4) a vehicle bridge to the NPS Visitor Center (RM 93).
An old bridge abutment is located at RM 86. The two primary boater access sites on the main-stem are Goodell Creek Campground and the Copper Creek take-out. There is also a boat-in only access site at Damnation Creek. Trails concentrated near the town of Newhalem follow the river for short distances. Two main campgrounds are also located along the river – Goodell and Newhalem. Goodell offers 21 river-side campgrounds; while the 130 Newhalem sites are primarily located away from the edge of the Skagit River. In this segment of the Skagit approximately 15 percent (three miles) of the shoreline is modified. This includes rip-rap along the north-side of the river.

The tributaries beginning in the rugged wilderness of the North Cascades Mountains are pristine, with limited shoreline modification concentrated in the lower portions. The North Cascades Highway does cross the north-side tributaries. Access roads also follow Newhalem Creek and Goodell Creek providing access to the lower stretches (See Maps 5 and 6). Two group campsites are located along-side Goodell Creek. Trails also follow Goodell Creek, Newhalem Creek and Thornton Creek. Shoreline modification of Goodell Creek is concentrated in the lower one-half mile. Shoreline modification of Newhalem Creek is concentrated in the lower one mile. There is also an old bridge crossing Newhalem Creek at river mile three.

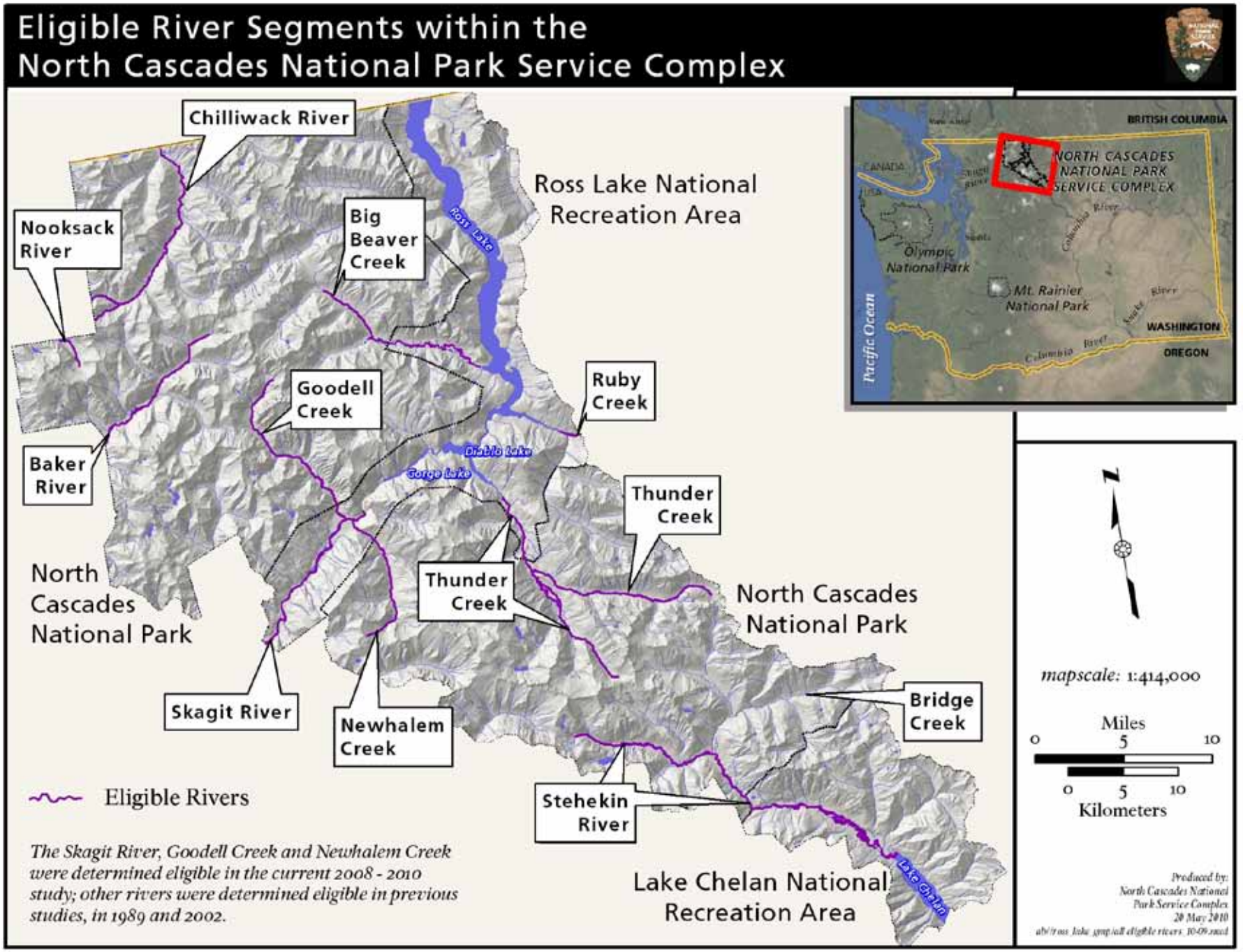


Figure 2. Eligible River Segments within the North Cascades NPS Complex

Accessibility

As mentioned above, the North Cascades Highway follows the Skagit River on its north-side and provides access to the river corridor following it the entire segment. Boat-in access is the primary way to get to the south-side of the river. The south-bank is undeveloped and represents the closest the wilderness boundary comes to the Skagit River. The main river/boating access sites are the Goodell Creek Campground put-in and the Cooper Creek take-out. The river can also be easily accessed in the Newhalem area. There are a few smaller spur roads that provide additional vehicle access to the north side of the river from the highway. In addition, one road crosses the Skagit to provide access to the Newhalem Hydroelectric project, Newhalem campground, and NPS visitor center on the south-side of the river. Established trails in the Newhalem area also provide access to the Skagit River and Newhalem Creek.

While the main-stem Skagit River can be readily accessed by vehicle, reaching its tributaries requires other means of travel. The North Cascades Highway does cross the north-side tributaries providing access to the mouth. A few spur roads and trails provide additional access to the lower portions of the tributaries. Access to south-side tributaries is limited to boat-in and walk-in, with the exception of the area around Newhalem Creek. Goodell Creek spur road provides access to two group campsites located in the lower half mile and an informal trail travels along-side the creek for approximately four and one-half miles. A trail on an old abandoned road also follows Newhalem Creek for about 4.5 miles.

Water Quality

The glacier-fed Skagit River watershed is known for its beautiful clear blue-green water and is often referred to as the "Emerald Skagit" and the "Magic Skagit." Its tributary's headwaters are high in the rugged mountains and glaciers of the area. In late summer these streams carry glacial rock flour that cloud the water and give it a blue-green color. The three hydroelectric dams upstream do have some impact on water quality by warming water and modifying nutrient loading processes; however, SCL manages the project and instream flow rates in a manner to meet the needs of fishery resources. In addition, SCL manages two sewage treatment plants for the towns of Diablo and Newhalem. These treatment plants are operated under the Washington Department of Ecology (DOE) "better than secondary" standards, which represents a high water quality level. Overall, the Skagit River study segment has a relatively low nutrient level, low bacterial content, relatively cool temperatures, and high dissolved oxygen content which contribute to its high water quality.

DOE monitors the Skagit River's water quality, with a station at Marblemount. In the DOE's old classification system, the Skagit River was classified as AA – "extraordinary waters." Under DOE's new classification system, the Skagit River is protected for core summer salmonid habitat and extraordinary primary recreation contact. The core summer salmonid protection includes managing the water quality for salmon spawning, juvenile rearing, and adult-holding during the months from June 15 to September 15. The temperature is monitored to ensure the seven day average temperature does not exceed 16 degrees Celsius (60.8 degrees Fahrenheit). The extraordinary primary recreation contact is the highest standard under the DOE's recreation standard. Under this standard fecal coliform levels must not exceed 50 colonies/100 ml.

Water quality for Goodell Creek is not monitored. The upper watershed is fed by glaciers and is considered pristine. The only impacts are from air-borne pollutants that fall as snow in the winter. Minor impacts from human features are concentrated in the lower half mile of Goodell Creek. Due to the natural condition of Goodell Creek, the water quality condition is considered to be high. The DOE listed Newhalem Creek as impaired in the 1990's due to inadequate stream flow from the small diversion dam operated by SCL. However, upon relicensing in 1997, the operation was changed and the project is now subject to minimum instream flow requirements to protect fishery resources and is only operated about half of the year. The water quality of the creek is no longer considered impaired and the lower reach supports salmon and bull trout. Since the diversion is fairly small, water quality impacts downstream of the diversion are likely to be minor. Therefore Goodell Creek's water quality is considered high with only minor impacts from the diversion, air-borne pollutants, and erosion from the road and trail use.

Preliminary Classification

Based on the criteria described above, the following classifications apply to the Skagit River and eligible tributaries (See Figure 3):

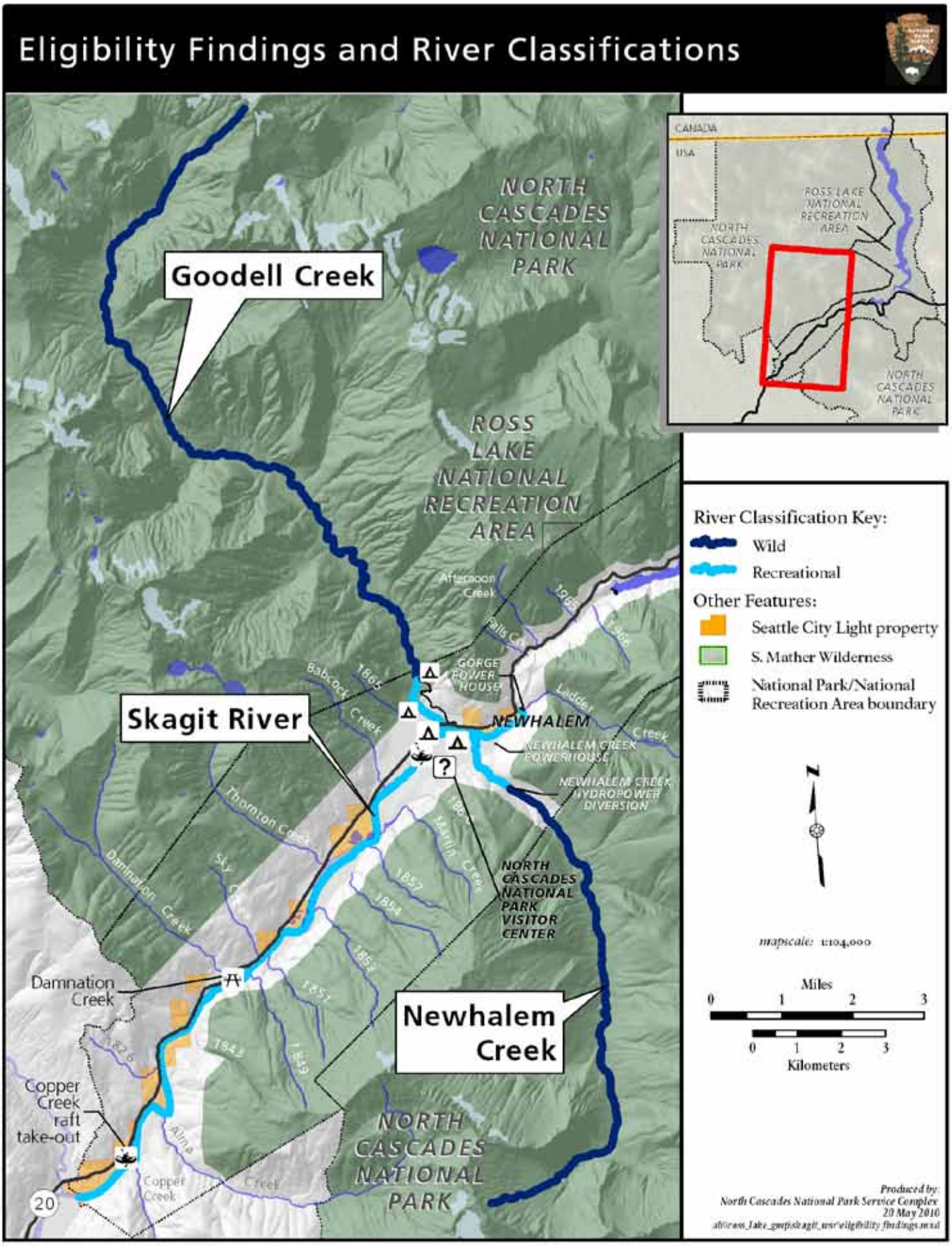


Figure 3. Eligibility Findings and River Classifications

Skagit River
- recreational – Below the Gorge Powerhouse to Ross Lake NRA boundary

Goodell Creek
- wild – Headwaters to the north-end of the Upper Goodell Campground (river mile 0.5)
- recreational – North-end of the Upper Goodell Creek Campground (river mile 0.5) to the mouth

Newhalem Creek
- wild – Headwaters to upstream of the diversion dam (river mile one)
- recreational – Upstream end of the diversion dam (river mile one) to the mouth

Suitability Evaluation

The WSR Act defines suitability as an assessment of whether eligible river segments should be recommended for inclusion into the National WSR System. It provides the basis for an agency's recommendation to Congress. This suitability analysis utilizes guidance from the Interagency WSR Council and is primarily based on the following four factors:

- The characteristics that make the river segments worthy of designation.
- The ability of NPS and its non-Federal partners to manage the river segments to protect their ORVs, water-quality, and free-flow.
- The compatibility of wild and scenic river designation with other potential uses of the river segments.
- The public's support for designation.

The report also outlines how the National Park Service intends to manage the river system.
The scope of this analysis includes the Skagit River below Gorge Powerhouse to the Ross Lake NRA boundary and its two eligible tributaries in this reach Goodell Creek and Newhalem Creek.

Characteristics that Make the River Segments Worthy of Designation

The Skagit River is a unique and exemplary river system both regionally and nationally. It was found to have a number of ORVs including: fish, wildlife, geology, pre-history, history, scenery, and recreation. In addition Goodell Creek and Newhalem Creek also are exemplary and possess a number of ORVs. Designation of this 11-mile main-stem segment and key tributaries would extend the Skagit WSR System from the downstream end of the Skagit Hydroelectric Project to the town of Sedro-Woolley and would provide more opportunities for holistic watershed management of this river system.

Land Ownership, Uses, Zoning, and Restrictions

Land Ownership and Management

This segment of the Skagit River is located entirely within the Ross Lake NRA, which is managed by the NPS. The majority – 79 percent of the lands within the likely wild and scenic boundary – is owned by the NPS and the other 21 percent are owned by SCL. WSDOT also has a right-of-way for the North Cascades Scenic Highway. Goodell and Newhalem Creek corridors are nearly entirely owned by the NPS. The area is primarily used for recreation, natural resource protection, and hydroelectric operations.

SCL purchased their lands along the Skagit River when constructing the Skagit Hydroelectric Project and when considering development of the proposed Copper Creek Dam, which would have flooded this reach. The majority of the eligible river segments are outside of SCL's Federal Energy Regulatory Commission's (FERC) boundary. Today, SCL manages these lands primarily for wildlife and fishery management. In addition some of the lands are used for routine maintenance. SCL intends to keep these lands and continue to manage them as they are today. SCL's current management focuses on fish and wildlife resources which would be compatible with the WSR Act.

Since the Skagit River is navigable, Washington State also asserts jurisdiction and ownership over approximately 480 acres of the bed of the Skagit River below the ordinary high water mark.

County Zoning and Shoreline Management

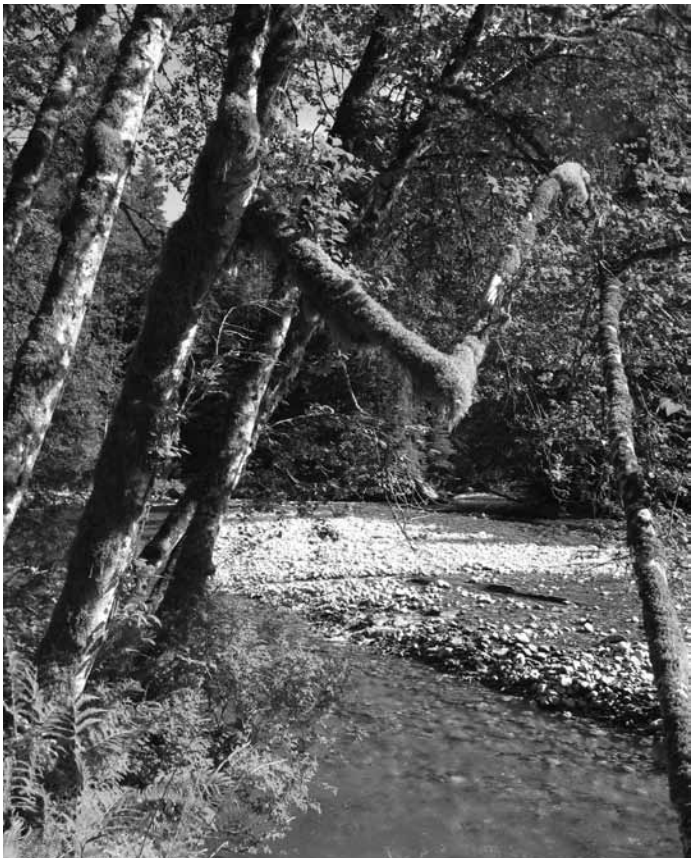
The study area spans both Skagit and Whatcom Counties. The majority of the area in Skagit County is zoned as open space, with small sections between Copper Creek and the Ross Lake NRA boundary zoned as industrial forest or mineral resource overlay. However, mining and logging are prohibited in the Ross Lake NRA to protect its scenic character. Most of the shoreline in Whatcom County portion of the study area is zoned as conservancy land. In both

counties, any non-federal development projects within 200 feet of the shoreline need to undergo shoreline review and obtain a permit or exemption.

Opportunities and Limitations on Hydropower Development

The Federal Power Act prohibits FERC from licensing hydropower projects in National Parks or National Monuments. New hydropower projects licensed by FERC are allowed in National Recreation Areas, including Ross Lake NRA, unless adverse effects on federal lands would occur. The North Cascades NPS Complex's 1968 enabling legislation allows continued operation of the Skagit and Newhalem Hydroelectric Projects within Ross Lake NRA and any other projects authorized by FERC.

The Washington Park Wilderness Act of 1988 (Public Law 100-668) created Stephen Mather Wilderness, consisting of 642,332 acres of wilderness in the North Cascades Complex, of which 80,043 acres lie within Ross Lake NRA. This legislation also limited hydropower facilities in the Ross Lake NRA to the existing Skagit River and Newhalem Creek Hydroelectric Projects, as well as proposed Copper Creek, High Ross, and Thunder Creek projects. Thus, all other hydroelectric projects are prohibited in the North Cascades NPS Complex.



Goodell Creek was found to be eligible for inclusion into the National WSR system.

Mining & Logging Restrictions

Currently, mining and logging are prohibited in the North Cascades NPS Complex. These prohibitions were in place to protect the scenic character of this area. These restrictions will continue to protect the proposed Skagit WSR Corridor.

Projects and Plans that are Enhanced, Curtailed, or Foreclosed Due to WSR Status

Suitability studies must assess the potential effects of WSR designation on the goals of tribes, non-governmental organizations, other local, state, and federal agencies, and the public. This determines what other potential uses of the river may occur in the foreseeable future and if WSR designation would benefit or conflict with these uses. This helps planners and managers decide which management action is best suited for the river and the public. This section discusses other relevant plans and projects and their compatibility with WSR designation.

WSR Water Resource Project Evaluation (Section 7)

The intent of the WSR Act is to preserve rivers from harmful effects of water resource projects. The WSR Act prohibits any new federally licensed hydropower dams on designated river segments. It also creates a process for evaluating/determining if other water resource projects have adverse impacts to the river and its special resources. This section describes that evaluation process, types of projects subject to this evaluation, and any known or likely projects in the foreseeable future that could be affected.

Projects that are subject to a Section 7 evaluation under the WSR Act have to be:

- federally assisted projects (undertaken, permitted, or funded by a federal agency) and
- located within the high water mark of a river bed

The baseline condition for all such analysis is the condition of the river and its resources at the time of designation. Continued operations of existing water resource projects would not trigger a Section 7 evaluation/determination. Generally, best practices involve conducting a river corridor reach analysis

to understand the channel geomorphology before implementing site-specific water resources projects. The following is a sample of the types of water resource projects that could potentially be affected by designating the Skagit River, Goodell Creek, and Newhalem Creek as wild and scenic rivers.

Dams and Hydropower Projects

In the 1970s, SCL had proposed to build a dam near Copper Creek that would flood the study reach section. These plans have since been abandoned. No other proposals of dams or hydropower facilities are known to exist in the foreseeable future. As mentioned above, the Washington Wilderness Act limited potential hydropower projects in this stretch of the upper Skagit River to include the existing Skagit River and Newhalem Creek Hydroelectric Projects as well as the proposed Copper Creek Dam. While there are no current proposals for dams in this reach, a wild and scenic river designation would prevent any new dams, hydroelectric projects, and related project facilities from being constructed in the study area in the future.

The continued operation of the existing hydroelectric projects would not trigger an evaluation/determination under the WSR act. Relicensing or amendments of these projects that involved changes to the operation or facilities would trigger this analysis. The baseline for this analysis would be the conditions of the river and its resources at the time of designation which includes the current operation of the hydroelectric projects. For projects upstream or on a tributary to a designated reach, the standard used in the evaluation is if the project would 'invade' (encroach upon or intrude) or 'unreasonably diminish' the rivers' resources. SCL is pursuing an amendment of the Skagit River Hydroelectric Project to develop a new Gorge tunnel. This project is not expected to affect the flows in the Skagit River.

Bank Stabilization

There are no known bank protection projects proposed in this reach. In designated WSR segments, federally assisted water resources projects need to be evaluated to ensure there are no adverse effects on the free-flowing character, water quality, and ORVs of the river segment. It is likely that bank stabilization projects will be proposed by the NPS, WSDOT, and/or SCL in the future to protect current infrastructure, fishery resources, recreation resources, or cultural resources. These projects would need to be evaluated to ensure no adverse impacts occur. Corridor reach analyses that evaluate the geomorphology of the river would help inform location, size, and type of appropriate bank stabilization for the river segments. Bioengineering and natural protection methods are encouraged in WSR reaches. Guidance on important resources to protect, process for determining bank stabilization, and type of acceptable methods would be outlined in the Comprehensive River Management Plan.

Road and Bridges

The NPS proposes to replace the existing bridge over the Skagit River, near Newhalem Creek and providing access to the visitor center, with an expanded bridge that would accommodate two-way vehicle traffic, pedestrian access, and interpretive platforms. An analysis of the bridge replacement would be conducted to ensure it had no effects on the free-flowing character, water quality, and ORVs of the river. Consideration could be given to modifying the bridge without adding to the existing footing and columns in the river corridor. Any other bridge and/or road projects that are located with the high water mark of the river corridors would also need to undergo a Section 7 analysis to ensure adverse impacts do not occur.

Habitat Restoration

There are no known proposals for water resource habitat restoration projects within the proposed WSR corridors. However, potential projects could include habitat enhancement structures, such as wood or boulders in the river corridors or construction of salmon side channels. A Section 7 evaluation/determination would need to occur for these projects and this evaluation would identify any adverse effects to the free-flowing character, water quality, and ORVs of the river. The need and goals for fish habitat restoration can be identified in the Comprehensive River Management Plan which would help guide implementation of in-river habitat enhancement structures.

Waste Water Treatment Plant

SCL owns and operates waste water treatment plants for their town sites in Diablo and Newhalem. Continued operation of these plants would not need to undergo a Section 7 evaluation. If the plant undergoes construction within the bed and banks of the river, then this would trigger a Section 7 analysis. Baseline conditions would include the existing operation of these facilities. These facilities

are operated to a high standard by Washington State DOE and adverse effects are not anticipated at this time.

Other Non-Water Resource Projects

Other projects and developments that are located outside the high water mark of the river corridors do not need to undergo a Section 7 evaluation/ determination. However, effects of the project should be evaluated to assure that the river values are protected. These types of projects could include transmission lines, vegetation management, and trails.

Salmon Restoration Goals

Salmon are a very important resource for the people in the Pacific Northwest and Puget Sound. The Skagit River is one of the most important river systems in Washington State for natural salmon stocks. It contains the largest and healthiest runs of wild Chinook and pink salmon in Puget Sound. Tribes; conservation organizations; recreation groups; local, state, and federal government; and utilities are all working towards shared goals for salmon recovery. The Skagit Watershed Council was created in 1997 and includes 40 diverse organizations who share the mission to "understand, protect and restore the production and productivity of healthy ecosystems in order to support sustainable fisheries."

Many reports and plans from organizations, tribes, and government agencies have been developed to support salmon recovery. Notably, the 2005 Skagit Chinook Recovery Plan developed by Swinomish Indian Tribe, Sauk-Suiattle Indian Tribe and the Washington State Department of Fish and Wildlife, comprehensively outlines recovery goals and strategies. The plan focuses on Chinook populations, but is also anticipated to benefit other salmon species and fishery resources. This plan was widely deferred to for the Skagit River section of the 2007 Puget Sound Salmon Recovery Plan adopted by the National Marine Fishery Service and by the Skagit Watershed Council. The goal of the recovery plan is to restore Skagit Chinook to optimum levels. The studies found the Skagit River system still retains significant amount of ecological function and high quality habitat which results in healthy populations in Puget Sound. However, the populations are at 50 percent of their historic abundance. The Skagit Recovery plan identified the following factors as limiting Chinook production including: seeding levels (density of spawners and juveniles), degraded riparian zones, poaching, current hydroelectric operations, sedimentation and mass wasting, flooding, high water temperatures, hydromodification or bank modification, water withdrawals, loss of delta habitat and connectivity, loss of pocket estuaries and connectivity, and illegal habitat degradation. For the upper Skagit reach, the plan identified restoring floodplain function and natural banks as very important since this reach has a narrow floodplain with limited opportunity for off-channel habitat. Restoring floodplain function at Bacon Creek and near the town of Newhalem were specifically mentioned. For the rest of this reach, softening existing bank modification with the use of wood and complex structures was recommended as well as protecting existing floodplain habitat free of roads and developments. Previous studies have found that salmon use natural banks five times more often than hardened banks.

The proposed WSR designation would help enhance salmon recovery goals for this reach by creation of a Comprehensive River Management Plan focusing on the river segments and its values. A WSR designation would direct protection and enhancement of salmon fishery as an ORV, prevent further loss of habitat through dam construction, and protect the free-flow character and natural banks of the river segments.

Bald Eagle Protection

The bald eagle was delisted from its threatened status under the Endangered Species Act in 2007 in the lower 48 states. Its primary legal protection is now covered under the Bald and Golden Eagle Protection Act (BGEPA). "Disturbance" of bald and golden eagles is prohibited under the BGEPA. Disturb means to agitate or bother a bald eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in its productivity, or nest abandonment." Specific management recommendations were developed to help prevent disturbance and protect bald eagles. In regards to recreation, two measures are recommended. The first advises managers to avoid recreational and commercial boating and fishing near critical foraging areas during peak feeding times. The second requires a 330-foot buffer during breeding season for non-motorized recreation activities (such as hiking, camping, kayaking, and hunting) that will be visible or highly audible from the nest.

The Skagit River, and to a lesser extent Goodell Creek, provide nationally significant habitat for bald eagles. This allows wildlife to be an ORV for these

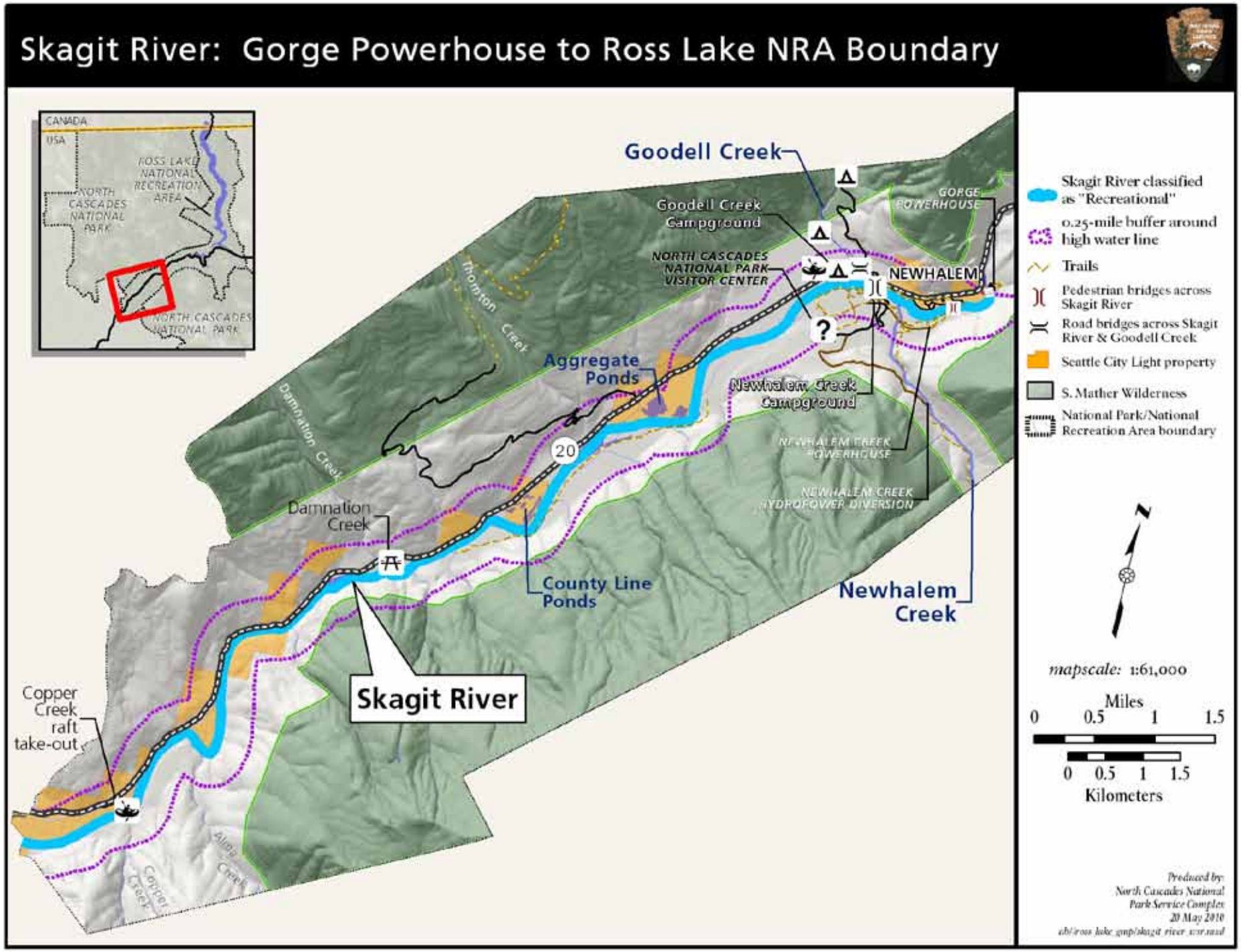


Figure 4. Skagit River from Gorge Powerhouse to Ross Lake NRA Boundary

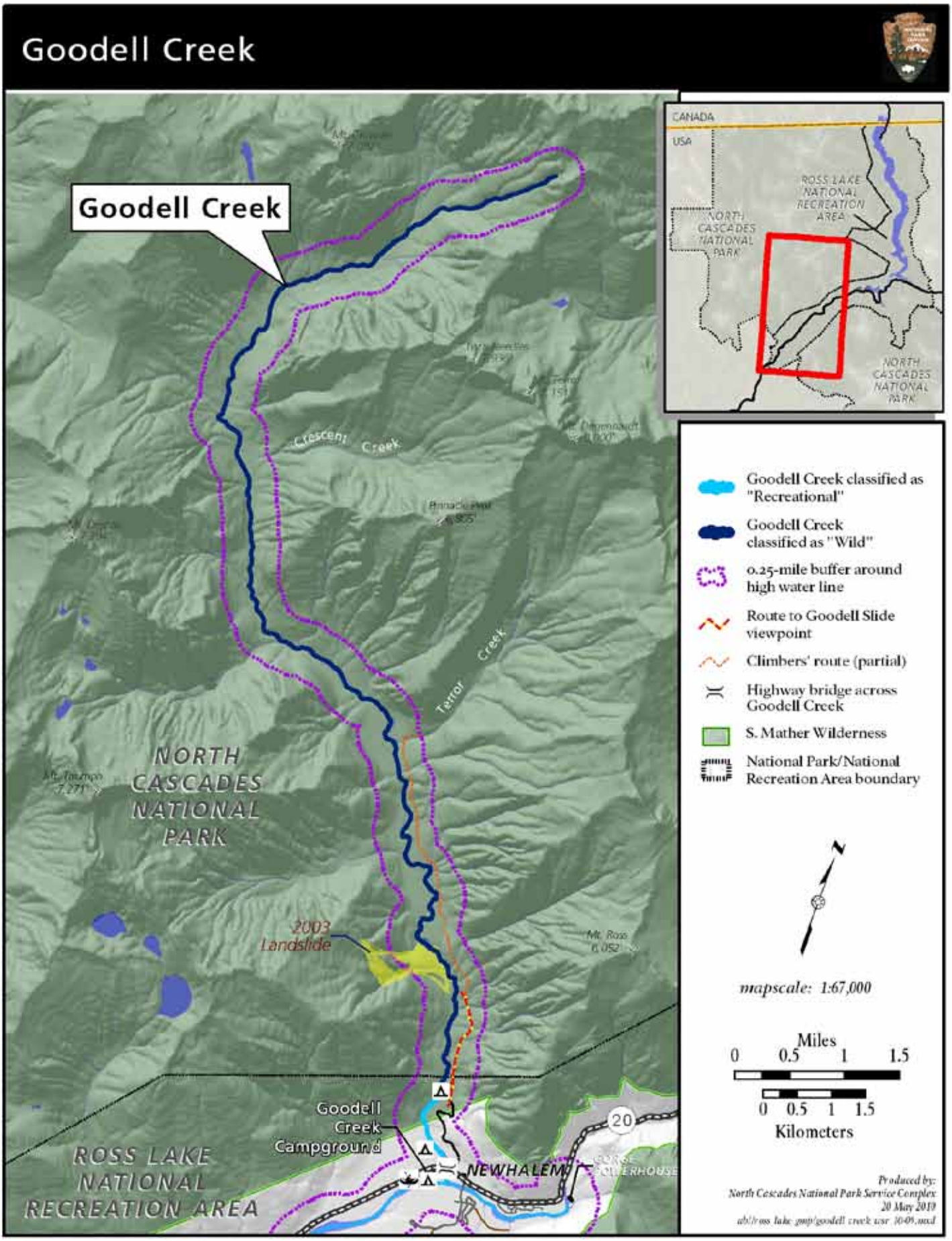


Figure 5. Goodell Creek

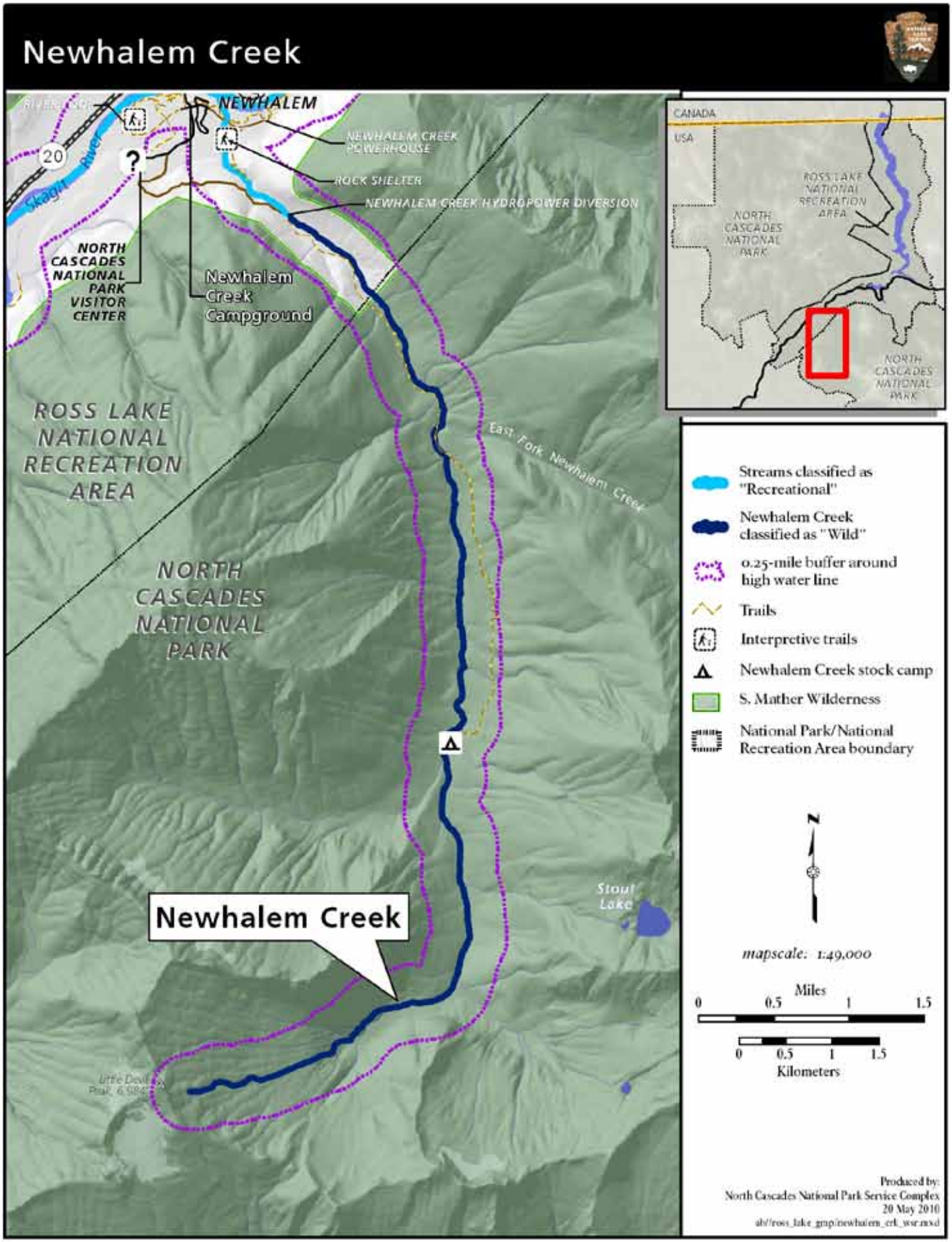


Figure 6. Newhalem Creek

segments and WSR designation would seek to protect and enhance this value. Thus, WSR designation is consistent with bald eagle protection plans and laws.

Skagit Wild and Scenic River

The Skagit River downstream of the Ross Lake NRA boundary near Bacon Creek to Sedro-Woolley is designated as a recreational river in the National WSR System; its ORVs are fish, wildlife, and scenery. Some of the main tributaries in this stretch including the Cascade, Sauk, and Suiattle are also part of the National WSR system and designated as scenic rivers. Together, these river segments make-up the Skagit WSR segment which was designated in 1978; a river management plan was completed in 1983. The Mt. Baker-Snoqualmie National Forest manages the Skagit WSR System. The ownership of the Skagit WSR System is a mix of Mt. Baker-Snoqualmie National Forest (46% percent), other public entities (4% percent), and private ownership (50% percent). Partnerships are an important component of managing this river system and the Mt. Baker-Snoqualmie National Forest outlined their management and partnership goals in their 2001 Beyond Boundaries document. Some of the key management aspects include: watershed and resource restoration, monitoring and protection; demand for recreation opportunities and community education; and intersection with other needs including floodplain management, hydropower production, and infrastructure protection. The Mt. Baker-Snoqualmie National Forest Plan also recommended that two additional Skagit tributaries be added to the National WSR System including Diobsud Creek and Illabot Creek. These creeks have not yet been designated.

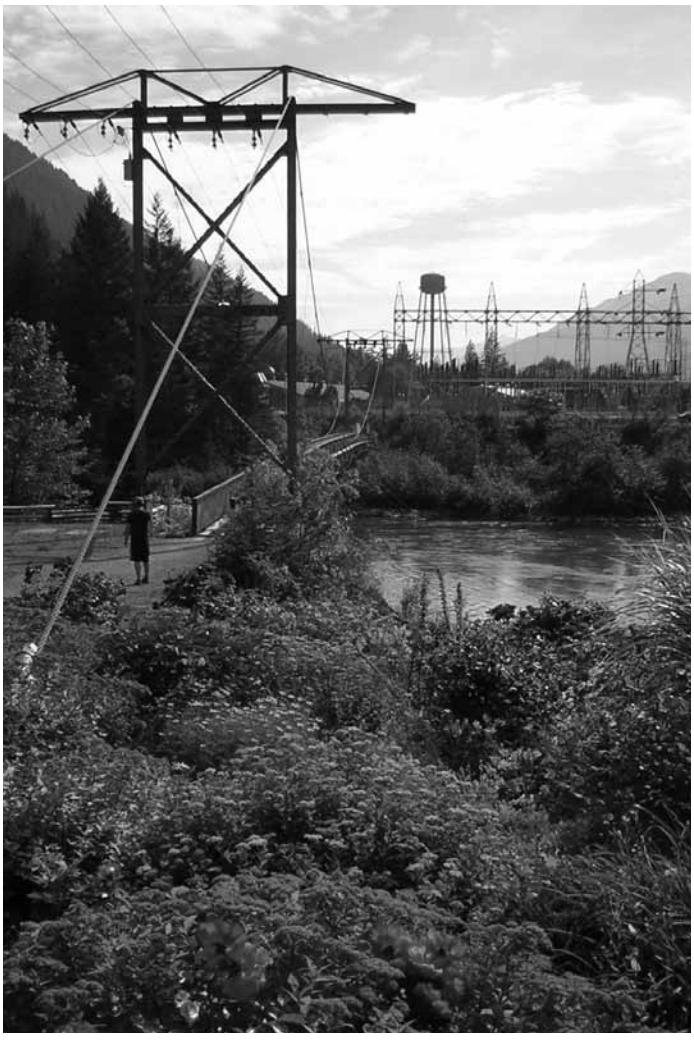
The current WSR study area ends at the Ross Lake NRA boundary near River Mile 83.1 while the existing WSR designation on the Skagit River managed by the Mt. Baker-Snoqualmie National Forest begins at the mouth of Bacon Creek, approximately 0.2 miles downstream. This study report focuses on the area within NPS jurisdiction, however, it is anticipated and recommended that any WSR designation of the Skagit River system by Congress would include a continuous stretch from below the Gorge Powerhouse to Bacon Creek.

Designation of the upper Skagit River would complete the main-stem Skagit River designation from Sedro-Woolley to the beginning of the Skagit Hydroelectric Project near the town of Newhalem. This would allow for opportunities for holistic management of the river system.

Cultural Resources

The studied waterways have a number of significant cultural resources. The Skagit and Newhalem hydroelectric projects are designated as historic districts on the National Register of Historic Places. These designations include the dams and associated facilities as well as the two company towns of Newhalem and Diablo. In addition, a number of pre-historic resources exist in the study area including the Goodell Creek and Newhalem Rockshelter sites, which are also on the National Register of Historic Places. Since the entire area has not been thoroughly surveyed, it is possible that additional regionally or nationally significant sites will be found in the future.

Pre-history, and in particular the Goodell Creek and Rockshelter sites, were identified as an ORV. History is also an ORV. NPS will continue to manage the lands to protect these resources. Since these resources were found to be ORVs, WSR designation would also seek to protect and enhance these resources.



Skagit River Hydroelectric Project.

Public Involvement

In the fall 2008, the NPS released a summary newsletter and held two public workshops on the preliminary findings of the WSR designation. Through the workshops and in written format, the majority of the public comments have expressed strong support for WSR designation. Several organizations including American Rivers, American Whitewater, Blue Sky Outfitters, Downstream River Runners, League of Northwest Whitewater Racers, Washington Kayak Club, North Cascades Conservancy Council, U.S. Forest Service, The Nature Conservancy, National Park Conservations Association, The Wilderness Society, North Cascade Institute, and SCL expressed support at the public workshops and/or through written comments. In addition, several members of the general public also came to the public meetings and submitted written comments. The primary reasons why people were supportive of designation included permanent protection of the ORVs of these exceptional river systems, completion of the Skagit WSR designation from Sedro-Woolley to the Skagit Hydroelectric Project and opportunities for holistic watershed management, and prevention of new hydropower facilities and dams in this stretch.

Many comments received stated that the timing was ideal for WSR designation and expressed a sense of urgency in accomplishing this. Only one public comment was received opposing designation. This citizen expressed concerns that opportunities for dam development would be limited by WSR designation.

NPS also met independently with the two other land managers in the river corridor - SCL and WSDOT. Both of these entities were generally supportive of WSR designation. SCL shared some concerns about potential effects on hydropower operations and relicensing, potential new salmon restoration projects, potential new transmission lines, and existing waste water treatment plants operations. SCL also expressed tentative support for designation and continues to manage their lands within the proposed Skagit WSR corridor for protection of fishery and wildlife resources consistent with the intent of the WSR Act. WSDOT shared concerns that WSR designation could add some compliance related work when WSDOT is pursuing road projects, but were not opposed to WSR designation. NPS also met independently with the Upper Skagit Tribe who expressed concerns that WSR designation could limit potential future projects involving in-stream and bank manipulation to enhance salmon restoration and protect cultural resources. The majority of the concerns mentioned above are related to the effects of WSR designation on existing operations or potential new projects in the river corridor. The WSR evaluation/determination process and potential effects on new water resource projects are described in the section above. There are no known projects in the reasonably foreseeable future that would be prohibited by WSR designation.

Management Intent

This section outlines how the National Park Service currently manages the eligible river segments, changes that would occur upon implementation of the Ross Lake NRA's General Management Plan, and potential changes that would occur if the river becomes designated. It also identifies a proposed WSR boundary and additional costs associated with designation.

NPS is required by the WSR Act to manage eligible and suitable river segments in a manner that protects their free flowing character, water quality, and ORVs until such the river segments become designated as part of the National WSR System or are found unsuitable.

Current Management and Direction in the Ross Lake NRA's GMP

Regardless of WSR designation, in accordance with the WSR Act and NPS management policies, the eligible river segments would be managed by NPS to protect their free-flowing condition and ORVs. The GMP outlines the vision and management actions for the Skagit River as well as other areas of Ross Lake NRA. The vision for the Skagit River zone is continued preservation of the shoreline environment, enhancement of fisheries along the Skagit River, and preservation of high quality day-use river recreation experiences. The Skagit River, Goodell Creek, and Newhalem Creek's free-flowing character, water quality, and ORVs would be protected and preserved. All management actions will be evaluated to avoid adverse effects on the river segments and their resources.

The entire list of GMP actions can be found in the alternatives section of the GMP. The most significant GMP actions and goals affecting the river segments are summarized below:

- Develop a park-wide vegetation management plan to preserve the ecological integrity of the riparian zone. Components could include monitoring and management of exotic species, planting native vegetation, and improving bank stabilization and erosion control methods.
- Expand monitoring of wildlife species and focus actions to protect wildlife from disease or human disturbance during critical seasons.
- Develop a park-wide fishery management plan. Work collaboratively with SCL to protect and enhance fishery resources and flows in the Skagit River. Consider a variety of measures to protect spawning habitat on the Skagit River including maintaining side channels and minimizing impacts from the North Cascades Highway and park infrastructure.
- Protect cultural resources and monitor sites to ensure degradation is not occurring.
- Protect the scenic character of the river corridors.
- Preserve the existing non-motorized whitewater boating opportunities on the Skagit River. Monitor recreation use and number of boat encounters per trip. Eliminate recreational motor boat use on the Skagit River. Administrative use of NPS, SCL, and WDFW would continue.
- Reconfigure and formalize the parking areas at Goodell launch site, Copper Creek take-out site, and Upper Goodell Creek Campground as appropriate.
- Consider developing new trail opportunities including Goodell Land Slide Trail, Newhalem Boardwalk Trail, Newhalem Falls Loop Trail, Skagit River portage trail at the S curves, and Newhalem Spawning Channel Trail.
- Replace bridge over the Skagit River to the Visitor Center with an expanded bridge that can accommodate two-way traffic, pedestrian access, and interpretive platforms.
- Work pro-actively with WSDOT to develop solutions to channel aggregation where the North Cascades Highway crosses Skagit tributaries including Goodell, Damnation, Thornton, and Rhode.
- Locate additional sites, should Goodell Creek Campground be impacted by flooding debris flow and certain sites have to be abandoned.
- Improve and expand interpretation opportunities as appropriate in partnership with North Cascades Institute and SCL.

Facilities and projects that are expected to continue from other entities include:

- The Skagit and Newhalem Hydroelectric Projects and associated transmission lines would continue to be operated in a similar manner.
- The North Cascades Scenic Highway would continue to be maintained by WSDOT and provide access to the Skagit River and Ross Lake NRA.

Much of the south-side of the Skagit River within the Ross Lake NRA is only accessible by boat. Photo is of the Skagit River downstream of Ross Lake NRA.

- The Newhalem and Diablo waste water treatment plants would continue to be operated and maintained by SCL.
- Salmon side-channels would continue to be maintained by SCL.

Any entities pursuing future federally-assisted projects that have the potential to affect the eligible river segments should consult with NPS in an attempt to avoid or mitigate adverse effects. Consultation is required according to a directive from the Council on Environmental Quality. If the river segments are designated then a water resource evaluation/ determination would be required per the WSR Act as described in the Water Resources Evaluation Section above.

Comprehensive River Management Plan

If the river segments are designated as WSRs, then a comprehensive river management plan would be developed. The comprehensive river management plan would further outline goals and management actions that would be acceptable and encouraged. For example, the need for salmon restoration through in-channel enhancements and side-channels or the desire for natural bank stabilization methods could be described. As described above any future water resource projects that are federally-assisted would need to undergo an evaluation/determination to ensure adverse effects do not occur. In addition to protections and guidance offered in the WSR Act, the Act also directs the NPS to use its general statutory authorities and the Wilderness Act where appropriate to protect the ORVs, water quality, and free-flowing character of the river segments. When conflicts arise, the more protective law would be applied.

The WSR Act directs the river management plan to:

- describe the existing resource conditions including a detailed description of the ORVs
- define the goals and desired conditions for protecting river values
- address development of lands and facilities
- address user capacities
- address water quality issues and instream flow requirements
- reflect a collaborative approach, recognizing the responsibilities of, and opportunities for, partnership with all stakeholders
- identify regulatory authorities of other governmental agencies that assist in protecting river values
- include a monitoring strategy to maintain desired conditions

Boundaries

If the river segments are designated, detailed boundaries would be determined. These boundaries are limited to an average of 320 acres or less per river mile, which equates to about one-quarter of a mile on either side of the river. It is recommended that the preliminary boundaries of the Skagit River, Goodell Creek, and Newhalem Creek be one-quarter of mile from the high water mark on either side of the river segments. NPS recognizes its responsibility to use its existing authorities to protect the ORVs that are found both within and outside the preliminary WSR boundaries.

Costs

The NPS is already managing the Skagit River, Goodell Creek, and Newhalem Creek. Additional costs related to managing the river system, if designated wild and scenic, would include the cost associated with developing and implementing a comprehensive river management plan. Minimal additional compliance work is also anticipated to comply with Section 7 of the WSR Act.

Conclusion

The upper Skagit River and the two eligible tributaries in this reach – Goodell and Newhalem Creeks - were found to be suitable for WSR designation. The addition of this 11-mile upper Skagit River segment and its key tributaries would complete the Skagit WSR system from the downstream end of the Skagit Hydroelectric Project to Sedro-Woolley and create more opportunities for holistic watershed management. The public support for this designation from the general public and two other land managers, SCL and WSDOT, was overwhelming positive. Only one comment was received opposing designation. A pair of comments also expressed concerns about the potential effects of WSR designation on new water resource projects, but there are no known proposals in the reasonably foreseeable future that would be prohibited by the WSR designation. SCL is committed to managing their lands to protect fishery and wildlife resources in compliance with the WSR Act. NPS owns the majority of the lands in the study area and manages the river system in a manner consistent with the intent of the WSR Act. Existing protections are in place prohibiting logging and mining, as well as limiting hydropower development. WSR designation would add further protections from additional hydropower development and encourage

natural bank protection, thus furthering regional and national goals for recovery and protection of salmon and bald eagles. Designation would require the development of a comprehensive river management plan which would enable better stewardship of the river segments and their special resources. WSR designation would also direct further protection and enhancement of natural, geological, cultural, scenic and recreational resources.

Therefore the NPS recommends that Congress extend the Skagit WSR designation to include this 11-mile upper Skagit segment and the two largest tributaries flowing into this reach.

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Final Statement of Findings for Floodplains

Ross Lake National Recreation Area Final General Management Plan and Environmental Impact Statement

Recommended: _____ July 15, 2011
Superintendent, North Cascades NPS Complex — Date

Certification of Technical Adequacy and Servicewide Consistency:

_____ 8/2/2011
Chief, Water Resources Division — Date

Concurrence: _____ 8/4/2011
Regional Safety Officer — Date

Approved: _____ 8-9-2011
Pacific West Regional Director — Date

Introduction

Preferred Alternative

The *Ross Lake NRA ~~Draft~~ Final General Management Plan and Environmental Impact Statement*'s preferred alternative would generally have beneficial effects on ecosystem functions and processes, including floodplain and alluvial processes. None of the major park facilities are located in a regulatory floodplain, although three campgrounds are located on alluvial fans and debris cones, which are known for their instability.

Destruction of facilities from catastrophic and natural events is becoming more common in the region due to an increase in the magnitude and frequency of severe storms. For example, in 2003 10 days of heavy rainfall exceeding 20 inches resulted in widespread flooding, landslides, debris flows and creek channel avulsions. This event led to significant shifts in the channels of Goodell and Colonial creeks into campgrounds. Continued aggradation at these sites is expected to cause future flooding and erosion damage problems, although the campgrounds are generally closed during the late fall flood season. The management philosophy of the preferred alternative is to maintain existing camping opportunities, but to adapt and relocate facilities as dictated by the severity and consequences of future flooding. Future management actions would strive to reduce flood hazards and damage on these landforms by potentially abandoning indefensible sites and reconfiguring access.

In this plan, the NPS would strive to minimize conflicts between alluvial processes and visitor and administrative developments by siting new facilities away from eroding stream banks and out of high flood hazard areas. The NPS would also seek to minimize manipulation of floodplain ecosystems and processes where possible through collaborative efforts with Seattle City Light, and other county, state and federal regulatory agencies, including the Washington State Department of Transportation.

Site Descriptions

Colonial Creek Campground

Colonial Creek Campground was constructed in the 1960s on an alluvial fan and debris cone where Colonial and Rhode creeks meet Diablo Lake (See Figure 1). It includes a park housing unit, six comfort stations, and about 160 campsites. During the summer season, Colonial Creek Campground is the most popular camping destination in Ross Lake NRA. The campground is regularly at capacity on summer weekends and holidays due to easy access from the North Cascades Highway, many wooded lake-front campsites, several day hikes, and access to Diablo Lake.

The entrance to both the north and south loops of Colonial Creek Campground crosses the toe of the Rhode Creek debris cone, which is an active debris torrent system. Rhode Creek, a small, straight, high gradient stream, follows the Thunder Lake fault, which provides massive quantities of rock and gravel. This material is deposited on the debris cone and on the highway and entrance road. Debris is flushed out of the narrow canyon about once every 20-25 years, with significant events in 1984 and 2006.

During campground construction in the 1960s, the U.S. Forest Service blocked a channel on the debris cone that led into the campground's south unit. The levee failed in the 2006 flood, sending floodwater into the campground. Gabion grade control structures placed in the channel on the debris cone by the NPS and removal of material from the entrance road have resulted in more frequent deposition of rock on the entrance road. This material has been eroded from the failed debris cone by the extensive widening of Rhode Creek channel in response to the check dams, which have largely failed. The NPS frequently clears out the lower portions of the constructed channel following debris flows, and less frequently reconstructs and armors the bank of the creek when channel aggradation increases the risk of avulsion. The channel of Rhode Creek is now deep and wide, and is clearly visible from the highway.

Erosion and channel aggradation on the left bank also caused damage to the access road to the water system, which includes a 5000 gallon water tank. In response to erosion caused by the 2006 flood, the NPS armored the bank of the stream and provided some relief flow for the reoccupied channel through the south unit of the campground.

The north side of the campground is constructed on the alluvial fan of Colonial Creek. Historically the NPS maintained a short, poorly constructed levee and cabled logs and rock to protect the campground along the right bank of the creek. In about 2002, the NPS constructed a series of small footbridges across distributary channels of Colonial Creek. A large foot log spanned the main channel, and was

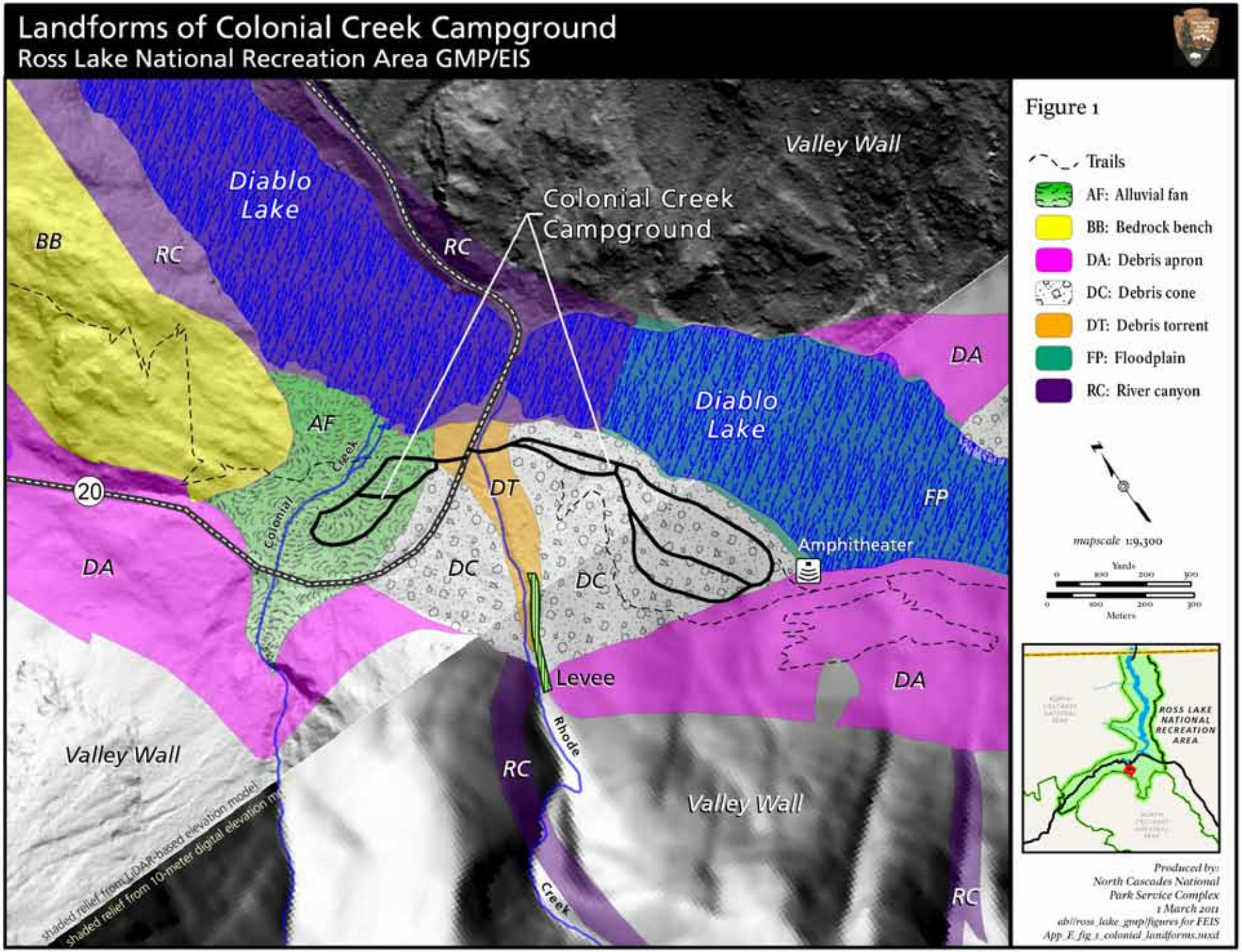

Figure 1. Landforms of Colonial Creek Campground

designed to be pulled back during flood events to provide the creek a clear path to Diablo Lake during flood season. The October flood of 2003 occurred before the foot log was removed, and appears to have triggered massive deposition of gravel in the main channel upstream of the bridge. This led the stream to jump out of its channel on the right bank upstream, and it followed one of the campground roads to Diablo Lake. In the process, it destroyed utility lines buried beneath the road, several campsites, and introduced a large amount of asphalt into the stream.

In response to this damage, an engineered logjam was installed just below the highway bridge to block a side channel that, if occupied, would threaten a major part of the north loop. The NPS also constructed a new campground loop road along the new creek channel. Unfortunately, in an attempt to save access to 11 campsites, the new road was constructed too close to the new channel, and the 2006 flood claimed another campsite and threatened the new road.

The north unit of Colonial Creek Campground remains on an active alluvial fan surface, while parts of the south loop are on the Rhode Creek debris cone. Relic flood channels cross both units and indicate that over time additional portions of the campground remain at risk to future flooding.

As a result of gravel, sand and silt deposited by Rhode Creek, the boat launch at Colonial Creek Campground has experienced shoaling since its construction. In response, the NPS has on more than one occasion dredged the boat ramp area. The boat ramp also is periodically unusable when Diablo Lake reservoir is drawn down by hydropower operations. In some instances, boaters who entered the lake during high water cannot retrieve their boats and have been stranded.

Diablo Lake just south of the boat ramp is also threatened by growth of the Thunder Creek delta. As part of the relicensing of the Skagit Hydroelectric Project, the NPS requested Seattle City Light to identify remedial measures to address this problem and incorporate those measures into the City's recreation and erosion control plans for the Skagit Project. Should maintaining the boat ramp become impossible, then the NPS consider several options. 1)R~~would r~~elocate the boat launch to the north side of the highway in the vicinity of the Diablo Lake boathouse, as recommended via previous assessments. Parking would still remain on the south side. Ancillary facilities in the vicinity of the ramp such as a vault toilet and picnic area could be included. 2) Maintain the launch in its current location by periodically dredging a channel from the launch to deeper water. This action would be done in coordination with Seattle City Light so dredging could be done at low water levels to minimize impacts to water quality. Should such dredging require the dredging of lacustrine wetlands, a Wetland Statement of Findings would be considered at that time. 3) If dredging is not feasible due to accelerated sedimentation rates, then the NPS would no longer attempt to maintain a boat launch in the vicinity of Colonial Campground. The NPS would either seek to establish a launch elsewhere on the reservoir, or abandon providing a boat launch on Diablo Lake. Boating would still be encouraged, but the loss of a boat launch would limit boating to paddlecraft, such as canoes and kayaks, or small motorboats, such as Jon boats, that could be launched without a ramp.

Goodell Campgrounds

The Goodell Creek Campground consists of 21 sites located along the confluence of Goodell Creek and the Skagit River (See Figure 2). It is located on low river terraces and the distal edge of the Goodell Creek alluvial fan, which is marked by a series of old flood channels that have been largely obstructed by Highway 20 and campground roads. There are also two group camping units along Goodell Creek, including a left bank group camp about 1 mile above Highway 20, and two group camps just above the highway on the right bank. The upper group campground is located on a terrace above the creek. The lower group campground and parts of the main campground are threatened by flooding from Goodell Creek. There are a series of small levees that were constructed to protect an old bridge abutment and other developments in the area. On the opposite bank from the lower group camp, Seattle City Light constructed a half-mile long levee to keep floodwater from spreading toward the town of Newhalem.

The flood risk has increased in the last few years due to channel changes on lower Goodell Creek induced by a massive 2003 landslide about one mile above the Skagit River. The landslide deposited approximately 2.9 million cubic meters of debris and completely blocked Goodell Creek and created a 2-acre lake that is approximately 10 meters deep. Since then, debris from the landslide has been working its way downstream, causing channel aggradation and channel instability from Lower Goodell Group Camp to the Skagit River. This process has led to the loss of

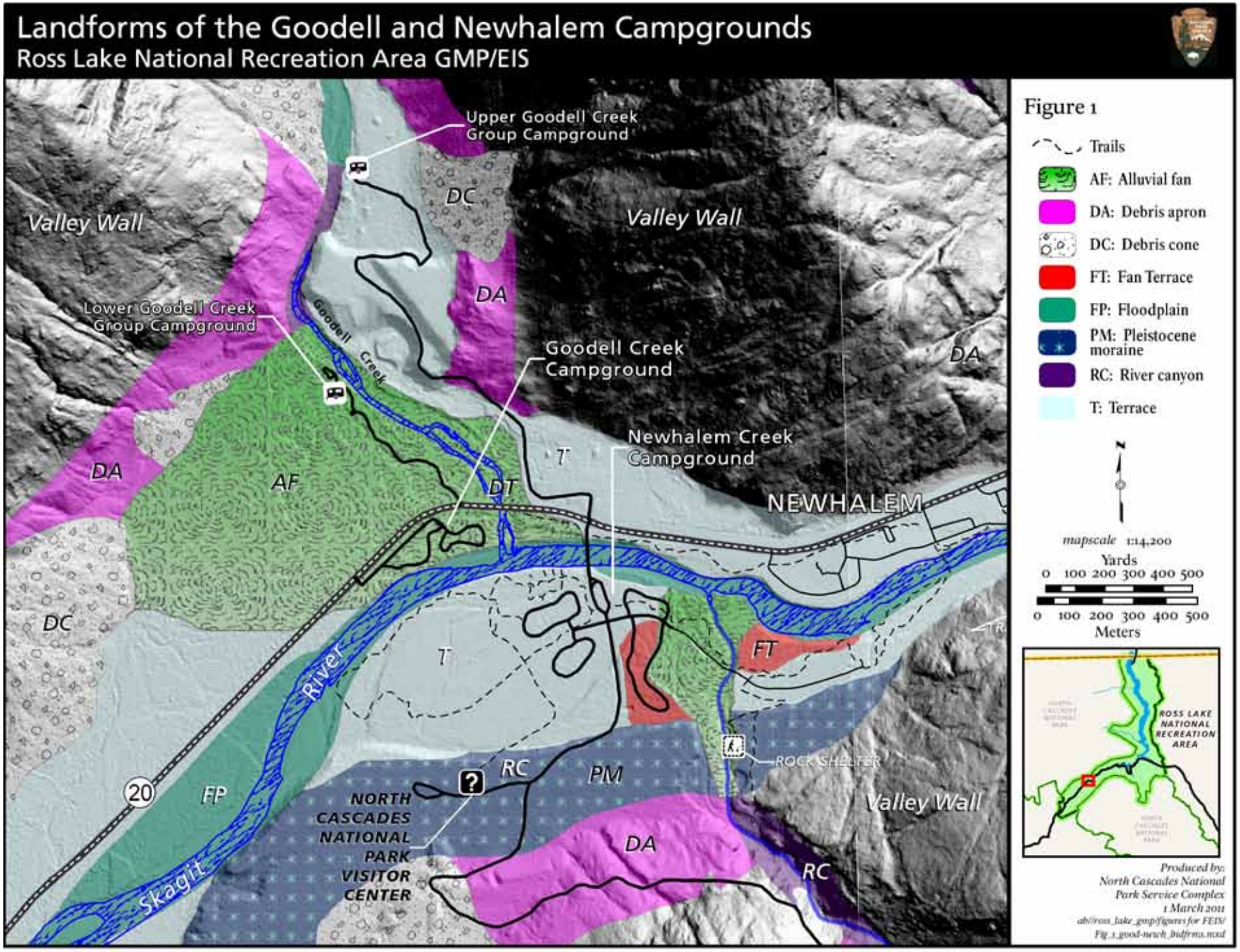

Figure 2. Landforms of the Goodell and Newhalem Campgrounds

two sites at the camp and threatens the access road off Highway 20.

Sites at the east end of the main Goodell Creek Campground also flooded, although flood damage has been limited to scouring of abandoned overflow channels scattered between campsites. Further problems are anticipated at both these campground locations given the continued aggradation of the riverbed and the fact the campground is situated on an alluvial fan.

General characterization of floodplain values and of the nature of flooding and associated floodplain processes in the area

Major flooding in the North Cascades generally occurs during fall rain-on-snow events as a result of heavy precipitation that can exceed several inches a day for a week or more. These events are triggered by a strong and persistent flow of tropical moisture from the equatorial Pacific Ocean, and area known as "pineapple expresses." They generally occur from mid October through December. Floodwaters from these events generally rise and fall rapidly, with flood peaks often occurring in a day or less. This type of flooding dominates lower elevation west-side streams, including the Skagit and its tributaries. In the last 15 years, events in 1989, 1990, 1995, 2003 and 2006 have triggered major changes on streams in the area.

Flooding also occurs in May and June due to rapid melt of heavy winter snowpack. Larger spring floods occur later in spring and can extend over several weeks into early summer. Peak flows for spring floods are typically lower than fall rain-on-snow events. At higher elevations above the rain-on-snow zone, and in colder east tributaries such as Ruby and Devil's creeks, spring flooding is generally dominant.

Occasionally, summer floods occur on small streams as a result of intense, localized convection associated with thunderstorm activity. The intensity and magnitude of these floods is greater in smaller first and second order watersheds.

Within Ross Lake NRA, most flooding problems are associated with tributary streams. One of the major effects of the three large hydroelectric dams on the Skagit River is decrease peak flood flows. While causing major impacts to ecosystem function and floodplain values, the dams provide protection to facilities along the Skagit River west of Newhalem, where the Skagit River regains its unregulated nature.

Justification for Use of the Floodplain

Description of why the proposed action must be located in the floodplain

The mountains of the North Cascades, including Ross Lake NRA, are often referred to as "the American Alps" because they include the steepest and most rugged topography in the contiguous United States. The precipitous topography provides little in the way of relatively flat, stable ground favorable for visitor service facilities and transportation infrastructure. In addition, approximately 94% percent of the North Cascades NPS Complex is designated as wilderness. Wilderness designation precludes permanent development of roads and facilities, and substantially constrains the amount of land available to provide visitor services and amenities commonly found in national parks. Simply put, there is little flat, defensible ground available, so floodplains, debris cones and alluvial terraces have become the default landforms of choice for establishing roads, campgrounds and associated facilities.

Congress established the lands and waters of Ross Lake NRA by transferring jurisdiction of the area from the U.S. Forest Service to the National Park Service. All the major campgrounds, roads and associated facilities that exist today were constructed by the U.S. Forest Service many decades ago. Developmental decisions at that time generally did not consider concepts such a geologic hazards, sustainability, adaptation to climate change, and deference to natural processes. This relatively static view of natural processes was also influenced by the perception that risks from natural processes such as flooding could be controlled through engineered solutions. Moreover, the natural human tendency to gravitate toward shorelines along lakes, creek and rivers resulted in the establishment of the most popular campgrounds and associated facilities in Ross Lake NRA on alluvial fans (North Unit of Colonial Creek Campground and the lower group camp and main campground at Goodell Creek), and debris cones (south unit of Colonial Campground).

Today these areas remain the most popular locations for frontcountry camping, and there is a high degree of public expectation to maintain camping opportunities in these areas. Demand for maintaining these camping experiences, coupled with a paucity of alternative camping locations that provide similar aesthetic conditions, places the NPS in the difficult

position of balancing the merits of maintaining camping opportunities in these areas against the risk of severe damage from future flooding.

The management philosophy of the preferred alternative is to maintain existing camping opportunities, but to adapt and relocate facilities as dictated by the severity and consequences of future flooding. The goal is to limit net loss of camping opportunities, but to relocate facilities to more geologically stable and less flood prone locations. For Colonial Creek and Goodell Creek Campgrounds, the preferred alternative would enable continued camping in all present areas, but campsites would be closed and relocated should reconstruction following severe flood damage not be feasible or sustainable.

Investigation of alternative sites

Alternative locations exist for relocating campgrounds in response to future flooding.

Hollywood

If Seattle City Light determines that Hollywood is no longer necessary for hydropower operations in the future, the NPS would work to acquire that land. ~~The NPS is presently working with Seattle City Light to acquire either through fee acquisition or land exchange an area known as "Hollywood" in the company town of Diablo~~ (See Figure 3). Hollywood is located on a flat alluvial terrace and alluvial fan where Stetattle Creek meets the Skagit River. It is protected by a levee on the left bank of Stetattle Creek, and by flood storage from Diablo and Ross Dams. It therefore has a relatively low risk of future flooding. Hollywood is not located within a regulatory floodplain. The area has never flooded since Seattle City Light established the levee and built the dams. The area is not considered likely to flood in the future because the levee is very well constructed, stabilized by mature trees along its length, and of sufficient height and strength to withstand the hydraulic scouring forces and flood elevations of Stetattle Creek. There is the possibility that a major landslide upstream could lead to stream aggradation on lower Stetattle Creek and threaten future development. However, there are sites at the east end of Hollywood that are relatively safe from Stetattle Creek.

Newhalem Creek Campground

The two main loops of Newhalem Creek campground were constructed on an alluvial terrace adjacent to the Skagit River, but the eastern two loops are on the alluvial fan of Newhalem Creek. Several campground loops were planned but never constructed, so there is ample opportunity for further expansion if necessary to offset the loss of camping elsewhere in the NRA.

Description of Site-Specific Flood Risk

Recurrence interval of flooding

Colonial Creek Campground

Colonial and Rhode creeks are steep, unregulated mountain streams that are prone to major channel avulsions in response to extreme rainfall events and associated channel aggradation. There is no long-term stream flow data available for Rhode Creek or Colonial Creek to quantify flood recurrence. Based on regression equations, the 100 year discharge for Colonial Creek is estimated at 650 cubic feet per second.

A review of administrative records indicates that floods of a 25 year or greater recurrence interval cause debris flows on Rhode Creek and major channel changes on lower Colonial Creek. This conclusion is supported by damage assessments from the early 1960s and 1984, along with the 2003 event.

Flood damage of the campgrounds at these sites has been exacerbated by management actions that placed facilities such as campground roads in old flood channels and attempted to constrict streams with levees and gabion structures. As a result of the manipulation of Rhode Creek, failure of the channel on the debris cone and damage to the campground entrance occurs every 2 to 5 years in response to 5 year rainfall events. Most of the southern unit of the campground is safe from flooding, although the 2006 flood forced Rhode Creek to occupy a system of old flood channels.

Colonial Creek has caused less damage than Rhode Creek in part because it has not been as heavily manipulated, but also because the watershed is more stable than fault-controlled Rhode Creek. The most recent damage to the north unit was a result of a large event and management actions that failed to clear the bridge from the main channel. Aggradation above the old footbridge since then has led to campground flooding again in 2006. It is anticipated that future floods of 25 year or greater magnitude will cause further damage and necessitate a management response.

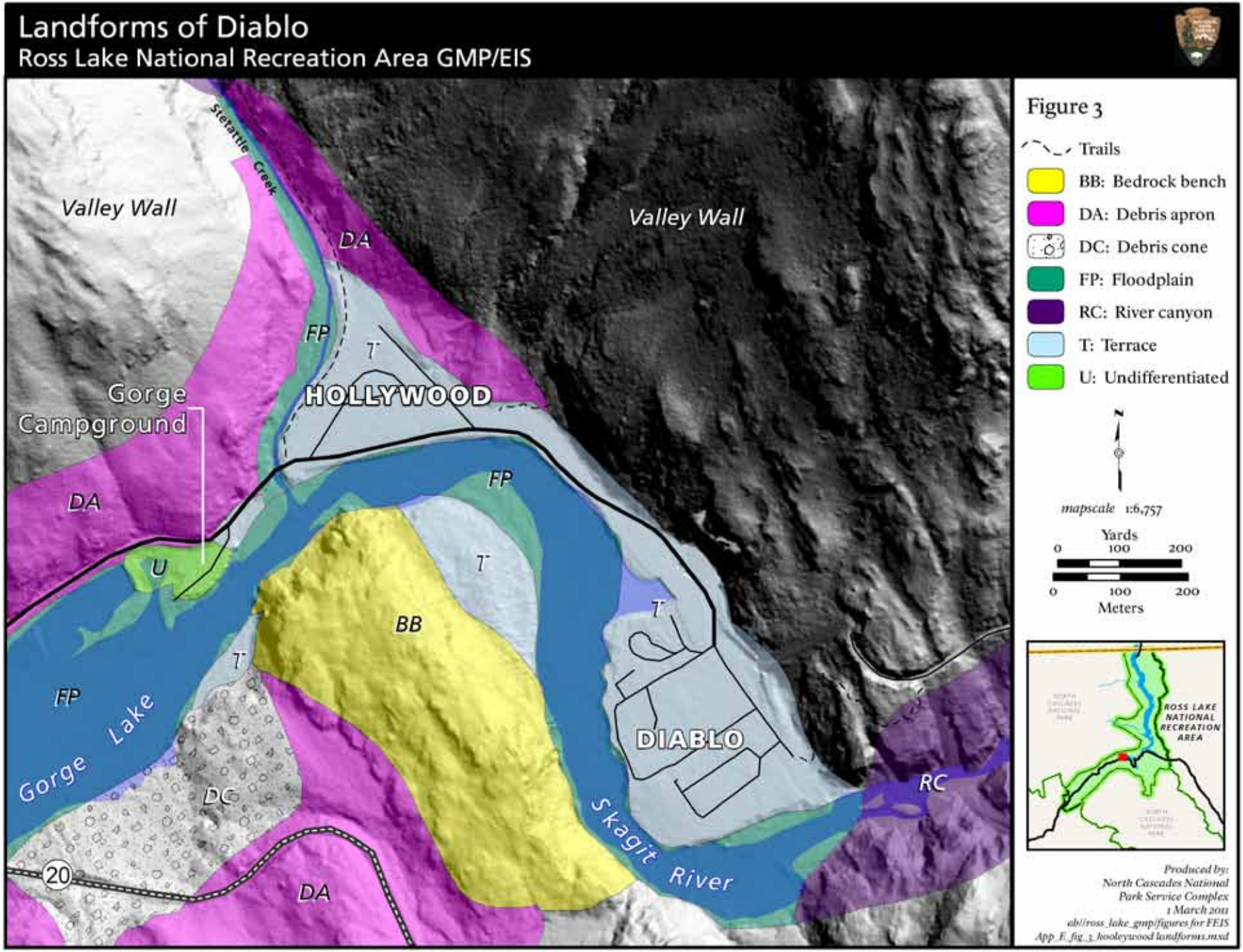

Figure 3. Landforms of Diablo

Goodell Creek Campground

Like many rivers in the region, Goodell Creek does not have streamflow records. While Lower Goodell Group Camp has history of flood damage judging by the levees, gravel from the 2003 landslide has now made parts of the campground prone to flooding during smaller annual events, including the spring 2008 and 2009 floods. Flooding of the main Goodell Creek Campground across Highway 20 has also become more frequent due to channel aggradation associated with the landslide and the recent passage of several large floods. In response, in 2008 the NPS installed larger culverts to move water through the campground. However, flooding is expected to worsen over time based on long term trends that show movement of Goodell Creek to the west.

Hydraulics of flooding at the site (depths and velocities)

Colonial and Rhode Creeks

Both Colonial and Rhode creeks drain steep mountain watersheds and are prone to rapid rise of floodwater during both fall and spring flood seasons. Flood waters from Colonial Creek, when it spills over banks and into the campground, are typically a foot or less deep in parts of the campground but can reach depths of 3 to 6 feet or more in side channels. Main channel velocities are on the order of 10 to12 feet per second with overbank flows on the order of 1 to 3 feet per second.

Unlike Colonial Creek, Rhode Creek is also likely to carry debris flows due to its straight, narrow, steep channel in the Thunder Lake Fault. Within the canyon above the debris cone, flows can reach depths of 10 feet or more and velocities in excess of 30 miles per hour. At these depths and velocities, Rhode Creek is capable of transporting boulders in excess of 3 feet diameter and depositing them on the entrance road.

Goodell Creek

Goodell Creek drains an area of steep, rocky terrain that covers 25,523 acres. Floodwaters in this basin rise quickly due to rapid runoff from extensive bare rock slopes. Floodwaters from Goodell Creek are channelized by the right and left bank levees, as well as the Highway 20 bridge. As a result, floodwater depth and velocity in lower Goodell Creek are deeper and faster than unregulated streams of comparable size. Based on regional regression equations and comparison with nearby watersheds of similar size, the 100 year discharge for Goodell Creek is about 7,900 cubic feet per second. Stream flow velocity in the main channel is likely on the order of 10 to 12 feet per second, with overbank depths less than 3 feet. Observed overbank flow velocities along the Lower Goodell Group Camp access road are 3 to 4 feet per second.

Rhode and Colonial Creeks, when they spill over banks and into the campground, are typically a foot or less, but velocities are on the order of 10 to 12 feet per second. Where channelized into over bank side channels, flows can reach 5 to 10 feet depths.

Time required for flooding to occur (amount of warning time possible)

Colonial Creek Campground

Rhode Creek has a very small and extremely steep watershed, so severe rainfall over a period of several hours could trigger flooding with relatively little advance notice. Floodwaters could rise at three times a year, including in fall rain-on-snow, spring snowmelt, and summer thunderstorm events. The potential for summer flood activity is of particular concern because it coincides with the main visitor use season. Most debris torrents on Rhode Creek could be reasonably assumed to occur, as they have in the past, during rain-on-snow events in late fall or early winter, during a time of low visitor use.

The watershed feeding Colonial Creek is larger and has a lower gradient than Rhode Creek, and as a result floodwaters rise more slowly. Given the size of Colonial Creek watershed, it is also unlikely that a summer thunderstorm could trigger flooding. It is anticipated that it would take several days or more of sustained rainfall before flooding of the north loop of the campground would commence. Flooding would be highly unlikely to occur during the high visitor use season. Several hours to days of advance notice would most likely be available, and there would be little if any use of the campground at this time.

Goodell Creek Campground

Goodell Creek watershed covers a 25,523 acre area, and because of the size of the watershed it would take several days to a week or more of sustained heavy precipitation for flooding to occur on lower Goodell Creek. Therefore, warning times for fall rain-on-snow or spring snowmelt floods would be a day or more.

The occurrence of several large landslides in the Goodell Creek watershed create the potential for sudden large discharges of water on lower Goodell Creek from sudden failure of the a debris dam. Indeed, the 2003 Goodell landslide and debris dam were not discovered until a day after the event occurred. Given that this event was triggered by heavy precipitation, there could be many hours to a day or more warning time for visitors at the campgrounds. However, should a landslide be triggered by an earthquake, it could take only hours for a lake to fill and dam to fail.

Opportunity for evacuation of the site in the event of flooding

Colonial Creek Campground

A debris flow on Rhode Creek would block the campground road and prevent evacuation by motor vehicles. Clearing could take several days to a week depending upon flow volume. Past events have deposited more than 30,000 cubic yards as deep as 6 feet. Other portions of the campground could be evacuated by motor vehicle in all but the most extreme precipitation events. Most visitors would be unlikely to remain in the campground under these extreme conditions. In the south unit of Colonial Campground, evacuation away from flood waters could be relatively easily accomplished on foot by moving to the south end of the campground or up the Thunder Creek Trail. In the north unit, evacuation would be to the south via Highway 20.

Goodell Creek Campground

Floodwaters could block the present entrance road to the Lower Goodell Group Camp and specific sites in the main Goodell Creek Campground. These conditions could prevent evacuation by motor vehicle for a day or more depending upon the severity of road damage. In all instances, evacuation by foot would most likely be possible.

Geomorphic considerations (erosion, sediment deposition, and channel adjustments)

The north unit at Colonial Creek Campground, Lower Goodell Group Camp, and the east end of the main Goodell Creek Campground are located on active parts of alluvial fans. These sites are expected to have frequent deposition of gravel and channel instability. If large amounts of sediment are introduced into the system, such as the Goodell landslide, bank erosion and channel instability can be expected to increase downstream.

The south unit of Colonial Creek Campground, including the main entrance road and part of Highway 20, are built on a debris cone deposited by Rhode Creek. This debris cone is constructed by massive deposits of rock and gravel as well as by alluvial deposits. Stream channels and the debris cones themselves are known to be unstable features.

Description and Explanation of Flood Mitigation Plans, Including:

A. Measures to reduce hazards to human life and property to the regulatory floodplain level, while minimizing the impact to the natural resources of the floodplain, including the use of non-structural measures as much as practicable;

No detailed floodplain mapping exists for this area. ~~None of the actions included in the preferred alternative are located within regulatory floodplains.~~ However, the campgrounds and entrance roads previously described ~~above~~ are located on alluvial fans and debris cones. These landforms~~, which have floodplains that~~ are inherently flood prone and unstable, so reasonable measures to reduce hazards to human life and property are needed.

The ~~development of the~~ south unit of Colonial Creek Campground is in a floodprone ~~high flood hazard~~ area on the Rhode Creek debris cone. The most probable risk of flooding in this area is in fall, winter and early spring during severe rain on snow events. The risk to human life and property during these synoptic scale events is very low because the campground is closed, there is little administrative use, and there is usually several days advanced warning of flooding.

Flooding is also possible in the summer following intense convective thunderstorms. These small scale events are often triggered by passage of a cold front or convective instability. When these events occur, the risk to human life and property is somewhat greater because (a) the campground is open and often at full capacity; and (b) the lead time for the risk of flooding is reduced due to uncertainty of the event location and intensity.

A reasonably foreseeable flooding scenario in the summer season would involve several hours of lead time for a debris torrent event. Potential impacts

would include the possibility of partial or complete loss of vehicle access to the campground and flooding of some campsites due to a channel shift at the head of the debris cone. These conditions could also trigger old-growth tree fall (e.g. from flood-scoured tree roots or from severe wind). It is during these summertime events that reasonable mitigation measures would be needed to reduce risk to life and property.

To mitigate risks to human life and property, ~~Given the sudden and catastrophic nature of flooding on the Rhode Creek debris cone and the potential for this on lower Goodell Creek by landslides,~~ the NPS will enact the following mitigation measures for Colonial Creek Campground:

1. Install warning signs to notify visitors of the potential risks. The signs would be posted at the Camptender kiosk, boat launch, and other prominent areas. ~~consider signing of the area near the mouth of the Rhode Creek and at lower Goodell Creek camps to the creek to warn visitors about the sudden and somewhat unpredictable flood hazard.~~
2. Develop a flood warning and campground evacuation plan. This concise plan would specify roles and responsibilities for response actions by park staff including measures for public notification and evacuation.
3. Identify and implement proactive steps to mitigate flood risk. To maintain camping opportunities at Colonial Creek Campground, the General Management Plan states the NPS would take proactive management actions at Rhode Creek to prevent campsites from being impacted by flooding, debris flow, and erosion. If campsites are affected in the future, the NPS would attempt reconstruction in the same area. If reconstruction of campground infrastructure following severe flooding is not feasible (or too impactful), the damaged areas would be abandoned and rehabilitated and new camping opportunities would be provided elsewhere in more sustainable locations.

B. Acknowledgement that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

The camp-tender housing and comfort stations at Colonial Creek Campground are not currently flooding, but several are located on active landforms where future changes could change conditions overnight.There are no other facilities in the preferred alternative that are within regulatory floodplains.

Summary

The Skagit River is the main stream in Ross Lake NRA, but it is not the main source of flooding since flood flows are regulated by three large hydroelectric projects. The preferred alternative does not propose any new administrative and visitor use facilities in regulatory floodplains. Several existing facilities would, however, remain in flood prone areas on alluvial fans and debris cones. These include the major park campground at Colonial Creek, as well as smaller campgrounds along Goodell Creek. Flooding at these sites has been exacerbated by occurrence of slope instability within watersheds and the occurrence of several large floods in the past 20 years. While flood conditions are not particularly severe at three of the four sites and warning times of several days are likely, Rhode Creek presents a special flood hazard due to the possibility of debris flows triggered by thunderstorms during the main visitor use season.

GLOSSARY

accessibility: The provision of NPS programs, facilities, and services in ways that include individuals with disabilities, or makes available to those individuals the same benefits available to persons without disabilities.

accretion: The addition to land bordering water caused by the gradual deposition of sediment and debris.

acquisition: The act or process of acquiring fee title, or interest other than fee title, of real property including acquisition of development rights or remainder interest.

adaptive management: Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.

Advisory Council on Historic Preservation: The Advisory Council on Historic Preservation (ACHP) is an independent federal agency that promotes the preservation, enhancement, and productive use of the nation's historic resources. As directed by the National Historic Preservation Act of 1966 as amended, the council serves as the primary federal policy advisor to the president and Congress; recommends administrative and legislative improvements for protecting our nation's heritage; advocates full consideration of historic values in federal decision-making; and reviews federal programs and policies to promote effectiveness, coordination, and consistency with national preservation policies.

aggradation: A decrease in channel capacity due to the raising of the streambed elevation and an increase in width/depth ratio. The cause of aggradation is often an increase in upstream sediment load and/or size of sediment exceeding the transport capacity of the channel, or may be the result of channel instability and a decrease in stream power and shear stress. Adverse consequences associated with aggradation include channel-accelerated bank erosion or avulsion.

air quality designations: Designated under the Clean Air Act, Class I areas are those areas that are afforded the highest level of protection from air pollutants and generally consist of wilderness areas, national parks, and wildlife refuges. Class II areas are all areas not designated Class I where additional air pollutant inputs may be permitted up to certain levels.

archeology: The scientific study, interpretation, and reconstruction of past human cultures from an anthropological perspective based on the investigation of the surviving physical evidence of human activity and the reconstruction of related past environments. Historic archeology uses historic documents as additional sources of information.

archeological resource: Any material remains or physical evidence of past human life or activities that are of archeological interest, including the record of effects of human activities on the environment. An archeological resource is capable of revealing scientific or humanistic information through archeological research.

alternatives: Sets of management elements that represent a range of options for how or whether to proceed with a proposed action.

appropriate use: A use that is suitable, proper, or fitting for a particular park, or to a particular location within a park.

aquifer: A saturated, permeable sediment or rock that can store or transmit significant quantities of water.

asset: A physical structure or grouping of structures, land features, or other tangible property which has a specific service or function.

asset management: A systematic process of maintaining, upgrading, and operating assets cost-effectively by combining engineering principles with sound business practices and economic theory.

avulsion: A sudden loss or addition to land caused by the erosive or depositional action of water creating a new channel or filling in an existing channel.

backcountry: Remote, roadless, and less intensely used areas where the majority of use is by overnight campers who hike or ride stock.

bank barbs: Low-profile, angular rock structures that protrude into a river channel at an angle pointed upstream. They are used as an instream flow redirection technique designed to redirect the fastest, deepest part of the channel away from the eroding bank and to create eddies along the bank where velocity and erosion are reduced.

bioengineering: The use of live plant materials to provide erosion control, slope and stream bank stabilization, landscape restoration, and wildlife habitat. These techniques are used alone or in conjunction with conventional engineering techniques.

candidate species: Species not currently protected under the Endangered Species Act but under consideration by the U.S. Fish and Wildlife Service for addition to the list of federally threatened or endangered species.

channel migration zone: The geographic area susceptible to channel erosion and/or channel occupation. Because alluvial channels are rarely static through time, rivers and streams naturally migrate within their valleys. Channels respond with horizontal movement (lateral migration, avulsion, channel widening, channel narrowing) and vertical movement (incision and aggradation) depending on site-specific circumstances and watershed conditions. Human landscape disturbance can exaggerate or constrain channel migration by affecting local and watershed-wide processes of flooding, erosion, and deposition. The CMZ can extend beyond areas of flood inundation and can advance into landscape features above the 100-year flood water surface elevation.

clasts: An individual constituent, grain, or fragment of a detrital sediment or sedimentary rock, produced by the physical disintegration of a larger rock mass.

climate change: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UN Framework Convention on Climate Change 1992).

Code of Federal Regulations (CFR): A publication that codifies the general and permanent rules or regulations published in the *Federal Register* by the executive branch departments and agencies of the federal government and which carry the force of law. The citation "36 CFR 1.1 " refers to part 1, section 1, of title 36.

commercial service: Any visitor-related service, activity, or facility for which compensation, monetary or otherwise, is exchanged. By law, all commercial services in parks must be authorized by the superintendent. Commercial services can originate within the park or outside.

conserve: To protect from loss or harm; preserve. Historically, the terms conserve, protect, and preserve have come collectively to embody the fundamental purpose of the NPS—preserving, protecting and conserving the resources contained within the National Park System.

consultation: A discussion, conference, or forum in which advice or information is sought or given, or information or ideas are exchanged.

cultural landscape: A geographic area, including both the cultural and natural resources and the wildlife or domestic animals therein, associated with an historic event, activity, or person, or exhibiting culture or aesthetic values. Cultural landscapes are investigated and defined in a way that emphasizes the interaction between human beings and nature over time. There are four overlapping types of cultural landscapes: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

cultural resource: An aspect of a cultural system that is valued by or significantly representative of a culture, or that contains significant information about a culture. A cultural resource may be a tangible entity or a cultural

practice. For NPS management purposes, tangible cultural resources are categorized as districts, sites, buildings, structures, and objects for the National Register of Historic Places, or as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources.

cumulative impact: The effect on the environment that would result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts can result from similar projects or actions, as well as from projects or actions that have similar impacts (40 CFR 1508.7).

decision maker: The managerial level employee who has been delegated authority to make decisions or to otherwise take an action that would affect park resources or values. Most often it refers to the park superintendent or regional director, but may at times include, for example, a resource manager, facility manager, or chief ranger to whom authority has been redelegated.

desired future conditions: The future condition of resources needed to meet a management objective. Desired future conditions are based on ecological, social, and economic considerations during the land and resource management planning process.

developed area: An area managed to provide and maintain facilities (such as roads, campgrounds, and housing) that serve park staff and visitors. It includes areas where park development or intensive use may have substantially altered the natural environment or the setting for culturally significant resources.

draft environmental impact statement (DEIS): A draft version of an environmental impact statement. The draft is available to the public for comment for a minimum of 60 days.

easement: A right or privilege one may have on another's land. For example, an easement may allow a utility company to build and maintain electrical transmission lines through another landowner's property, but take no other actions beyond those defined in the easement.

ecosystem: A functioning system composed of a community of living organisms and their interactions with the physical and chemical environment. This term usually describes these systems at a regional or broad physiographic scale.

effect: The result of actions on natural and cultural resources, aesthetics, economic, social or human health and safety. Effects can be direct, indirect, or cumulative. This term is used interchangeably with "impact."

endangered species: Any animal or plant species in danger of extinction throughout all or a significant portion of its range. These species are listed as threatened or endangered by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act.

environmental impact statement (EIS): A detailed analysis document mandated by the National Environmental Policy Act (NEPA) when a proposed action or alternative has the potential for significant impact on the human environment.

environmentally preferred alternative: The alternative that would best promote the policies set forth in NEPA section 101 from among all action alternatives analyzed as part of the planning process. The Council for Environmental Quality encourages agencies to identify an environmentally preferable alternative in the draft environmental impact statement or environmental assessment, but only requires that it be named in the record of decision. It is usually selected by the planning team.

erosion: The wearing away of land surface either by natural chemical or physical processes (including water, wind, or ice) or human or animal activities.

ethnographic resource: A site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, or

other significance in the cultural system of a group traditionally associated with it.

executive orders, memoranda, or proclamations: Regulations having the force of law issued by the President of the United States to the executive branch of the federal government.

exotic species: An organism that occurs outside its natural geographic distribution due to deliberate or accidental human action.

eyrie: The nest of a bird of prey, such as a hawk or eagle, in an elevated place.

fauna: The animal life of an area.

Federal Register: A daily publication of the National Archives and Records Administration that updates the Code of Federal Regulations, in which the public may review the regulations and legal notices issued by federal agencies. Source citations for the regulations are referred to by the volume and page numbers of the *Federal Register* and the date of publication. For example, volume 65, page 2,984 might be cited as "65 FR 2984, January 19, 2000."

final environmental impact statement (FEIS): The document that responds to public comments on the draft environmental impact statement and may include corrections and revisions as a result of public comment.

fire management plan: An implementation plan that details how natural fire regimes and prescribed fires will be managed in a park or other area.

fire suppression: All work and activities associated with fire extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

floodplain: Level streamside land that may be subject to flooding..

flora: The plant life of an area.

flow regime: A condition of stream flow defined by the mode of sediment transport, bed form, and flow resistance.

foundation statement: A statement that begins a national park unit's planning process and sets the stage for all future planning and decision-making by identifying the unit's mission, purpose, significance, special mandates and broad mission goals. It is incorporated into a unit's GMP, but may also be produced as a standalone document for a unit.

frontcountry: Areas of a park that are easily accessible to visitors (as opposed to backcountry) and are more frequently used, often by single-day visitors. The frontcountry contains developed areas and is generally along or accessed by transportation corridors.

fundamental resources and values: Those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management because they are critical to achieving the park's purpose and maintaining its significance. A fundamental value, unlike a tangible resource, refers to a process, force, story or experience, such as such as an ancestral homeland, wilderness values, or oral histories.

gateway community: A community adjacent to a national park unit that may serve as a point of entry for visitors to the unit. Gateway communities often have significant socioeconomic and cultural ties to the unit.

general management plan (GMP): A plan that clearly defines direction for resource preservation and visitor use in a park, and serves as the basic foundation for decision-making. GMPs are developed with broad public involvement and usually guide parks for 15 to 20 years. GMPs are accompanied by a draft and final environmental impact statement.

geologic resources: Any natural resource or process of a geologic nature or pertaining to the physical history of the earth. Examples include mineral resources, rock strata, fossil remains, or landscape features produced by processes such as exfoliation, erosion and sedimentation, glaciation, karst or shoreline processes, fossilization, or seismic, volcanic, and tectonic activities.

geographic information system (GIS): Both a database designed to store geographic data and a set of computer operations that can be used to analyze the data.

grizzly bear core area: areas more than 0.3 miles (500 meters) from a road or high use trail that are free of motorized traffic and high levels of human use.

groundwater: Water below the ground surface filling voids in soil or rock layers. The source of groundwater is precipitation (rain, snow, or glacial melt) that has percolated downward from the surface.

habitat: The natural abode of an organism, including all biotic, climatic, and all factors affecting its life.

heptachlor: an organic compound that was used as an insecticide, considered a persistent organic pollutant (POP)

herbaceous: Pertaining to, or characteristic of, an herb (fleshy-stemmed plant), as distinguished from the woody tissue of shrubs and trees.

hydrology: The study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

impact: see effect.

impact topic: A specific category of analysis for impacts, such as wildlife, vegetation, or historic structures. Impact topics are identified through public scoping and a determination of what aspects of the human environment would be affected if an action was implemented. Analysis of impacts for a specific topic may be required as a result of a public law or an executive order.

impairment: An impact so severe that, in the professional judgment of a responsible NPS manager, it would harm the integrity of park resources or values and violate the 1916 NPS Organic Act.

implementation plan: A plan that follows guidance from, but provides greater detail than, the general management plan and that specifies how one or more of the desired resources conditions, visitor experiences, or proposed actions will be accomplished. An implementation plan may direct a specific project or an ongoing activity.

indicator: A component or attribute of an ecosystem that can be observed and/or measured. An indicator provides evidence of the function, productivity, health, and/or condition of the ecosystem.

indigenous (species): Any species of organism native to a given land or water area by natural occurrence.

infrastructure: A general term describing public and quasi-public utilities and facilities such as roads, bridges, sewers, sewer plants, water lines, storm drainage, power lines, parks and recreation facilities, public libraries, and fire stations. Infrastructure can also be considered permanent installations such as lighting, sidewalks, buildings, and water systems.

integrity: The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

invasive non-native species: A non-native species (with respect to a particular ecosystem) whose introduction causes or would likely cause harm to the economy, environment, or human health.

irretrievable: One of the categories of impacts mentioned in the National Environmental Policy Act to be included in environmental impact statements. An irretrievable effect applies to a loss of production or a commitment of renewable natural resources.

irreversible: A category of impacts mentioned in the environmental impact statement that applies to non-renewable resources, such as minerals and archeological sites. Irreversible effects can also refer to effects of actions that can be renewed only after a long period of time, such as the loss of soil productivity.

issue: Some point of debate that needs to be resolved. For GMP planning purposes, issues can be divided into "major questions to be answered by the GMP" (also referred to as the "decision points of the GMP") and "NEPA

issues" (usually environmental problems related to one or more of the planning alternatives).

kiosk: A stall or other structure set up in a public place where one can obtain information.

landscape: A collection of similar ecosystems, distributed over a large geographical area, that share underlying biological, physical or human-made characteristics. See also cultural landscape.

lateral water infiltration: lateral movement of water into a soil or rock surface

life cycle costing: An accounting method that analyzes the total costs of a product or service, including construction, maintenance, manufacturing, marketing, distribution, useful life, salvage, and disposal.

management concept: A brief statement of the kind of place the park should be (also referred to as a "vision statement").

management direction (also desired condition or management prescription): A planning term referring to statements about desired resource conditions and visitor experiences, along with appropriate kinds and levels of management, use, and development for each park area.

management prescriptions: See management direction.

management zone: A geographical area for which management directions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities, development, and park operations. Each zone has a unique combination of resource and social conditions and a consistent management direction. Different actions are taken by the NPS in different zones.

management zoning: The application of management zones to a park unit. The application of different type of zones and/or size of zones are likely to vary in different alternatives.

Memorandum of Agreement or Memorandum of Understanding: Short written statements outlining the terms of an agreement, transaction, or contract between two or more parties.

minority: Defined by the U.S. Census as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic.

mitigation: Modification of a proposed action to lessen the intensity of its impact on a particular resource; compensation for an impact.

National Ambient Air Quality Standards: Allowable concentrations of air pollutants in the ambient (public door) air as specified in 40 CFR 50.NAAQS and based on air quality criteria. These are divided into primary and secondary standards which allow for adequate margins of safety to protect the public health and welfare.

National Environmental Policy Act (NEPA) process: The objective analysis of a proposed action to determine the degree of its environmental impact on the human (natural and cultural) environment, alternatives to the proposed action, mitigation to reduce or compensate for the impact, and the full and candid presentation of the analysis to, and involvement of, the interested and affected public. This process is required of all federal agencies by the National Environmental Policy Act of 1969.

National Park System: The sum total of the land and water now or hereafter administered by the Secretary of the Interior through the National Park Service as park, monument, historic site, parkway, recreational area, or other purposes.

National Register of Historic Places: The federal listing of nationally, regionally, and locally significant buildings, structures, sites, objects or districts. Sites listed in the National Register must be considered when making management decisions if an action could affect that site. Parks are required to assess properties over 50 years old to determine their eligibility for nomination to the National Register.

Native Americans: "Of, or relating to, a tribe, people, or culture that is indigenous to the United Sates," according to the Native American Graves Protection and Repatriation Act. Typically, the general term is applied to American Indian tribes, Alaska Natives, Native Hawaiians and other Pacific islanders. Federally recognized American Indian tribes and Alaska Natives have a unique status as "eligible for the special programs and services provided by the United States to Indians because of their status as Indians."

Native American consultation: Consultation required by various laws, regulations, executive orders and policies relative to indigenous peoples who may have traditional or contemporary interests in the lands now occupied by parks. Consultation done in compliance with legal requirements is considered to be government-to-government consultation when federally recognized American Indian tribes and Alaska Natives are involved.

native species: Plants, animals, or other living organisms indigenous to an area.

natural quiet: Refers to the state of having only natural sources of sound; wind, rustling leaves, water, and animal calls are examples.

night sky: A sky free of artificial light sources and light pollution.

non-native species: Plants or animals that are not indigenous to the area (see also exotic species).

notice of availability: A notice in the *Federal Register* of the availability to the public of either a draft or final environmental impact statement or a record of decision on an action.

notice of intent: A notice in the *Federal Register* of the intent to prepare an environmental impact statement on a proposed action.

paleoecological : Pertaining to the study of ancient or prehistoric ecosystems.

park: Any one of the nearly 400 areas of land and water administered as units of the National Park System. The term is used interchangeably with "unit."

paulustrine: Pertaining to material growing or deposited in a marsh, wetland or paludal environment.

peak season: High-use times, usually from Memorial Day to Labor Day, when most park visitation occurs.

pedon: The smallest unit or volume of soil that contains all the soil horizons of a particular soil type, usually having a surface area of 10.76 square feet or approximately 1 square meter and extending from the ground surface down to bedrock.

persistent organic pollutant (POP): an organic compound that is resistant to environmental degradation through chemical, biological, and photolytic processes. POPs have been observed to persist in the environment, to be capable of long-range transport, to bioaccumulate in human and animal tissue, to biomagnify in food chains, and to have potential significant impacts on human health and the environment.

Planning, Environment, and Public Comment (PEPC) System: An online database designed to facilitate the project management process in conservation planning and environmental impact analysis. It assists NPS employees in making informed decisions with regard to a number of compliance issues throughout the planning, design, and construction process.

prescribed fires: Fires ignited by park managers to achieve resource management and fuel treatment objectives.

preservation: The act or process of applying measures to sustain the existing form, integrity, and material of a historic structure, landscape, or object. Work might include preliminary measures to protect and stabilize the property, but generally focuses on the ongoing preservation, maintenance, and repair of historic materials and features rather than extensive replacement and new work (NPS DO-28).

primary interpretive themes: The most important ideas or concepts to be communicated to the public about a park.

professional judgment: A decision or opinion that is shaped by study, analysis, and full consideration of all the relevant facts, and that takes into account:

- the decision maker's education, training, and experience
- advice or insights offered by subject matter experts and others who have relevant knowledge and experience
- good science and scholarship and, whenever appropriate,
- the results of civic engagement and public involvement activities relating to the decision.

public involvement: Public input and participation sought in the planning for public lands and required under the National Environmental Policy Act. Comment is sought at the initial scoping (information gathering) and draft stages for an EIS or during initial scoping and upon publication of an EA.

reconstruction: The act or process of depicting, by means of new construction, the form, features, and detailing of a nonsurviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

record of decision (ROD): The document that states which alternative analyzed in an environmental impact statement has been selected for implementation and explains the basis for the decision. The decision is published in the *Federal Register*.

rehabilitation: The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical or cultural values.

repatriation: To send back to place of origin. In the case of repatriated structures, these structures would be brought back to their original location.

restoration: The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

regulations: Rules or orders prescribed by federal agencies to regulate conduct, and published in the Code of Federal Regulations.

reservoir: An artificial lake where water is collected and kept in quantity for use.

revegetation: The reestablishment and development of a plant cover either by natural means or by artificial means such as reseeding.

right-of-way: A permit or an easement that authorizes the use of public land for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, and reservoirs. It is also the reference to the land covered by such an easement or permit. See also easement.

rip-rap: Hard, durable, angular rock that is free of organic material and resistant to weathering and erosion. Rip-rap is commonly used to stabilize drainage channels.

sackung: "Sackungen" is a German term that describes gravitational spreading or deep seated gravitational slope deformation at or near ridge tops in mountainous terrain. The process occurs when over-steepened, or undercut valley slopes create a gravitational spreading or slope deformation away from a ridge top.

sacred sites: Certain natural and cultural resources treated by American Indian tribes and Alaska Natives, and Native Hawaiians as sacred places having established religious meaning and as locales of private ceremonial activities.

scoping: Includes both internal and external scoping. Internal scoping is NPS decision making on issues, alternatives, mitigation measures, the analysis boundary, appropriate level of documentation, lead and cooperating agency roles, available references and guidance, defining purpose and need, and so forth. External scoping is the early involvement of the interested and affected public.

section 106 consultation or the 36 CFR 800 process: Discussions between a federal agency officials and the state historic preservation officer, and when necessary, the Advisory Council on Historic Preservation, and other interested parties concerning historic properties that could be affected by a specific undertaking. Section 106 is the part of the National Historic Preservation Act that outlines the procedure. The procedure is codified in 36 CFR 800.

section 7 consultation: The requirement of section 7 of the Endangered Species Act that federal agencies consult with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service if a proposed action might affect a federally listed species or its critical habitat.

sensitive species: A plant or animal species not yet officially listed, but which is undergoing status review for listing on the U.S. Fish and Wildlife Service's official threatened and endangered list. These include species whose populations are small and widely dispersed or restricted to a few localities and species whose numbers are declining so rapidly that official listing may be necessary.

servicewide: An action, regulation, or description that relates to all units of the National Park System.

significance statements: Explanations of why, within a national, regional, and systemwide context, a park's resources and values are important enough to warrant national park designation.

socioeconomic analysis: The task of assessing the impact of a plan or project on a community's or region's social structure, on a community's fiscal health, or a region's economic basis.

soundscape (natural): The aggregate of all the natural and nonhuman-caused sounds that occur in parks, together with the physical capacity for transmitting natural sounds.

special mandates: Legal mandates specific to a park that expand upon or contradict a park's legislated purpose

stabilization: According to NPS management policies, archeological resources, buildings, structures, and objects subject to erosion, slumping, subsidence, or other natural deterioration will be stabilized using the least intrusive and destructive methods. The methods used will protect natural resources and processes to the maximum extent feasible. Stabilization will occur only after sufficient research demonstrates the likely success of the proposed stabilizing action, and after exiting conditions are documented.

stakeholder: An individual, group, or other entity that has a strong interest in decisions concerning park resources and values. Stakeholders may include recreational user groups, people with a historic affiliation to the park, permittees, and concessioners. In the broadest sense, all Americans are stakeholders in the national parks.

state historic preservation officer or office: An official in each state appointed by the governor to administer the state historic preservation program and carry out certain responsibilities relating to federal undertakings in the state.

stewardship: The cultural and natural resource protection ethic of employing the most effective concepts, techniques, equipment, and technology to prevent, avoid, or mitigate impacts that would compromise the integrity of park resources.

stock: Animals such as horses, mules, or llamas that can be ridden or used to carry supplies.

strategic plan: A servicewide five-year plan required by the Government Performance and Results Act in which the NPS states how it plans to accomplish its mission during that time, and the value it expects to produce for the tax dollars expended. Similarly, each park, program, or central office has its own strategic plan, which considers the servicewide mission and its own particular mission.

streambed: The channel bottom of a stream, river or creek; the physical confine of the normal water flow.

stream reach: A classification term used in hydrology to refer to relatively similar section of stream or river based on factors such as stream gradient and valley width.

superintendent: The senior NPS official in a park; used interchangeably with "park superintendent" or "unit manager."

sustainable: The yield of a natural resource that can be produced continually at a given intensity of production or extraction.

sustainability: The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.

threatened and endangered species: As defined in the Endangered Species Act of 1973 as amended (Public Law 93-205; 87 Stat. 884), "endangered species" is "any species which is in danger of extinction throughout all or a significant portion of its range" and a "threatened species" is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms, or (5) other natural or human-made factors.

understory: The trees and woody shrubs growing beneath the tallest trees or other vegetation in an area.

unit: See park.

universal design: The design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design.

user capacity: The type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in a park without degradation. Management prescriptions in the general management plan.

visitor: Anyone who uses a park's interpretive, recreational, and educational services, regardless of where such use occurs (such as through Internet access, libraries, or other methods).

visitor experience: The perceptions, feelings, and reactions a person has while visiting a park. Examples of visitor experiences include: a sense of being immersed in a natural landscape; a feeling of being crowded; a feeling of being in an area where the sights and sounds of people and vehicles are predominant; having a sense of challenge and adventure; or a perception of solitude and privacy.

visitor use: Passive or active recreational activity on public land.

visual resource: A part of the landscape important for its scenic quality. It may include a composite of terrain, geologic features, or vegetation.

watershed: An area that collects and discharges runoff to a given point. It is often used synonymously with drainage basin or catchment area.

wetland: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and which under normal circumstances will support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Typical wetlands include marshes, shallow swamps, sloughs, lakeshores, bogs, wet meadows, river overflows, mud flats, and riparian areas.

wilderness (designated): Federal land that has been designated by Congress as a component of the National Wilderness Preservation System. See also wilderness (eligible, study, proposed and recommended) and wilderness (potential).

wilderness (eligible, study, proposed and recommended): Federal lands that have been found to possess wilderness character based on the criteria specified in the Wilderness Act. The four categories reflect different stages of the wilderness review process, and all are managed to preserve the wilderness resources and values that make them eligible for

wilderness designation. See also wilderness (designated) and wilderness (potential).

wilderness (potential): Federal lands that are surrounded by, or adjacent to, lands proposed for wilderness designation but that do not themselves qualify for designation due to temporary, nonconforming uses or incompatible conditions. Potential wilderness is a subset of the other wilderness categories. See also wilderness (designated) and wilderness (eligible, study, proposed and recommended).

wildfire: An unwanted wildland fire, regardless of ignition source, which is unplanned, has escaped control, or does not meet management objectives and therefore requires a suppression response.

zone: See management zone.

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