

Draft General Management Plan/ Environmental Impact Statement May 2004

National Park Service
U.S. Department of the Interior

Crater Lake National Park
Oregon





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Draft
General Management Plan / Environmental Impact Statement

Crater Lake National Park
Klamath, Jackson, and Douglas Counties, Oregon

Crater Lake National Park was authorized by an act of Congress on May 22, 1902 (Public Law 32 Stat. 20). The last comprehensive management plan for the park was completed in 1977. Much has changed since 1977 — visitor use patterns and demographics have changed, there are new demands for various recreational experiences and activities, and 22,400 acres were added to the park. Each of these changes has implications for how visitors access and use the national park and the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations. A new plan is needed.

This document examines four alternatives for managing the national park for the next 15 to 20 years. It also analyzes the impacts of implementing each of the alternatives. The “no-action” alternative, alternative 1 describes the existing conditions and trends of park management and serves as a basis for comparison in evaluating the other alternatives. The emphasis of alternative 2 would be on increased opportunities in recreational diversity and resource education. Under alternative 3 visitors would experience a greater range of natural and cultural resources through recreational opportunities and education. The focus of alternative 4 would be on preservation and restoration of natural processes. Alternative 2 is the National Park Service’s preferred alternative.

Impacts resulting from the no-action alternative would be negligible to minor on natural resources, park operations, and concession operations, with no adverse impact on most cultural resources. Under alternative 2 there would generally be moderate to major beneficial impacts. Impacts from alternative 3 would be beneficial, except for possible adverse impacts on concession operations. Alternative 4 would offer moderate beneficial impacts to natural and cultural resources, with a moderate, adverse impact on visitor use.

This *Draft General Management Plan / Environmental Impact Statement* has been distributed to other agencies and interested organizations and individuals for their review and comment. The public comment period for this document will last for 60 days after the EPA’s notice of availability has been published in the *Federal Register*.

HOW TO COMMENT ON THIS PLAN

If you wish to respond to the material in this document you may submit your comments, with your name and address, by any one of several methods. You may mail written comments to:

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You may also email comments to the following address: CRLA-GMP@nps.gov. Include your name and return address in your Internet message, and if possible, request a return receipt. You may also email directly to terri_urbanowski@nps.gov.

You may hand-deliver comments to Crater Lake National Park headquarters in the park.

Our practice is to make comments, including names and addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their address from the planning record, which we will honor to the extent allowable by law. There also may be circumstances in which we will withhold from the record a respondent's identity, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representative or officials of organizations or business, available for public inspection in their entirety.

This method for public comment submittal listed above stems from court rulings concerning the release of public comments, and it is included as recommended by the Office of the Solicitor, Department of the Interior (DOI).

SUMMARY

The purpose of this *Draft General Management Plan / Environmental Impact Statement* for Crater Lake National Park is to present a direction for resource preservation and visitor use and a basic foundation for decision making for the park for the next 15 to 20 years. The general management plan provides a comprehensive direction for managing resource activities, visitor activities, and development that would be appropriate at the park in the future.

An important element in determining the desired resource and visitor experience conditions for the park has been public participation. Many issues and concerns were identified by the general public and NPS staff as part of the initial planning efforts, and comments were solicited at public meetings, in planning newsletters, and on the internet.

Once public input was received the planning team identified four alternatives for managing the park—a no-action and three action alternatives, including the preferred alternative. The plan also analyzes and presents the environmental and socioeconomic impacts or consequences of implementing each of those alternatives—the environmental impact statement part of this document. A summary of the alternatives and the important impacts is given below.

ALTERNATIVE 1 – NO ACTION

Description

The no-action alternative represents continuation of the current management direction and approach at the park. It is a way of evaluating the proposed actions of the other three alternatives.

Under the no-action alternative, archeological and ethnographic resources in the park would continue to be surveyed, inventoried, and evaluated as National Park Service staff and funding permitted. Natural resource management protection, preservation, and restoration activities would also continue as staffing and funding allowed.

Existing buildings and facilities in the park would remain; some historic structures would be adaptively used. Munson Valley would continue to serve as the center of NPS administration, maintenance, and housing.

The existing road access and circulation system within the park would continue, and visitor recreational opportunities and interpretive programs in the park would continue.

Impacts

Impacts resulting from the no-action alternative would be negligible to minor on natural resources, park operations, and concession operations. Most cultural resources, archeological sites, cultural landscapes, ethnographic resources, or museum collections would have no adverse impacts. Rehabilitation of the superintendent's residence would result in minor adverse impacts due to some loss of historic fabric. However, adaptive use of the structure as a science and learning center would ensure its long-term preservation and therefore provide a moderate beneficial impact.

Visitor access, recreational and educational opportunities, and visitor facilities and services would remain relatively unchanged, and the park would continue

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to be an important visitor attraction, contributing to the tourism industry in the region. However, potential increases in visitation over the life of the plan could impact the ability to access some areas of the park and enjoy those areas in relative solitude and tranquility.

ALTERNATIVE 2 (PREFERRED) – EMPHASIS ON INCREASED OPPORTUNITIES

Description

Management of the park would emphasize increased opportunities for recreational diversity and research and education. Most recreational opportunities would remain, but new opportunities along Rim Drive would allow visitors to directly experience the primary resource of Crater Lake in ways other than driving. Any new uses around the rim would be nonmotorized and low impact. Opportunities to experience the lake by hiking and biking in a quieter setting would be explored by experimental seasonal road closures of East Rim Drive. Other frontcountry opportunities, such as short trails and picnic areas, would be along the roadways. These new opportunities would provide transitional experiences between the developed areas (or transportations corridors) and the backcountry and also provide for enhanced interpretation, new research, and access the backcountry. Winter snowmobile and snowcoach access would remain along North Junction to the rim.

Research and educational opportunities would be enhanced. A new science and learning center would form the core of the new research. The park would expand and encourage partnerships with universities, scientists, and educational groups. The information gathered would be

disseminated throughout the park to rangers, interpretive staff, and visitors. As a result, special in-depth tours would be available to interest groups such as birdwatchers or geology clubs.

As described under the no-action alternative, existing buildings and facilities in the park would remain, but some structures would be adaptively used.

Current and future needs for office and administrative space would be accommodated without additional construction. Administrative and other organizational functions, which are not by necessity park-based, would be moved to surrounding communities as demand for space within the park increased.

Parking and road congestion at the park would be managed by improving existing pullouts, parking areas, and overlooks. If, in the future, crowding conditions developed, shuttles and other alternative transportation systems would be used to solve the problems, rather than expanding road and parking capacities.

Impacts

This alternative increases visitor opportunities for recreation, education and interpretation, and access to park facilities and services, creating major beneficial impacts on the visitor experience.

Impacts on cultural resources, including the superintendent's house, would be the same as the no-action alternative, with the exception of museum collections, which would have minor to moderate, long-term benefits.

Greater emphasis on research, partnering, and visitor education would also indirectly

promote moderate beneficial effects on biotic communities and could result in some adverse impacts on some threatened and endangered species.

As in alternative 1, some benefits would result from reconfiguration of Rim Village and adaptive reuse of existing buildings. However, under alternative 2, increasing staffing and moving some functions out of the park to nearby communities would result in beneficial impacts on park operations and on the local economy. Although the impact regionally would be negligible, the park would continue to be an important visitor attraction and contribute to the tourism industry in the three-county region. Alternative 2 is the environmentally preferred alternative as evaluated according to the National Environmental Policy Act.

ALTERNATIVE 3 – EMPHASIS ON ENJOYMENT OF THE NATURAL ENVIRONMENT

Description

The emphasis of this alternative would be to allow visitors to experience a greater range of natural and cultural resources significant and unique to the park through recreational opportunities and education. A wider range of visitor experiences would reach out to greater diversity of visitor groups. Recreational programs, which would focus on minimizing impact, would provide the focus for interpretation and education.

Resources would be managed to permit recreation while protecting the resources. Opportunities for recreation would be viewed in a regional context, where the park could serve as a source of information for regional recreational opportunities. Winter access would be

improved by grooming along North Junction Road. During the summer season use of a shuttle bus system would be explored.

Use of most current facilities would continue. Treatment of historic structures and cultural landscapes would be similar to the no-action alternative, although such resources could be affected by construction of additional trails, installation of new interpretive signs and other media, and expanded tour programs under alternative 3.

Adequate space in an onsite facility would be provided for the curation and storage of the park's museum collections .

Impacts

This alternative's emphasis on increasing the diversity of visitor experience would create major beneficial impacts on the visitor experience. The shift toward a diverse visitor program also would decrease the range of interpretive programs, resulting in a moderate adverse impact on those preferring interpretive programs over experience.

Impacts on cultural resources would be the same as alternative 2.

Actions resulting from this alternative would result in some adverse impacts on some threatened and endangered species or biotic communities.

As described under alternative 2, the reconfiguration of Rim Village, adaptive reuse of existing buildings, increased staffing, and moving some functions outside the park would result in beneficial impacts. The park also would continue to be an important visitor attraction and

SUMMARY

contribute to the tourism industry in the three-county region.

ALTERNATIVE 4 – EMPHASIS ON PRESERVATION AND RESTORATION OF NATURAL RESOURCES

Description

Park management would be focused on the preservation of native species and natural processes and the restoration of biodiversity and natural processes where altered. The park would be an active partner in a regional conservation strategy that would include other agencies and environmental groups. Most park operations and visitor contact facilities would be outside the park and shared with other agencies and communities.

Resource preservation and restoration would be the overriding consideration in the park. Areas that have been altered would be restored to their natural conditions. Cultural resources would be preserved at the highest level possible. Museum collections would be increased but would be stored in an offsite facility that met professional and National Park Service museum standards.

The visitor experience would stress activities that have low environmental impacts on and are harmonious with the resources. More emphasis would be placed on self-guided and discovery education, and interpretive programs would focus on stewardship.

Vehicular transportation would be altered to reinforce the visitor experience. The Rim Road would be closed between

Cleetwood Cove and Kerr Notch. Winter use of the park would change to allow natural processes to proceed with less disturbance than current management practices allow. Winter plowing of the road to the rim would stop, except for spring opening. Snowmobiling along North Junction Road would no longer be allowed.

Facilities that are not historic and not essential to park functions would be removed and the area rehabilitated. Functions that are, by necessity park-based, would be retained in the park.

Impacts

Impacts resulting from this alternative would include overall beneficial impacts to natural and cultural resources. The decrease in diversity of opportunities, accessibility, and number of interpretive programs would have a moderate adverse impact on the visitor experience.

A decrease in buildings and facilities in the park, along with reduced winter operations, would have moderate beneficial impacts on park operations. The addition of a shuttle and snowcoach would result in moderate, long-term, adverse impacts on concession operations.

Moving operations out of the park would have a beneficial impact on the local economy. Although the impact regionally would be negligible, the park would continue to be an important visitor attraction and contribute to the tourism industry in the three-county region.

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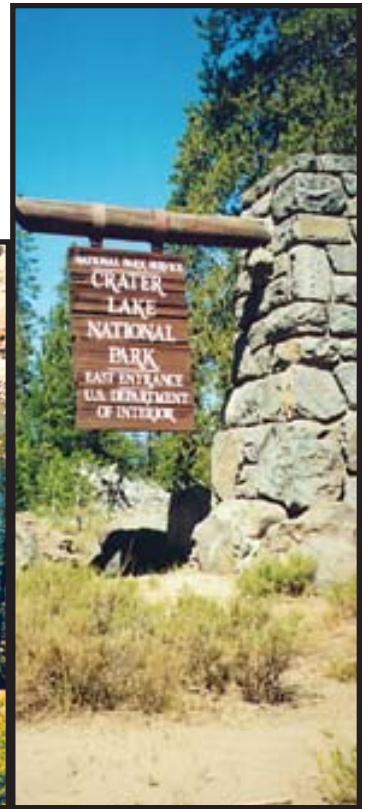
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PURPOSE OF AND NEED FOR THE PLAN



PURPOSE, NEED, AND SCOPING

INTRODUCTION

General management plans are intended to be long-term documents that establish and articulate a management philosophy and framework for decision making and problem solving in the parks. General management plans usually provide guidance during a 15- to 20-year period

This *Draft General Management Plan / Environmental Impact Statement* presents four alternative future directions for the management and use of Crater Lake National Park. The plan also analyzes and presents the environmental and socioeconomic impacts or consequences of implementing each of those alternatives – the environmental impact statement part of the document. An important element in determining the future directions is public participation throughout the planning process. One of the alternatives, alternative 2, is the National Park Service's preferred alternative. The potential environmental impacts of all alternatives have been identified and assessed. Actions directed by general management plans or in subsequent implementation plans are accomplished over time. Budget restrictions, requirements for additional data or regulatory compliance, and competing national park system priorities prevent immediate implementation of many actions. Major or especially costly actions could be implemented 10 or more years into the future.

BRIEF DESCRIPTION OF THE PARK

Crater Lake National Park is in southwest Oregon in the south-central portion of the Cascade Range (see Vicinity map). The

park ranges in elevation from about 3,800 feet in the southwest corner of the park to just over 8,900 feet at Mount Scott. The flora of Crater Lake National Park is typical of the vegetation found throughout the Southern Cascades. Generally, the vegetation reflects a mosaic of forested and open nonforested areas. Vegetation ranges from a mixed conifer forest dominated by ponderosa pine at the south to high elevation mountain hemlock and whitebark pine forest at the rim. The park is regarded by many as a sanctuary for native forest and meadow communities.

Near the center of the park is the park's most spectacular resource, Crater Lake. It is 1,943 feet deep, the deepest lake in the United States. The lake is in a caldera which was formed when the top of the 12,000-foot volcano erupted and collapsed. Over the centuries, the caldera has collected water from rain and snow to form the lake. It is about 5 miles in diameter and is surrounded by the jagged, steep-walled cliffs of the caldera left by the climatic eruption and collapse of Mt. Mazama about 7,700 years ago. The cliffs surrounding the lake rise from 500 to 2,000 feet above the lake's surface.

From the rimmed summit, the land slopes gradually downward in all directions. There are no inlets or outlets to the lake. Evaporation and seepage prevent the lake from becoming deeper. Due to the topography, Crater Lake has no influent or effluent streams to provide continuing supplies of oxygen, nutrients, and fresh water. Crater Lake is considered a youthful lake with a high level of purity. The purity can be attributed to the absence of inflowing streams introducing minerals and other debris. The lack of dissolved minerals greatly restricts the growth of

aquatic plants and the absence of sufficient carbonates inhibits the development of large shelled animals. The result is a high level of light penetration that exceeds other alpine lakes. Crater Lake holds the world record for clarity among lakes.

Visitors primarily come to Crater Lake National Park to view the lake. The inherent qualities of the lake and its setting provide breathtaking views from the rim of the caldera. The quality of the lake's water enables sunlight to penetrate and create the renowned blue coloration. The steep caldera walls and mirror-like reflections tinted in subtle shades. At times brilliantly blue; at other times buried in a mass of brooding clouds, Crater Lake has a mystic and inspiring quality.

The park encompasses approximately 182,304 acres and is heavily forested, except for a number of treeless and pumice-covered flats. The topography ranges in elevation from about 3,800 feet in the southwest corner of the park to 8,900 feet at Mount Scott, which is the highest point in the park. Streams originating on the slopes of the caldera form headwaters of the Rogue River to the west or join the Klamath Basin to the south and east. Steep-walled canyons cut in pumice, such as at Annie, Castle, and Sun Creeks, contribute to the ruggedness of the terrain.

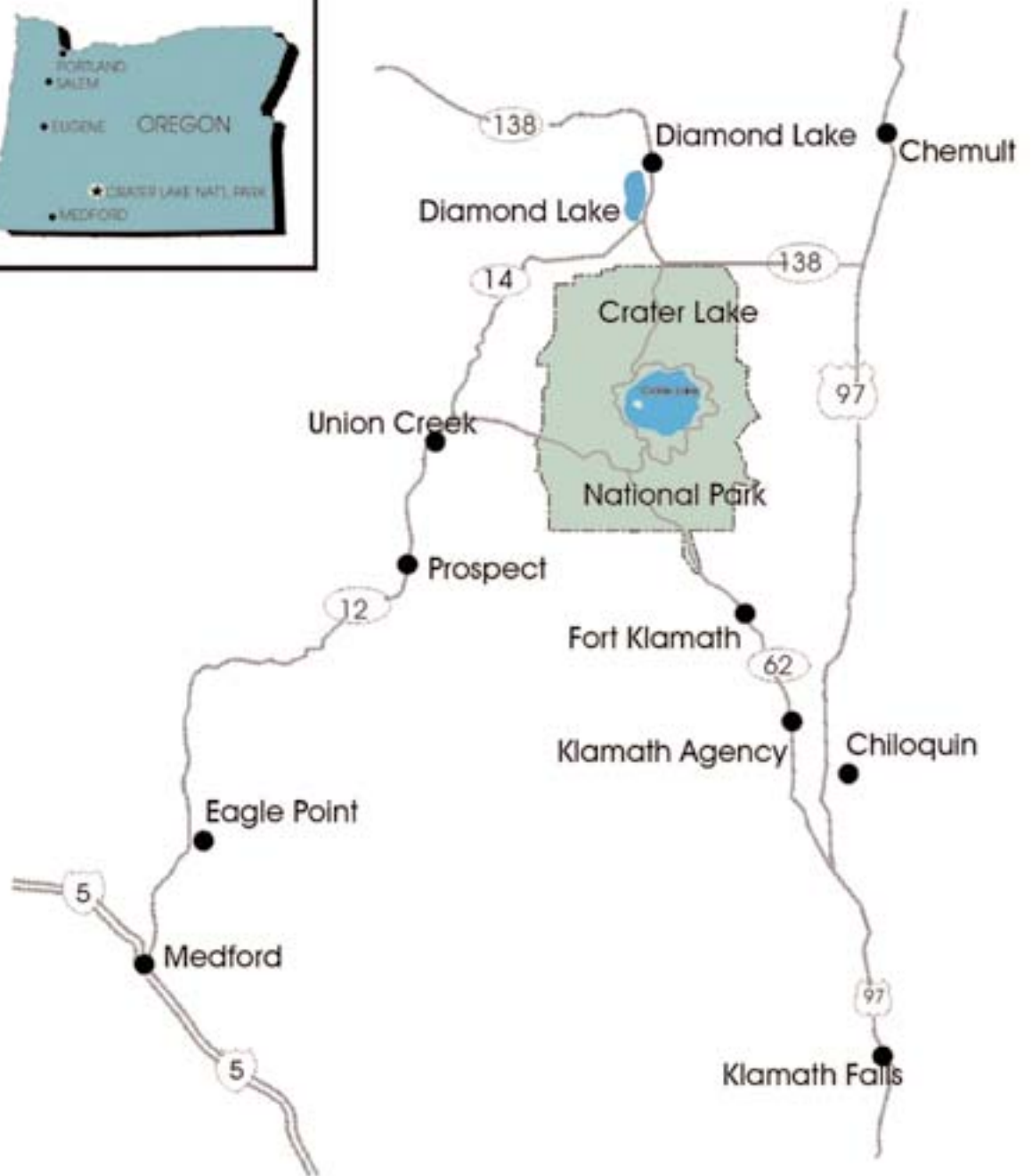
Some of the nation's best examples of blending rustic architecture and other built features within a national park setting can be seen in the park at Rim Village and at park headquarters in Munson Valley. This designed landscape was constructed over 15 years, beginning in 1926. Most of the features in these two areas are listed on the National Register of Historic Places. The Crater Lake superintendent's residence at Munson Valley was designated a national historic landmark (NHL) because

it is an outstanding example of rustic architectural design.

Crater Lake National Park is a vital element in a diverse regional recreation complex. Many visitors stop at the park as part of a north-south trip to various parks and scenic areas in Oregon and northern California. In southern Oregon, Crater Lake has historically been the leading visitor draw.

The park's southern entrance station at Mazama Village is 76 miles from Medford and 56 miles from Klamath Falls and can be reached by Oregon State Route (OR) 62. During summer the park can also be reached from the north by OR 138. Both the south and north access roads lead to Rim Drive, a 33-mile roadway that circles the caldera rim. Pullouts along Rim Drive provide scenic lake views. Rim Drive is in the process of being nominated to the National Register of Historic Places and has been designated as part of an All-American Road (as are south Highway 62, Munson Valley Road, and the North Entrance Road). Winter access is maintained only from the south and west on OR 62 through the Munson Valley headquarters area and up to Rim Village. Road closures, particularly between headquarters and the rim, are common during the winter because of frequent snowstorms.

Rim Village, at an elevation of 7,100 feet on the south edge of the Crater Lake caldera, has functioned as a year-round operation since 1948, although services are limited in the winter. Summer interpretive activities are provided from a small visitor contact facility near the rim and at the Sinnott Memorial overlook. The Sinnott Memorial is 25 feet below the rim on a precipitous cliff overlooking the lake. It has architectural significance as an



Vicinity

PURPOSE OF AND NEED FOR THE PLAN

expression of park rustic style in which the use of materials and siting blends seamlessly into the rim of the caldera. The Sinnott Memorial offers visitors a spectacular view of Crater Lake and is an ideal place to interpret the lake and caldera. Seasonal hotel accommodations are available at Crater Lake Lodge. Food services, gift sales, a picnic area, geology talks (summer only), and interpretive exhibits are also available at Rim Village.

Mazama Village is about 7 miles south of Rim Village and is the primary overnight visitor use area in the summer. A campground, motel accommodations, a camper services store, shower and laundry facilities, a gas station, interpretive walks, and evening campfire programs are all available during the summer. The nearby Annie Spring entrance station is the first contact station where visitors arriving by way of OR 62 might encounter NPS staff during the summer.

Cleetwood is on the north shore of Crater Lake and is accessed from Rim Drive. It is about 6 miles east of the north junction where Rim Drive intersects the north entrance road. Cleetwood contains a parking area, a nonpermanent ticket sales structure, and a portable restroom at the rim. A trail descends the side of the caldera to the lake. The concessioner offers commercial boat tours of the lake, accompanied by NPS interpreters.

Park headquarters is about 3 miles south of Rim Village and serves as the center of NPS administration, maintenance, and housing. It also serves as the year-round visitor interpretation and orientation point. Park headquarters is in a historic complex of buildings at the central portion of the Munson Valley development area. Visitor information services and interpretive exhibits are

provided in this complex at the visitor information center. Primary park administrative services are in the administration building. Storage and maintenance facilities are also in the park headquarters area.**PURPOSE AND NEED**

The purpose of this *Draft General Management Plan / Environmental Impact Statement* is to clearly define a direction for resource preservation and visitor experience at Crater Lake National Park over the next 15 to 20 years. The approved plan would provide a framework for proactive decision-making, including decisions on visitor use, natural and cultural resource management, park development, and addressing future opportunities and problems.

This document will not describe how particular programs or projects will be implemented or prioritized. Those decisions will be deferred to more detailed implementation planning, which will follow the broad, long-range decision making presented in this document.

The National Parks and Recreation Act of 1978 (PL 95-625) requires the preparation and timely revision of general management plans for each unit of the national park system. The previous *Master Plan* for Crater Lake was approved in 1977. A number of subsequent planning efforts were initiated, each undertaken to enhance the visitor experience and resource protection at the developed areas of Crater Lake National Park. The park has implemented significant portions of the plans for specific developed areas. For example, Crater Lake Lodge has been rehabilitated and reopened in May 1995. A new dormitory for concession employees has been built near Mazama Village. This *General Management Plan* will provide an

opportunity to consolidate these past decisions that are spread throughout several documents into a single document. The *Draft General Management Plan / Environmental Impact Statement* takes a new look at the management of the park based on the changes that have occurred since 1977 and current issues and concerns confronting the park, with the intent of building on the park's previous planning accomplishments. Visitor use patterns and demographics have changed, there are new demands for recreational experiences and activities, and 22,400 acres were added to the park. Each of these changes has implications for how visitors access and use the national park and the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations.

THE SCOPING PROCESS

Public meetings and newsletters were used to keep the public informed and involved in the planning process for Crater Lake National Park. A mailing list was compiled that consisted of members of government agencies, nongovernmental groups, businesses, legislators, local governments, and interested citizens.

The notice of intent to prepare an environmental impact statement was published in the *Federal Register* on May 25, 2001. A newsletter issued January 2001

described the planning effort. Public meetings were held during April 2001 in Klamath Falls, Medford, Roseburg, and Salem and were attended by 96 people. A total of 72 written comments were received in response to that newsletter. A second newsletter issued in July 2001 summarized the comments received in the meetings and in response to newsletter 1. These comments were used to complete the park purpose and significance statements that serve as the foundation for the rest of the planning. Comments on various issues facing the park were referred to during development of the general management plan.

In spring of 2002 a total of 95 comments were received in response to a third newsletter describing draft alternative concepts and managing zoning. In general opinions were fairly divided in support of individual alternatives and how to address the issues. A number of letters favored continued snowmobile use while other people favored elimination of snowmobiles in the park. Opinions were divided on managing traffic on Rim Drive—maintaining current two-way traffic, converting part of the road to one-way traffic, or closure of the road to traffic. Most respondents favored use of shuttles. A number of people who opposed partnering with private industry were concerned with large-scale commercialization within the park.

PLANNING DIRECTION AND GUIDANCE

PURPOSE, SIGNIFICANCE, MISSION, AND INTERPRETIVE THEMES

The purposes, significance, and mission goals of Crater Lake National Park are three of the key elements that shaped the development of the *General Management Plan*. These elements underlie how the park is managed. Park purpose statements are based on park legislation and legislative history, other special designations, and NPS policies. The statements reaffirm the reasons Crater Lake National Park was established as part of the national park system and provide the foundation for park management and use.

Significance statements identify the resources and values that are central to managing the area and express the importance of the park to our natural and cultural heritage. Understanding the park's significance helps managers make decisions that preserve the resources and values necessary to accomplish the area's purposes. Crater Lake's mission goals articulate the ideal future conditions the National Park Service is striving to attain. All of the alternatives and management prescriptions in this management plan are consistent with and support the park's purpose and significance statements and the park's mission.

Interpretive themes are the key stories or concepts that every visitor to the park should have the opportunity to learn. They include the ideas that are critical to a visitor's understanding of the park's purpose and significance. These themes provide the foundation for the park's interpretation and education programs and direction for interpretive media (e.g., exhibits, films, brochures, etc.) at the park.

Based on Crater Lake National Park's enabling legislation, legislative history, agency management policies, public input, and the knowledge and insights of park staff, the planning team identified the following purpose and significance statements, mission, and interpretive themes for Crater Lake National Park.

Park Purpose

The NPS Organic Act of 1916 directs that the fundamental purpose of all parks is "to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Crater Lake National Park was established in 1902, dedicated and set apart forever as a public park or pleasure ground for the benefit and enjoyment of the people of the United States. In managing this park, the Park Service was originally charged with "the protection and preservation of the game, fish, timber, and all other natural objects therein." In 1980, Congress updated the park purpose "to preserve for the benefit, education, and inspiration of the people of the United States certain unique and ancient volcanic features, including Crater Lake, together with significant forest and fish and wildlife resources" (Public Law 96-553).

Park Significance

- Crater Lake is one of the most renowned lakes on earth, principally because of the beauty imparted by its large size, blue color, mountain setting, and ever-changing character.
- Crater Lake lies in a caldera that was left by the climactic eruption

and collapse of Mount Mazama more than 7,700 years ago. The circular lake, which formed in the caldera is considered by scientists to be a unique model for how small calderas evolve in geologic time. At a depth of 1,943 feet, Crater Lake is the 7th deepest lake in the world, and holds the world record for clarity among lakes.

- In addition to the lake, most of the forests that surround Crater Lake have never been logged and are largely preserved in their pristine condition. These mature forests harbor a variety of plant and animal life which are characteristic of higher elevations in the Cascade Range. Because extensive alteration of forestland has taken place elsewhere in the Cascade Range, some of these plants and animals are rare. Those forests within the park boundary add unique opportunities for solitary and wilderness experiences.
- Some of the nation's best examples of blending rustic architecture and other built features within a national park setting can be seen at Rim Village, park headquarters in Munson Valley, and along Rim Drive. Much of Rim Village, park headquarters, and Rim Drive are within districts listed on the National Register of Historic Places.
- Crater Lake is of enduring importance to contemporary members of American Indian tribes because of its centrality to long-standing cultural traditions and resource harvesting activities, as well as its symbolic significance as a

sacred site. The park is part of a larger cultural landscape that extends well beyond park boundaries.

- Crater Lake has been the object of scientific study for more than a century, and is unique for the scientific research related to its pristine waters, associated geothermal activities, and unusual aquatic organisms.
- The unique natural and cultural resources of Crater Lake National Park provide exemplary opportunities for students and educators.

Mission

Crater Lake National Park's mission is

to forever preserve the beauty of Crater Lake National Park, its unique ecological and cultural heritage, and to foster understanding and appreciation through enjoyment, education, and inspiration

Interpretive Themes

Cultural: Evidence left behind by a continuum of different land uses for thousands of years helps us imagine past human interaction with these resources and instills appreciation for the continuing challenge of balancing human use with preservation.

Research and Education: For more than 100 years, Crater Lake has been a landscape of exploration and discovery. Today scientists are studying the lake and surrounding resources to better understand natural systems and improve future

management of the national park and the quality of life in this country and the world.

Geology: Geologic processes, primarily vulcanism, that created the Crater Lake caldera and the Cascade Mountains provides important lessons about the evolution of our planet.

Plant / Animal Diversity: The Cascades ecosystem at and around Crater Lake National Park supports an extraordinarily rich biological diversity.

Recreation and Visitor Experience: The serenity and beauty of Crater Lake National Park offers its visitors a wide range of recreational activities and opportunities to experience natural beauty, quiet, solitude, reflection, and inspiration.

SERVICEWIDE LAWS AND POLICIES

As with all units of the National Park Service, the management of Crater Lake National Park is guided by a number of legal mandates and park policies in addition to the enabling legislation. These include the 1916 Organic Act (which created the National Park Service), the General Authorities Act of 1970, the act of

March 27, 1978 (relating to the management of the national park system), and other applicable federal laws and regulations, such as the Endangered Species Act and the National Historic Preservation Act. The National Park Service has also established management policies for all units under its stewardship. These are identified and explained in *NPS Management Policies* (2001).

These legal mandates and policies prescribe many resource conditions and some aspects of the visitor experience. This plan is not needed to decide, for instance, whether or not it is appropriate to protect endangered species, control exotic species, protect archeological sites, or provide access for visitors with disabilities. Although attaining some of these conditions set forth in these laws and policies has been temporarily deferred in the park because of funding or staffing limitations, the National Park Service will continue to strive to implement these requirements with or without a new general management plan.

The conditions prescribed by laws, regulations, and policies most pertinent to the planning and management of the park are summarized below.

Natural Resources

Desired Condition	Source
Vegetation	
The preservation of the natural objects...the protection of the timber, and ...the preservation of all kinds of game and fish.	Crater Lake National Park enabling legislation
The preservation of the park's unique ecological and cultural heritage	
NPS-managed natural systems, and the human influences upon them, will be monitored to detect any significant changes. Action will be taken in the case of such changes, based on the type and extent of change.	NPS <i>Management Policies</i>
Maintain all the components and processes of naturally evolving park ecosystems.	
The National Park Service will re-establish natural functions and processes in human-disturbed natural systems in parks unless otherwise directed by Congress.	
The Park Service will, within park boundaries, identify, conserve, and attempt to recover all federally listed threatened, endangered, or special-concern species and their essential habitats. As necessary, the Service will control visitor access to and use of essential habitats, and may close such areas to entry for other than official purposes. Active management programs (such as monitoring, surveying populations, restorations, exotic species control) will be conducted as necessary to perpetuate, to the extent possible, the natural distribution and abundance of threatened or endangered species, and the ecosystems upon which they depend.	Endangered Species Act (16 USC 1531, et seq.); NPS <i>Management Policies</i>
The Park Service will identify all state and locally listed threatened, endangered, rare, declining, sensitive, or special concern species and their essential habitats that are native to and present in the parks. These species and their essential habitats will be considered in NPS planning and management activities.	NPS <i>Management Policies</i>
Plant and animal species considered to be rare or unique to a park will be identified, and their distributions within the park will be mapped.	
Management of populations of exotic plant and animal species, up to and including eradication, will be undertaken whenever such species threaten park resources or public health and wherever control is prudent and feasible.	
Revegetation efforts will use seeds, cuttings, or transplants representing species and gene pools native to the ecological portion of the park in which the restoration project is occurring.	
Water Resources and Aquatic Ecosystems	
Surface and ground waters are restored or enhanced; water quality meets as a minimum the standard for contact recreation.	Clean Water Act; Executive order 11514; NPS <i>Management Policies</i>
NPS and NPS-permitted programs and facilities are maintained and operated to avoid pollution of surface and ground waters	Clean Water Act; Executive Order 12088; NPS <i>Management Policies</i>

Desired Condition	Source
Natural floodplain values are preserved or restored.	Executive order 11988; Rivers and Harbors Act; Clean Water Act; NPS <i>Management Policies</i> ; Director's Order 77-1
The natural and beneficial values of wetlands are preserved and enhanced.	Executive order 11990; Rivers and Harbors Act; Clean Water Act; NPS <i>Management Policies</i> ; Director's Order 77-2
Protection of stream features will primarily be accomplished by avoiding impacts to watershed and riparian vegetation, and by allowing natural fluvial processes to proceed unimpeded.	NPS <i>Management Policies</i>
Wildlife	
Federal- and state-listed threatened and endangered species and their habitat are sustained.	Endangered Species Act; NPS <i>Management Policies</i>
Populations of native plant and animal species function in as natural condition as possible except where special management considerations are warranted.	NPS <i>Management Policies</i>
Native species populations that have been severely reduced or extirpated from the park are restored where feasible and sustainable.	
Management of populations of exotic plant and animal species, up to and including eradication, will be undertaken whenever such species threaten park resources or public health and when control is prudent and feasible.	
Air Resources, Soundscapes, and Lightscapes	
Air quality in the parks meets national ambient air quality standards (NAAQS) for specified pollutants. Park activities do not contribute to deterioration in air quality.	Clean Air Act; NPS <i>Management Policies</i>
The National Park Service will preserve the natural ambient soundscapes of parks, which exist in the absence of human-caused sound.	NPS <i>Management Policies</i>
The Park Service will protect natural darkness and other components of the natural lightscape in parks.	NPS <i>Management Policies</i>
Geological, Soils, and Paleontological Resources	
Management of significant thermal features, including assessment, monitoring, data collection and protection from significant adverse effects due to geothermal development.	Geothermal Steam Act Amendment of 1988
Natural geologic processes proceed unimpeded.	NPS <i>Management Policies</i>
Paleontological resources, including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education , interpretation, and scientific research.	
Natural soil resources and processes function in as natural condition as possible, except where special management considerations are allowable under policy.	
The Park Service will actively seek to understand and preserve the soil resources of parks, and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.	
Research, Resource Inventory and Monitoring	

PURPOSE OF AND NEED FOR THE PLAN

Desired Condition	Source
Management of the resources will be enhanced by the availability and utilization of a broad program of the highest quality science and research. The Park Service will undertake a program of inventory and monitoring to provide baseline and long-term trends in the condition of resources. The Park Service will encourage publication and dissemination of information derived from studies.	National Park Omnibus Management Act of 1998, Title II National Park System Resource Inventory and Management
Wilderness	
The Park Service seeks to retain wilderness potential in areas proposed as wilderness until enacted or rejected. The administration of wilderness meets the standards within the Wilderness Act: Protection of these areas in an unimpaired state for future use and enjoyment as wilderness Preservation of the wilderness character of these areas	NPS <i>Management Policies</i> ; Wilderness Act of 1964; Director's Order #41
Wilderness is protected and managed so as to preserve its natural conditions and which - generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable. - has outstanding opportunities for solitude or a primitive and unconfined type of recreation.	Wilderness Act of 1964; Director's Order #41
Fire Management	
Each park is required to have a fire management plan / environmental assessment that addresses wildland and prescribed fires. Wildland fires are naturally ignited and part of natural systems that are being sustained by parks. Prescribed fires are human ignited to achieve resource management or fuel treatment objectives.	NPS <i>Management Policies</i> ; <i>Director's Order #18</i>
Fire suppression within proposed wilderness will be consistent with the "minimum requirement" concept. (minimum tool or administrative practice to successfully and safely accomplish the objective with the least adverse impact on wilderness character or values)	

Cultural Resources

Desired Condition	Source
Prehistoric and Historic Archeological Sites	
Archeological sites are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act
Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable.	Archeological and Historic Preservation Act Archeological Resources Protection Act
In cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged.	<i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> (1992) Programmatic Memorandum of Agreement among the National Park Service, Advisory Council on Historic Preservation, and national Council of State Historic Preservation Officers (1995) <i>NPS Management Policies</i>
Historic Structures and Cultural Landscapes	
Historic structures and cultural landscapes are inventoried and their significance and integrity are evaluated under national register criteria.	National Historic Preservation Act Archeological and Historic Preservation Act
The qualities of historic structures and cultural landscapes that contribute to their actual listing or their eligibility for listing on the National Register of Historic Places are protected in accordance with the <i>Secretary of the Interior's Standards</i> , unless it is determined through a formal process that disturbance or natural deterioration is unavoidable.	<i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> (1992) Programmatic Memorandum of Agreement among the National Park Service, Advisory Council on Historic Preservation, and national Council of State Historic Preservation Officers (1995) <i>NPS Management Policies</i>
Objects and Archival Manuscripts Collections	
Manage parks to provide for the protection of historic, prehistoric, and scientific features.	The Antiquities Act of 1906.
Manage parks to "maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archaeological significance and... establish and maintain museums in connection therewith."	The Historic Sites Act of 1935.
All museum objects and manuscripts are identified and inventoried, and their significance is determined and documented. The qualities that contribute to the significance of collections are protected in accordance with established standards. Ensure that objects housed in repositories/institutions outside the park are preserved, protected, and documented according to NPS standards and guidelines.	American Indian Religious Freedom Act Archeological Resources Protection Act Native American Graves Protection and Repatriation Act <i>NPS Management Policies</i> <i>NPS Museum Handbook</i> <i>Director's Order #24</i>
Ethnographic Resources	
Manage parks to provide for the protection of historic, prehistoric and scientific features.	Antiquities Act of 1906

PURPOSE OF AND NEED FOR THE PLAN

Desired Condition	Source
Continue to recognize the past and present existence of peoples in the region and the traces of their use as an important part of the cultural environment to be preserved and interpreted.	American Indian Religious Freedom Act (1978 and as amended in 1994)
Consult with associated American Indian tribes to develop and accomplish the programs of Crater Lake National Park in a way that respects the beliefs, traditions, and other cultural values of the American Indians who have ancestral ties to park lands.	Native American Graves Protection and Repatriation Act (1990)
Accommodate access to and ceremonial use of traditional use areas in a manner that is consistent with park purposes and avoid adversely affecting the physical integrity of these sites and resources.	Presidential Memorandum of April 29, 1994, Government-to-Government Relations With Native American Tribal Governments
American Indians linked by ties of kinship or culture to ethnically identifiable human remains would be consulted when remains may be disturbed or are encountered on park lands.	Executive Order 13007 of May 24, 1996, Indian Sacred Sites

Visitor Management Requirements

Desired Condition	Source
Visitor Experience and Park Use Requirements	
Visitor and employee safety and health are protected.	NPS <i>Management Policies</i>
Visitors understand and appreciate park values and resources and have the information necessary to adapt to the park environments. Visitors have opportunities to enjoy the park in ways that leave park resources unimpaired for future generations.	NPS Organic Act Crater Lake National Park enabling legislation NPS <i>Management Policies</i>
Park recreational uses are promoted and regulated. Basic visitor needs are met in keeping with park purposes.	NPS Organic Act Title 36 of the Code of Federal Regulations NPS <i>Management Policies</i>
New and remodeled buildings, outdoor developed areas, and features are accessible to all visitors, including those with disabilities, in compliance with federal standards. However, it may not be possible to make all sites or historic buildings accessible because the required changes would affect the integrity of the feature or the historic structure. In these cases interpretive brochures or programs could help convey an experience to visitors.	Americans with Disabilities Act Architectural Barriers Act Rehabilitation Act NPS <i>Management Policies</i>

Development and Sustainability

Desired Condition	Source
New and remodeled buildings and facilities reflect the NPS commitment to energy and resource conservation, as well as durability.	Executive Order 12873 Executive Order 12902 Guiding Principles of Sustainable Design (NPS 1993)

SPECIAL MANDATES AND ADMINISTRATIVE COMMITMENTS

Special mandates and administrative commitments refer to park-specific requirements. Those most directly related to the *General Management Plan* or that may potentially affect it are listed below.

Proposed Wilderness

The Wilderness Act of 1964 “established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as ‘wilderness areas,’ and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment

as wilderness.” The 1974 National Park Service wilderness proposal recommended wilderness designation for approximately 122,400 acres of lands within the park. This recommendation was transmitted to Congress by the president.

The legislative process has not been completed for the Crater Lake National Park Wilderness Designation proposal. However, it is the policy of the National Park Service (2001 NPS *Management Policies*, Chapter 6: Wilderness Preservation and Management) to “take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process has been completed. Until that time, management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation. This policy also applies to potential wilderness, requiring it to be managed as wilderness...”

Among other mandates are the protection of wilderness areas and the preservation of their wilderness character. Wilderness characteristics are defined in the Wilderness Act as:

- The earth and its community of life are untrammelled by humans, where humans are 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.

Threatened and Endangered Species Management

The federal Endangered Species Act and NPS policy provide special protection to all federally listed and threatened and endangered species. Species appearing on state lists of endangered, threatened, and special concern are also considered in planning and management activities. The park supports and provides habitat for a number of federal or state listed species. The Park Service would continue to prepare and periodically update specific management plans and programs (e.g., fire management plan; bull trout restoration program; threatened and endangered species inventory, monitoring, and research programs). These initiatives are directed by servicewide laws and policies,

and the *General Management Plan* will not explore alternatives to these plans and programs. Nothing in this *General Management Plan* would conflict with these initiatives.

Although these plans and programs would benefit threatened and endangered species and their habitat within the park, it should be noted that some adverse effects, including “taking” of individuals, such as loss of some individual fish during bull trout restoration operations, have and would likely continue to occur. The Park Service would continue to consult the U.S. Fish and Wildlife Service as these plans and programs are prepared and updated to ensure the conservation of these species. While these beneficial and adverse effects would not result from the implementation of any of the *General Management Plan* alternatives, they are considered in the cumulative impacts analysis (see “Environmental Consequences, Cumulative Impacts” section).

Research and Monitoring

The Crater Lake Long-Term Limnological Monitoring Program (LTLMP) began with a congressionally mandated (Public Law 97-250) 10-year study (1982 - 1992). The 10-year program was established to determine whether the lake was undergoing what appeared to be a long-term decline in water clarity. The National Park Service did not have an adequate limnological data base to interpret the apparent changes in clarity for managing this nationally and internationally treasured resource. During the 10-year program scientists and park managers built a high quality limnology program. The program documented that the lake clarity was within normal inter-annual variation, it also provided valuable data

and recommendations on a number of other management issues.

In 1994 the National Park Service received Congressional funding to continue a long-term monitoring program as part of park base operations. The purpose of the long-term program is to develop a limnological database to evaluate long-term trends; to develop an understanding of the interrelationships among ecosystem components to evaluate change, and; to contribute to the preservation and management of Crater Lake, and other international aquatic resources through publication of peer reviewed program results.

Title II – National Park System Resources Inventory and Management of the National Parks Omnibus Management Act of 1998 had the following purposes:

- More effectively achieve the mission of the National Park Service
- Enhance management and protection of park resources by providing clear authority and direction for scientific study
- Ensure appropriate documentation of resource conditions
- Encourage use of the national park system for the benefit of park management as well as broader scientific value
- Encourage the publication and dissemination of information derived from studies in the national park system
-

The act directs that management of park units is enhanced by the highest quality science and information. It further establishes a program of inventory and monitoring resources to establish baseline information and provide information on

the long-term trends in the conditions of national park resources.

Klamath Basin General Stream Adjudication

The State of Oregon, Klamath Basin General Stream Adjudication, is currently active and includes Crater Lake National Park. The adjudication is a legal process that will determine the quantities and relative priorities associated with the park's use of water from Crater Lake and the streams flowing within the park. The United States of America, National Park Service, has filed twenty-one federal reserved water rights claims (Claim Nos. 591 – 611) on behalf of Crater Lake National Park for instream, lake level, and out-of-stream uses. On August 2, 2001, the hearing officer ordered Claim Nos. 591 – 601, for instream and lake level uses, referred back to the adjudicator for final disposition. On February 28, 2002, the hearing officer signed a Final Proposed Order and recommended that the Adjudicator enter a Final Order for Claim Nos. 602 – 611, for out-of-stream uses. Final adjudication of the park's federal reserved water rights claims will occur when the claims of the other federal agencies included in the adjudication are settled. Acquisition of the federal reserved water rights would not eliminate the risk of Crater Lake's administrative uses being called out by downstream senior water rights holders during dry years. The National Park Service is negotiating with local water users for senior water rights that would augment the park's federal reserved water rights during dry years.

Visitor Services Plan

Klamath Falls, Medford, and Roseburg are the gateways to Crater Lake National Park providing the primary business,

transportation, and service centers in their respective counties. Klamath Falls is the closest of these, located 50 miles south of the park. A number of smaller unincorporated communities — Beaver Marsh, Diamond Lake, Fort Klamath, Prospect and Union Creek — are much closer to the park. These provide some visitor services, not all of which are year-round.

Overall guidance for actions at the major developed areas is provided as part of the 1999 *Crater Lake National Park Visitor Services Plan*. The plan is a blend of actions intended to improve the protection of park resources while providing enjoyable visitor experiences. The *Visitor Services Plan* analyzed the appropriate level and location of interpretive and visitor services in the park, considering both National Park Service and commercial services. It stated that NPS interpretive services would be emphasized. Commercial services, considered to be necessary and appropriate due to the park's distance from sizable communities, would be modified to better serve visitors.

The *Visitor Services Plan* identifies the appropriate and necessary levels and kinds of NPS and concession services desired at Rim Village as well as the other major developed areas within the park. This *General Management Plan* builds on the previous planning effort. Elements of the *Visitor Services Plan* include the following:

Rim Village

- Rehabilitate historic cafeteria building
- Relocate parking and road to area behind cafeteria building
- Convert existing parking lot to pedestrian open space

PURPOSE OF AND NEED FOR THE PLAN

- Construct new visitor contact station for year-round information and interpretation
- Remove Rim Village dormitory

Mazama Village

- Retain Mazama Village Motor Inn
- Construct new restaurant and expand parking lot
- Remove public laundries
- Increase space for sale of gift and sundry items and camping supplies
- Retain gasoline sales
- Retain limited food service
- Retain public showers
- Retain amphitheater
- Develop two group campsites
- Construct concession maintenance facility

Munson Valley

- Retain park administration, maintenance and housing facilities
- Provide interpretive services
- Provide backup of winter visitor contact station and post office

Cleetwood Cove

- Rehabilitate Trail and add wayside exhibits
- Replace dock and improve bulkhead
- Construct seasonal shade structure
- Construct storage structure for supplies and equipment
- Retain vault toilets
- Define trail entry and crosswalk



PLANNING ISSUES

INTRODUCTION

The general public, NPS staff, and other agencies and organizations identified issues and concerns during scoping for this general management plan (see “Scoping Issues” in the “Purpose, Need, and Scoping” section). Resource protection, visitor expectations, tolerance for greater crowding, the amount of park resources devoted to snowplowing, and the current limitations on staff and budget to provide interpretive presentations and outreach activities were the starting point of issues for this *General Management Plan*. Comments received during scoping demonstrated that snowmobile use, boundary enlargement, impacts on surrounding communities and the region, and use were important to visitors, organization, and other agencies.

The general management plan provides a framework or strategy for addressing the issues within the context of Crater National Park’s mission, purpose, and significance goals; it also proposes resource conditions for summer and winter use on the land within the park boundary and desired visitor experiences.

ISSUES

A variety of issues that the National Park Service currently faces were identified. The issues were identified and refined through discussions with park staff, interested agencies and organizations, and the general public.

Some of the issues, such as modifying fees, are outside the scope of this plan. Some concerns identified during the planning process are already prescribed by law, regulation, or policy and were addressed

in the preceding section, “Servicewide Laws and Policies.” The key issues addressed in this plan are identified below along with the underlying questions and concerns identified during scoping.

Resource Protection: To what extent can visitor uses and visitor, administrative, and support facilities be provided while protecting natural and cultural resources?

- Should historic structures in the park be adapted for administrative use or educational or interpretive purposes?
- Is the park adequately addressing the potential resource protection concerns associated with visitor use (e.g., disturbance to wildlife; trampling of soils and vegetation; the effects of vehicle emissions on air and water quality), including winter use within the park?
- To what extent can visitor opportunities be provided without adverse impacts to resources?

Interpretation, Education, and Recreation: What is the appropriate balance between interpretation, education, and recreation within the park? What types of access are needed to support the appropriate mix of visitor experiences?

- Should the park expand its educational program and educational outreach? In what ways should this be done?
- Is the park providing an adequate range of visitor information services?
- Is the park currently providing an appropriate range of visitor experiences? Should the park consider increased bicycle, hiking, camping, and pedestrian access? Should any of these activities be decreased?

- Should alternative means of transportation be considered for visitor access at Crater Lake? If so, what type? Should parts of Rim Drive be closed to vehicular access to improve bicycle and pedestrian access?
- What types of winter access and use should be accommodated within the park? Should winter lake-viewing be limited? Expanded?

Partnerships: To what extent should the park partner with and support other agencies, organizations, and researchers to further common needs and fulfill the NPS mission?

- The clear waters of Crater Lake and the pristine surrounding forest areas in the park offer unique opportunities for scientific research and education. As a part of its mission, the park promotes and encourages research. Should the park emphasize and encourage research activities and partnerships that facilitate research and learning?

- Staff and budget levels limit onsite interpretive presentations and outreach activities. Should the park develop and expand its partnerships with other agencies or commercial operators to enhance orientation and education opportunities?

Park Operations: To what extent should park facilities and operations be maintained, expanded, or relocated to provide for park operational needs and efficiencies?

- Existing facilities have inadequate space for administrative and support functions. They lack adequate employee workspace and collections storage. Should these functions remain in the park or be relocated outside the park?
- A substantial portion of park resources is devoted to plowing the road to the Rim Village each winter. Are there other ways to accommodate winter lake-viewing?

IMPACTS TOPICS – RESOURCES AND VALUES AT STAKE IN THE PLANNING PROCESS

IMPACTS TOPICS

Impact topics allow comparison of the environmental consequences of implementing each alternative. These impact topics were identified based on federal laws and other legal requirements, NPS subject-matter expertise and knowledge of limited or easily impacted resources, and concerns expressed by other agencies or members of the public during scoping. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

To focus the environmental impact analysis, and to ensure that the alternatives were evaluated against relevant topics, the planning team selected the following specific impact topics for further analysis and eliminated others from evaluation. These topics are described in the subsequent “Affected Environment” section and analyzed in the “Environmental Consequences” section.

Cultural Resources

Cultural resource impact topics were selected on the basis of major values identified in the park’s enabling legislation, values identified in the scoping process, and applicable laws and executive orders pertaining to cultural resources (e.g., the 1966 National Historic Preservation Act and the National Environmental Policy Act). The topics are archeological resources, historic buildings/structures, cultural landscapes, ethnographic resources, and museum collections.

Natural Resources

Natural resource impact topics were selected for analysis based on the major values identified in the park’s enabling legislation, values or issues identified in the planning process, NPS knowledge of limited or easily impacted resources, as well as applicable laws and regulations (e.g., Endangered Species Act of 1973, as amended, and NPS *Management Policies 2001*). The topics are biotic communities (includes the interrelated components of vegetation, wildlife and their habitat, and soils), threatened, endangered, and sensitive species (selected species), water resources, and air quality.

Visitor Use and Experience

The planning team identified visitor experience as an important issue that could be appreciably affected under the alternatives. The Organic Act and NPS *Management Policies 2001* both direct the Park Service to provide enjoyment opportunities for visitors that are uniquely suited and appropriate to the superlative resources found within the park. The different aspects of visitation and enjoyment that are evaluated include orientation, interpretation, education, soundscapes, scenic quality, and access and circulation

Park and Concession Operation

Actions proposed in the alternatives could adversely or beneficially affect both park and concession operations. For example, eliminating winter snow plowing to the rim and implementation of a snowcoach

operation would affect operations for both the park and concessioner.

Socioeconomic Environment

The planning team selected the socioeconomic environment as an impact topic because the park plays an important role in recreation in the region, which in turn contributes to the economy of the surrounding communities. Analyzing the regional economic impacts provides the context for evaluating the possible impacts the alternatives may have on the surrounding area.

IMPACT TOPICS ELIMINATED FROM FURTHER EVALUATION

The following topics were dismissed from further analysis because the alternatives being considered would have no discernable effect on the resource or topic, or the resource does not occur in the park.

Floodplains and Wetlands

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) require an examination of impacts to floodplains and wetlands, of potential risk involved in placing facilities within floodplains, and protecting wetlands. The 2001 NPS *Management Policies*, DO 77-1 (*Wetland Protection*), DO 77-2 (*Floodplain Management*), and DO-12 (*Conservation Planning, Environmental Impact Analysis, and Decision Making*) provide direction for development proposed in floodplains and wetlands. It is NPS policy to avoid affecting floodplains and wetlands and to minimize impacts when they are unavoidable. Permanent streams in the park generally have steep-sided channels, and associated floodplains and riparian areas are narrow. The term wetlands

include wet environments such as marshes, swamps, and bogs. They may be covered in shallow water most of the year, or be wet only seasonally. Plants and animals found in these areas are uniquely adapted to wet conditions. Crater Lake National Park wetlands include Sphagnum Bog, Thousand Springs, Boundary Springs, seeps, and creeks.

Facilities proposed for development under the alternatives would be sited to avoid floodplains and wetlands. Based on the prevalence of upland sites both within the park and nearby communities, it is expected that wetlands and floodplains would be avoided. Mitigation measures would be required as part of construction to minimize any potential indirect effects. For example, erosion control measures would be used to minimize siltation or sedimentation of nearby waters or wetlands from construction site runoff. Before initiating any ground-disturbing projects, further investigation would be conducted to ensure that these resources would not be appreciably affected. Floodplains and wetlands will be addressed at the project level to ensure that projects are consistent with NPS policy and EO 11988 and EO 11990, and any potential impacts would be negligible.

Ecologically Critical Areas, Wild and Scenic Rivers, or Other Unique Natural Resources

Four distinct natural areas within the boundaries of Crater Lake National Park have been designated as research natural areas: Sphagnum Bog, Llao Rock, Pumice Desert, and Desert Creek. These four areas illustrate unique ecosystems and represent outstanding habitats of the Oregon Cascades Province, as defined in the *Oregon Natural Heritage Plan* (1981).

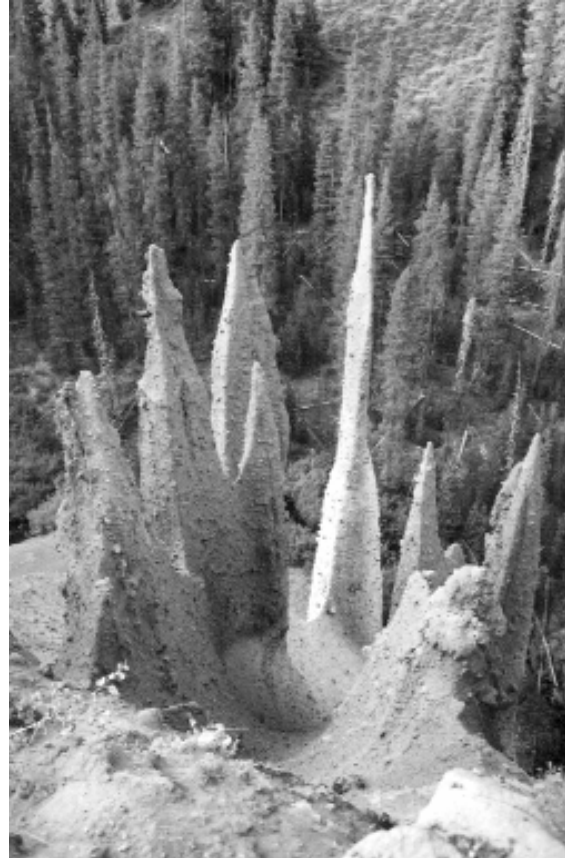
Several other areas within the park contain important ecological communities. Boundary Springs is in the northwest corner of the park and is one of the headwater sources of the Rogue River. The spring produces a reliable, year-round flow in an otherwise arid area, resulting in a lush moss and herb flora (Applegate 1939). Thousand Springs is approximately 1 mile south of the west entrance (OR 62) of Crater Lake National Park. The Thousand Springs site is a complex of freshwater springs that flow west into Union Creek and eventually into the Rogue River.

These research natural areas and important ecological communities would continue to be preserved and managed to minimize human disturbance under all of the alternatives. Negligible disturbance to these areas has occurred or is expected to occur under any of the alternatives.

No actions proposed in the alternatives would affect the eligibility or designation of a wild and scenic river.

Geologic Resources

Crater Lake National Park lies within a north-south chain of large volcanic cones built during the last few hundred thousand years along the crest of the Cascade Range (Schaffer 1983). The current landscape was formed after the eruption and collapse of Mt. Mazama. The park landscape displays a large range of volcanic rocks and remnant glacial material as well as a variety of geologic features. The steep-walled cliffs of the caldera left by the eruption of Mt. Mazama display the geologic layering of lava flows over time. Wizard Island is an example of a cinder cone and lava flows that erupted soon after the one which formed the caldera. Several more post caldera volcanoes are



hidden by the lake. Studies of the lake bottom have shown the presence of hydrothermal activity on the lake floor. The Sand Creek/Pinnacles area in the southeast corner of the park is a site of unique geological importance. The canyon formed by Sand Creek has sloping walls of scoria and pumice. Along the walls are numerous pinnacle formations, many 50 feet or taller.

No actions proposed in the alternatives would affect these geologic resources.

Threatened, Endangered, and Sensitive Species (Select Species)

There are a number of species that are considered threatened or endangered in Oregon, according to lists maintained by the U.S. Fish and Wildlife Service, Oregon Department of Agriculture, and the

Oregon Natural Heritage Program (ONHP) that inhabit, or for which potential habitat exists in the park. The alternatives would have no effect on some of these species as discussed below. Surveys would be conducted and potential new development or trails proposed under any of the alternatives would be sited to avoid disturbing sensitive species.

Lost River sucker (*Deltistes luxatus*) and shortnose sucker (*Chasmistes brevirostris*) are federal and state endangered species. Both species are primarily lake residents that spawn in rivers, streams, or springs associated with lake habitats. Wood River, which flows south of the park in the upper Klamath Lake watershed, provides spawning habitat for these species. Neither species is known to inhabit the park at present, and it is not known if they have historically inhabited the park. The alternatives would have negligible effects on water use from Annie Spring, which joins with the Wood River south of the park. There would be no measurable effect on Wood River flows; and, therefore, may affect, but would not be likely to adversely affect spawning habitat for these species would occur.

Yellow-billed cuckoo (*Coccyzus americanus*) is a federal candidate and listed by ONHP under species threatened or endangered or possibly extirpated from Oregon but secure elsewhere. Populations of this species have declined in portions of their range in the United States, particularly west of the Continental Divide. Western yellow-billed cuckoos appear to require large blocks of riparian habitat for nesting. Loss and degradation of western riparian habitats appears to be a primary factor in their decline. A survey in eastern Oregon and Klamath County located no birds but identified potential breeding habitat along the lower Owyhee



River (Littlefield 1988). This species is not known to inhabit the park, nor would the alternatives adversely affect large blocks of riparian habitat. No effect on this species is anticipated under any of the alternatives.

Oregon spotted frog (*Rana pretiosa*) is a federal candidate and listed by ONHP under species threatened or endangered throughout their range. The tailed frog (*Ascaphys truei*) and Cascade frog (*Rana cascadae*) are both federal species of concern and listed by the state under species threatened or endangered or possibly extirpated from Oregon but secure elsewhere. Spotted frogs are highly aquatic and live in or near permanent bodies of water, including lakes, ponds,

slow streams and marshes. Tailed frogs are stream dwellers that do not inhabit ponds or lakes. The Cascade frog is found in small pools adjacent to streams flowing through subalpine meadows. They can also be found in sphagnum bogs and fens, seasonally-flooded, forested swamps, small lakes, ponds, and marshy areas adjacent to streams. These species are not known to inhabit the park, nor are the alternatives expected to affect potentially suitable habitat.

Crater Lake newt (*Taricha granulosa* ssp. *mazamae*) is listed by ONHP under species threatened or endangered throughout their range. This species is endemic to Crater Lake and is found in the shoreline ecosystem of the lake. None of the actions within the alternatives would affect areas of known populations. The Park Service would continue to take management actions as necessary to avoid impacts from continuing visitor and research activities that occur within the caldera.

Mt. Mazama collomia, (*Collomia mazama*) is listed by the ONHP under taxa that are endangered or threatened throughout their range or which are presumed extinct. This species inhabits high elevation (4,800' -6,300') forest-meadow ecotones in the red fir/mountain hemlock and lodgepole pine forest zones and occasionally along riparian areas. Within the park it is found north of Sphagnum Bog, along Pacific Crest Trail and Dutton Creek, and in scattered open woods and meadows of the lodgepole pine and true fir forest zones along the west side of park. None of the actions under the alternatives would affect areas of known populations within the park. The Park Service would continue to take management actions as necessary to avoid impacts by backcountry visitors. Crawford's sedge (*Carex crafordii*), abrupt-beaked sedge (*Carex abrupta*), and

lesser bladderwort (*Utricularia minor*) are listed by the ONHP under species that are threatened, endangered, or possibly extirpated from Oregon, but are stable or more common elsewhere. These species occur within the park and are associated with wetlands and/or springs. The alternatives would not affect habitat where these species are found.

Prime and Unique Farmlands

In 1980 the Council on Environmental Quality (CEQ) directed that federal agencies assess the effects of their actions on farmland soils classified as prime or unique by the Natural Resources Conservation Service, U.S. Department of Agriculture. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. There are no prime or unique farmlands associated within the park, and this impact topic was dismissed from further analysis.

Lightscape

NPS *Management Policies* (2001) state that the National Park Service will preserve, to the greatest extent possible, the natural lightscapes of parks, including natural darkness. The agency strives to minimize the intrusion of artificial light into the night scene by limiting the use of artificial outdoor lighting to basic safety requirements, shielding the lights when possible, and using minimal impact lighting techniques. The actions proposed in the alternatives could result in new facilities, some of which could necessitate some night-time lighting. However, the effects of this lighting would be localized and minimized by the mitigation techniques described above. Only a small area would



Natural or Depletable Resource Requirements and Conservation Potential

None of the alternatives being considered would result in the extraction of resources from the park. Under all of the alternatives ecological principles would be applied to ensure that the park's natural resources were maintained and not impaired.

Energy Requirements and Conservation Potential

The National Park Service would pursue sustainable practices whenever possible in all decisions regarding national park operations, facilities management, and development in Crater Lake National Park. Whenever possible, the Park Service would use energy conservation

technologies and renewable energy sources. Consequently, the alternatives would negligibly affect energy consumption compared to current conditions.

Land Use

There are no anticipated conflicts with local land use planning. The proposed management zones and creation of additional recreation and visitor service opportunities in the park as proposed under certain alternatives would not be inconsistent with local land use plans. Potential development of NPS facilities in local communities outside the park would conform with any local land use plans such as the *Klamath County Comprehensive Plan*. None of the alternatives would be expected to induce changes in land use

outside the park, and there are no private in holdings within the park.

Environmental Justice

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. No alternative would have health or environmental effects on minorities (including American Indian tribes) or low-income populations or communities as defined in the Environmental Protection Agency’s *Environmental Justice Guidance* (1998). Therefore, this impact topic has been dismissed as an impact topic in this document.

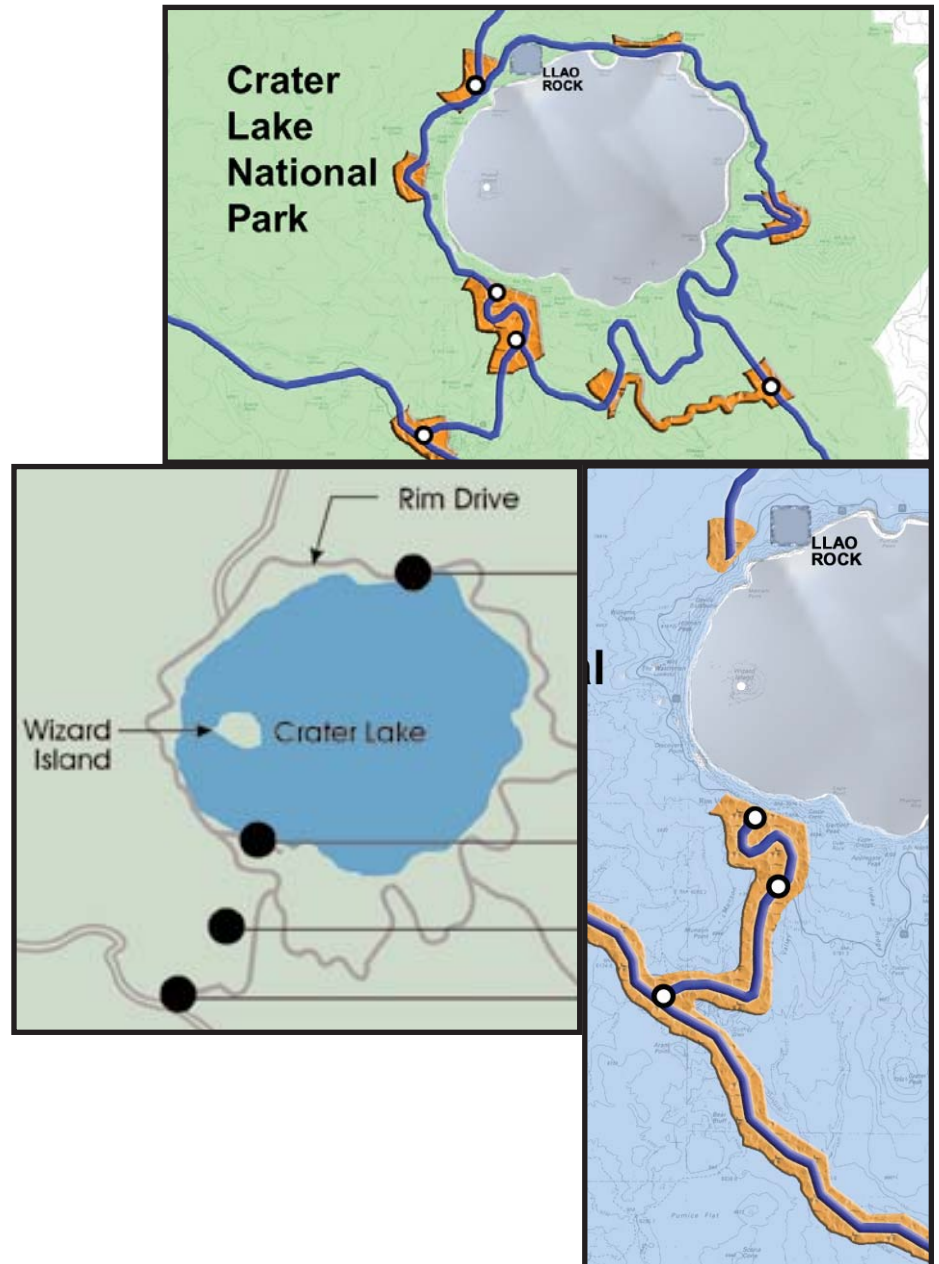
Indian Trust Resources

The lands comprising Crater Lake National Park are not held in trust by the secretary of the interior for the benefit of Indians due to their status. Therefore, this topic was dismissed.

Wilderness Resources and Values

The alternatives place all lands within the 1974 wilderness proposal within the backcountry zone and would allow only uses and development compatible with the protection of wilderness characteristics and values. All new development proposed under any of the alternatives would occur within the exclusions, and proposed wilderness lands would be avoided during construction activities. Backcountry opportunities for visitors to experience solitude and unconfined recreation in the backcountry would remain unchanged. Opportunities for primitive recreation, primarily hiking and backpacking, in the wilderness would remain. In most wilderness areas of the park, visitors would continue to find what they perceive as pristine natural conditions. For example, visitors would continue to find a landscape generally untrammelled by people with few signs of disturbance or alteration. Relatively few visitors use the backcountry in the park, and although this number is expected to increase, negligible impacts to backcountry visitor experiences are anticipated under alternative 1 (no-action alternative).

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE



THE ALTERNATIVES

This *Draft General Management Plan / Environmental Impact Statement* presents four alternatives, including the National Park Service's preferred alternative, for future management of Crater Lake National Park. Alternative 1, the no-action alternative, describes the continuation of current management and trends and serves as a basis for comparing the other alternatives. Alternative 2 is the National Park Service's preferred alternative. It would provide additional opportunities while providing for the research and protection of resources. Alternative 3 would allow visitors to experience the entire range of natural and cultural resources significant and unique to the park through recreational opportunities and education. Alternative 4 would have a greater emphasis on resource preservation and restoration than the other alternatives.

The preferred alternative was developed following an initial assessment of the impacts of the preliminary alternatives. An evaluation process, called "Choosing by Advantages (CBA)," was then used to evaluate and compare the alternatives and to develop a preliminary preferred alternative. As part of the CBA process, the planning team looked at comparative costs of the alternatives (see appendix C for these comparative costs).

ACTIONS COMMON TO ALL ALTERNATIVES

All alternatives to be considered in the *General Management Plan* must be consistent with and contribute to sideboards within which all management actions must fall. These sideboards are the purpose and significance statements, along with the mission goal. All alternatives must also be

within NPS legal mandates and park policies.

At Crater Lake National Park the lake and the surrounding environment led to the initial creation of the park. Research and information since the legislation creating the park have highlighted the unique and scientific aspects of the lake. In addition to the beauty of its large size, blue color, and mountain setting, the lake holds the world record for clarity among lakes and has been the object of scientific study for more than a century due to its pristine waters, associated geothermal activities, and unusual aquatic organisms. The ongoing Crater Lake Long-Term Limnological Program has indicated that the chemical and physical parameters measured in the lake are within their expected range of variation.

All alternatives in this *General Management Plan* would provide for resource protection and visitor use. The park would manage its ecosystems for the sustainability of the resources found in the park. Protection, preservation, and monitoring of the primary and most unique resource in the park, Crater Lake, would occur in all alternatives.

All alternatives in this general management plan discuss resource condition, the visitor experience, and appropriate activities and facilities. Prior to this general management plan, the 1999 *Crater Lake National Park Visitor Services Plan* established the basis for a new concession contract. This new 10- year contract went into effect in 2003. The concession projects proposed in the *Visitor Services Plan* are consistent with the alternatives. Any future commercial actions or operations would need to be

within the defined visitor experience, level of activity, and facilities as defined in the preferred alternative.

DEVELOPMENT OF THE ALTERNATIVES

Before the alternatives were developed, information on park resources, visitor use, and visitor preferences was gathered and analyzed. Information about the issues and scope of the project was solicited from the public, other agencies, special interest groups, and park staff through newsletters, meetings, and personal contacts. This information helped with developing the preliminary alternatives. The alternatives were further refined based on public comments on an alternatives newsletter. Each of the alternatives support the park's purpose, significance, and mission; address issues; avoid unacceptable resource impacts; and respond to differing public desires and concerns.

Using the information described above, the planning team developed eight management zones for guiding preservation, use, understanding, and development of

Crater Lake National Park and its resources. These zones form the basis of the alternatives and reflect the range of ideas proposed by the Park Service and public.

MANAGEMENT ZONES

An important tool in planning and management is the establishment of management zones for various areas in the park. These zones identify how different areas could be managed to achieve a variety of resource conditions and visitor experiences. Each zone specifies a particular combination of resource, social, and management conditions (see the following chart). Under the action alternatives, the National Park Service would take different actions in different zones concerning uses and facilities.

Summer and winter scenarios and maps follow each alternative description because the park landscape changes so dramatically from winter to summer. These scenarios help distinguish when visitor activities and access are possible and allowed.

Table 1: Management Zones

ZONE		RESOURCE CONDITION OR CHARACTER	VISTOR EXPERIENCE	APPROPRIATE ACTIVITIES OR FACILITIES
NATURAL HERITAGE ZONES	BACKCOUNTRY	Biological diversity and ecological integrity - Managed for wilderness character and values - Moderate level of management for resource protection and visitor safety - Minimal evidence of modern civilization - Subtle onsite controls and restrictions - Resource modifications would harmonize with the natural environment. Tolerance for resource degradation in this zone would be very low	Immersed in nature, away from comforts and conveniences - Opportunities for solitude - Few other visitors - High level of independence, challenge, adventure and application of outdoor skills - Longer time commitment - Low tolerance for noise and visual intrusions - Generally requires higher level of physical exertion	Minimal - Primitive trails - Small designated campsites - Small facilities, including antennas - No motorized vehicles (except to attain management objectives when determined necessary) - If any, facilities in the zone would avoid sensitive resources
	FRONT COUNTRY	Transition between developed areas and those managed for natural values - Managed predominately for natural values - Subtle site modifications to accommodate use that harmonizes with natural environment - Moderate level of management for resource protection Tolerance for resource degradation would be low to moderate	In contact with nature, close to modern conveniences - Common to encounter other visitors - Some physical exertion required - Short to moderate time commitment - Moderate tolerance for noise and visual intrusions	Support facilities - Trails, possibly paved - Facilities for visitor comfort and convenience — may include restrooms, trash cans, benches, tables, kiosks, signage or drinking fountains - Bicycling and other nonmotorized recreation

ZONE		RESOURCE CONDITION OR CHARACTER	VISTOR EXPERIENCE	APPROPRIATE ACTIVITIES OR FACILITIES
	LAKE AND CALDERA	Pristine • Highest level of resource protection • Low levels of management for access, resource protection and visitor safety would be appropriate in these areas • Any resource modifications would be minimal and would harmonize with the natural environment	Fully immersed in nature in a unique environment • Access would require a moderate to high level of challenge • Visitors would access the resource as part of a guided boat tour • Intimacy with resources, learning, and access to a large portion of the lake would be key elements of this experience • Probability of encountering other boats would be low, and there would be some opportunities for individual solitude	Minimal facilities to accommodate boat operations, research, and visitor needs • Boat touring with a guide would be the predominant activity • Swimming, fishing, and scuba diving are permitted. Any other activities would require park approval • Comfort stations, boat dock and storage, and access trail • Hiking would be necessary to access the area
	RESEARCH NATURAL	Protection for unique habitats and extraordinary ecological values • Managed to allow natural processes to occur without disturbance or impacts from humans • Tolerance for resource degradation in this zone would be very low	Resource Oriented • Visitors may or may not be allowed, depending on specific resource goals. • If allowed, visitation would be education-oriented and an NPS guide could be required	Minimal and probably temporary facilities required to meet the resource objectives • Research, observation, and other activities which would not impact the zone's specific objectives

ZONE	RESOURCE CONDITION OR CHARACTER	VISTOR EXPERIENCE	APPROPRIATE ACTIVITIES OR FACILITIES
CULTURAL HERITAGE ZONE	Maintaining and protecting cultural resources and providing for quality visitor experiences - Evidence of management activity and resource preservation could be visible to visitors. - Setting would be predominantly historic - National register-listed (or eligible) properties would be managed to preserve their documented values. - Historic scene and the landscape would be managed to maximize their integrity and to support visitor use - Some minor aspects of the natural and cultural landscape could be modified to protect resources and accommodate use	Immersed in a built environment - Rich in architectural and cultural history - Interpretive and educational services and media would be greatest - Opportunities to understand and appreciate resources - Visitor activities would occur in both structured (such as interpretive talks) and unstructured ways (self-guided tours and waysides) - Probability of encountering other people and NPS staff would be high - Opportunities for physical challenge would be low - Moderate intrusions on the natural soundscape by cars and other people	Learning about the park's natural and human history and its ecological and historical significance - Viewing Crater Lake, birdwatching, photography, walking, and picnicking - A range of interpretive, educational, and orientation programs would be provided, with orientation and interpretation of resources taking place mostly onsite - Facilities could include visitor contact, restrooms, exhibits, and facilities related to park administration and operations - Trails and picnic areas
TRANSPORTATION ZONE	Resources modified to accommodate roads and road construction - Minimize impacts to resources - Minimize landscape and visual impacts - Resources modified for essential visitor and park operational needs	Touring the park, enjoying scenic overlooks and interpretive media, and gaining access into other park areas - Visitor attractions would be convenient and easily accessible - Visitors would have little need to exert themselves, apply outdoor skills, or spend a long time in the area - Probability of encountering other visitors and NPS staff would be high	Substantially developed area - Paved roads, pullouts, overlooks, and associated short trails and picnic areas, parking areas and other facilities (such as restrooms, picnic tables, kiosks, wayside exhibits) that support visitor touring - Most facilities and some trails would be accessible in this area - Road realignment could occur within a road corridor measuring 200 feet from the centerline of the road

ZONE	RESOURCE CONDITION OR CHARACTER	VISTOR EXPERIENCE	APPROPRIATE ACTIVITIES OR FACILITIES
DEVELOPED ZONE	Resources modified for visitor and park operational needs • Not in designated wilderness nor near sensitive resources • Visitors and facilities would be intensively managed • Signs of human activity would be fairly obvious	Convenient and accessible • Opportunities for adventure would be relatively unimportant • Promotes social experiences • Probability of encountering other visitors or NPS staff would be high	Visitor and administrative facilities • Visitor centers, lodges, administrative offices, maintenance areas, and residences • Paved paths, roads, parking, and other walkways connecting facilities could be appropriate • Campground

ALTERNATIVE 1 – NO ACTION

The no-action alternative represents continuation of the current management direction and approach currently used at the park. This alternative is presented as a way of evaluating the proposed actions of the other three alternatives and is useful in understanding why the National Park Service or the public may believe that future changes are necessary.

Ongoing and planned actions and projects in the park are included under projects that make up the cumulative impact scenario and are not included as part of this alternative. The impacts of these actions are analyzed as part of the cumulative impact analysis.

The existing road access and circulation system within the park would continue. Two-way traffic and existing pullouts along Rim Drive that provide scenic lake views would be maintained. Several pullouts that are heavily used would likely continue to have crowding problems during peak times and problems with newer, larger vehicles and RVs. Grayback Road would remain unpaved and open to one-way traffic. During winter, private vehicular access would be maintained from the south and west on OR 62 through park headquarters and up to Rim Village. Winter snowmobile and snowcoach access would continue along North Junction to the rim. Other winter visitor activities in the park, including cross-country skiing and snow play on unplowed roads, would also continue. The Park Service would initiate a data collection and monitoring program to gather information on winter use and resource conditions to ensure long-term protection and sustainable use of park resources.

Existing buildings and facilities in the park would remain. Preservation and maintenance

of existing historic structures would continue based on available staff and funding. Some historic structures would be adaptively used for visitor use and administrative functions. The superintendent's residence, a national historic landmark, would be rehabilitated for use as a science and learning center. Munson Valley would continue to serve as the center of NPS administration, maintenance, and housing. It would also serve as the year-round visitor interpretation and orientation point. There would continue to be inadequate storage and workspace for park collections that meets NPS museum standards. Due to limited staffing, the cataloging backlog would continue to increase.

Existing visitor recreational opportunities and interpretive programs in the park would continue. Rim Village would continue to function as a year-round operation with limited services in the winter. Seasonal interpretive activities would be provided at the rim. Mazama Village would be the primary overnight visitor use area in the summer. Development at Cleetwood would continue to provide access to Crater Lake and the commercial boat tours of the lake.

Cultural resources in the national park would continue to be surveyed, inventoried, and evaluated under National Register of Historic Places criteria of evaluation to determine their eligibility for listing in the national register as NPS staff and funding permitted.

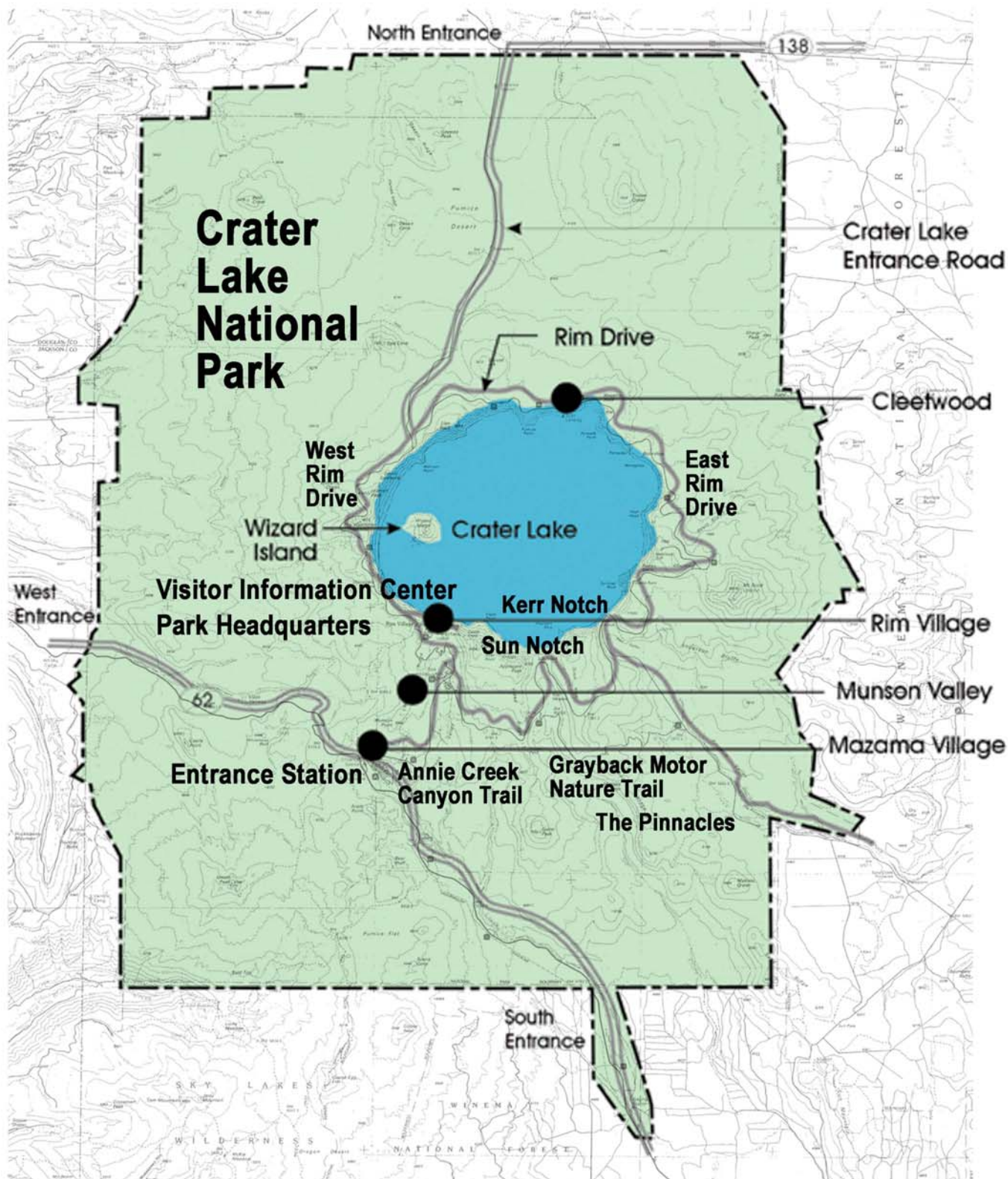
Natural resource management protection, preservation, and restoration activities would also continue as staffing and funding allowed. The following protection

measures to protect the lake would also continue:

- minimal development would be allowed within the caldera and lake drainage area
- operations would be managed to prevent contaminants from draining into the lake
- only essential visitor service would be provided at Rim Village
- the number and types of boats would be controlled
- a single access trail would be provided to the lake

The Crater Lake Long-term Limnological Program would continue to research and monitor Crater Lake as well as determine periodic recommendations for resource preservation. Partnerships with academia and other outside research interests would continue in support of inventorying and monitoring of resources.





Legend

--- Park Boundary

0 1.5 3 6

Scale in Miles



Alternative 1
No Action

ALTERNATIVE 2: PREFERRED ALTERNATIVE— EMPHASIS ON INCREASED OPPORTUNITIES

CONCEPT AND RELATED ACTIONS

Management of the park would emphasize increased opportunities for visitors in both recreational diversity and learning about park resources. Most visitor recreational opportunities would remain.

This alternative would explore a greater diversity of uses along Rim Drive. New opportunities would allow visitors to directly experience the primary resource of Crater Lake in ways other than driving. Any new uses would be nonmotorized and low impact and be limited to areas that would have space to accommodate them; new trails could be included. Additional opportunities may be provided by seasonal closures of sections of east Rim Drive to allow hiking and biking along Rim Drive. These closures would also provide opportunities to experience the lake in a quieter setting without requiring physical changes to the historic Rim Drive. Closure of Rim Drive would be experimental to determine how well this approach worked, and the road may be reopened if warranted. The Grayback Road would no longer be used for motorized transportation. It would function as a nonpaved trail to accommodate hikers, bicyclists, and stock use. Winter snowmobile and snowcoach access would remain along North Junction to the rim. Winter access in private vehicles to Rim Village would continue via plowing the road. The Park Service would initiate a data collection and monitoring program to gather information on winter use and resource conditions to ensure long-term protection and sustainable use of park resources. Other current opportunities would still be available but with a greater depth and range of information. Some additional

frontcountry opportunities would be in areas along the rim and along the roadways. Transitional experiences (such as short trails and picnic areas) would be provided between the developed areas or transportation corridors and the backcountry. Areas for enhanced interpretation, new research, and access to the backcountry would also be provided.

Opportunities would be added for research, learning, and conveying of information to park visitors. The goal would be to facilitate research that was focused, purposeful, and significant to the resources of Crater Lake National Park or that would further basic natural, cultural, and social science understanding. A new science and learning center would form the core of the new research. The park would expand and encourage partnerships with universities, scientists, and educational groups. Research would provide information that is relative to and could be compared to larger regional and global contexts, which would then form the basis of a more substantive interpretive and educational experience for visitors.

The park, through its partnerships, would invite scientists, educators, students, and researchers to study mutually beneficial subjects at Crater Lake. Joint conferences and seminars could be held on related topics with partnering universities or with other agencies or at the park's science and learning center. The information gathered would be disseminated throughout the park to rangers, interpretive staff, and visitors. Park staff would use new and expanding sources of information to manage resources and to analyze impacts to the resources and incorporate the newest research into their interpretive

talks. Researchers would interpret their research through field trips, seminars, and workshops. Visitors would have the opportunity to participate in extended workshops to support research and resource management. Special in-depth tours would be available to interest groups, such as bird groups or geology clubs. An underlying theme would be the environment, especially its connection beyond park boundaries. Methods for disseminating information about park resources would go beyond the current level. Radio information would be provided for visitors in private cars, and interpreters would provide research-based programs for buses and tour boats. New technology would be used to provide information to "virtual" visitors who may never step within the boundary of the park.

The park's museum collections would be increased as a result of the expanded research activities. Pertinent park-related collection materials not currently owned or managed by the National Park Service would be acquired and stored in onsite and offsite facilities that met professional and National Park Service museum standards. Thus, adequate storage and workspace would be provided for improvement of curation, protection, and access to the collections, and staffing would be upgraded to reduce the cataloging backlog.

Existing buildings and facilities in the park would remain, but some structures would be adaptively used for new functions and uses, including the rehabilitation of the superintendent's residence as a science and learning center. While researchers, scientists, and artists may be invited and

encouraged to visit and stay in the park, it is anticipated to be small numbers and relatively short term — a few days to a month. Space would be provided within existing facilities for educational groups — classes, clubs, and tour groups. Current and future needs for office and administrative space would be accommodated without additional construction. Administrative and other organizational functions, which were not by necessity park-based, would be moved to surrounding communities as demand for space within the park increased. Community-based employees would strengthen ties to nearby communities as well as provide greater choices of living situations for employees, thereby improving recruitment and retention. Functions could be dispersed to more than one community in the area, locating close to institutions partnering with the park to strengthen and solidify those relationships.

A greater emphasis on research, education, and interpretation would require an increase in staffing in those areas.

Parking and road congestion at the park would be managed by improving existing pullouts, parking areas, and overlooks. Minor changes could include signing, marking parking spaces, and minor pavement alterations. If, in the future, crowding conditions developed, shuttles and other alternative transportation systems would be used to solve the problems, rather than expanding road and parking capacities. At that time, a feasibility analysis would determine whether the alternative transportation would be a concession, Park Service operated, or a service contract.

MANAGEMENT ZONING

Summer

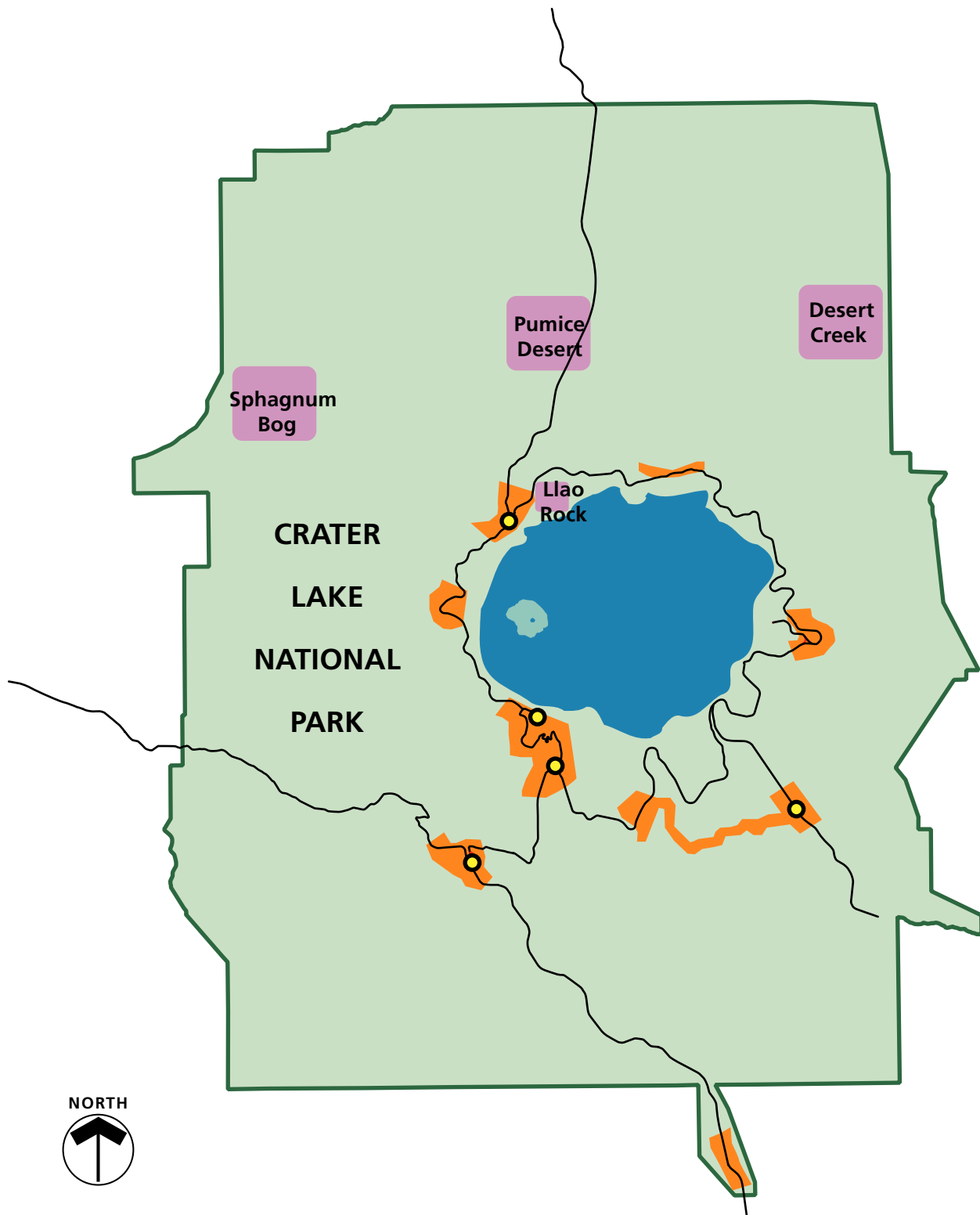
Most of the lands within the park would be managed under the backcountry management zone, which includes most lands contained in the 1974 wilderness recommendation. This zone would preserve the park's pristine landscape and provide visitor opportunities for solitude and a primitive experience. The research natural zone would be applied to the four research natural areas (shown on the Alternative 2 — Summer map) in the park that possess unique habitats and extraordinary ecological values. This zone includes the remaining lands contained in the 1974 wilderness recommendation not zoned as backcountry. Crater Lake would be zoned lake and caldera. Management would emphasize continued resource

protection and the learning opportunities associated with this unique environment. The developed zone would include visitor and administrative facilities at Rim Village, Munson Valley, Mazama Village, North Junction, and Lost Creek. The transportation zone would include corridors along the park road system. The frontcountry zone would be in a number of areas along the Rim Drive and other park roadways to support expanded frontcountry opportunities. The Grayback Road, which would become a nonpaved trail, would also be included in this zone.

Winter

In the winter, the backcountry zone would be expanded to include those portions of the park's road system and visitor facilities that would be closed in the winter.





NORTH



Legend

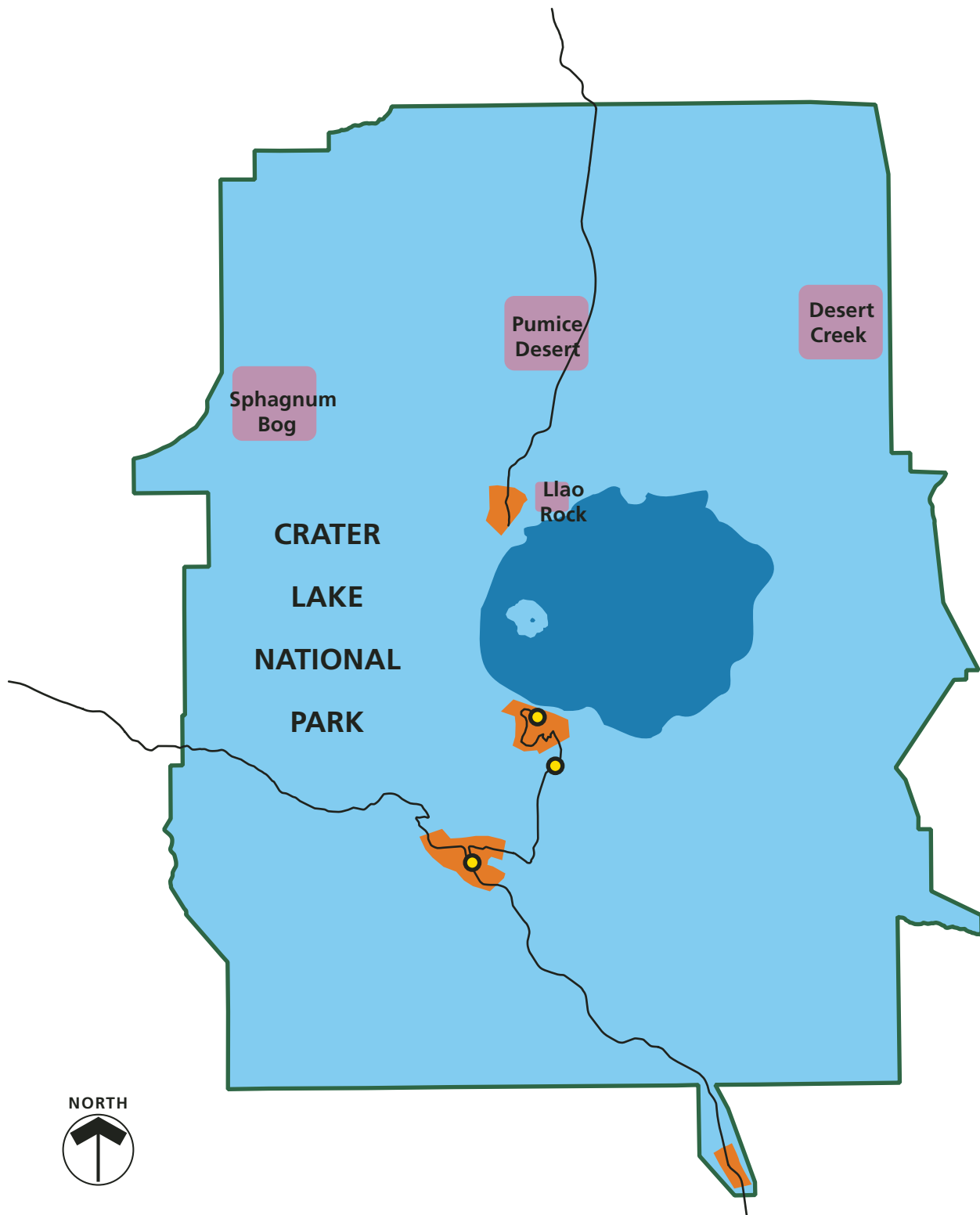
-  Park Boundary
-  Lake/Caldera
-  Transportation
-  Development
-  Front Country
-  Research
-  Back Country (Summer)

Alternative 2 - Preferred Summer

Emphasis on Increased
Visitor Opportunities

Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20141



NORTH



Legend

-  Park Boundary
-  Lake/Caldera
-  Transportation
-  Development
-  Front Country
-  Research
-  Back Country (Winter)

Alternative 2 - Preferred Winter

Emphasis on Increased
Visitor Opportunities

Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20142

ALTERNATIVE 3 — EMPHASIS ON ENJOYMENT OF THE NATURAL ENVIRONMENT

CONCEPT AND RELATED ACTIONS

The emphasis of this alternative would be to allow visitors to experience a greater range of natural and cultural resources significant and unique to the park through recreational opportunities and education. The park would be managed to provide a wider range of visitor experiences and would reach out to a greater diversity of visitor groups — different ages, abilities, economic, and ethnic groups. Recreational opportunities would provide the base for interpretation and education. These programs would focus on minimizing impact, leaving no trace and acquisition of skills for outdoor recreation. Programs would include a broader range to provide appropriate levels of education and interpretation for a variety of groups. Trails would be located to introduce visitors to a diverse range of ecosystems and terrain and to accommodate ability and experience levels.

Resources would be managed to permit recreation while protecting resources. The park would partner with a range of tourism, hospitality, and recreation clubs, along with private contractors and related agencies, to provide orientation and education. Some orientation and education efforts could occur offsite in local hotels and/or on tours to prepare visitors for and teach stewardship to groups before getting to the park. Partnering with commercial operators to provide interpretation on guided van tours would be encouraged. Interpretive programs for less physically fit visitors would be provided; possibly on tours or in community facilities. Opportunities for recreation would be viewed in a regional context.

While not all recreational activities are appropriate for, nor would be allowed within the boundaries, the park could serve as a source of information for regional recreational opportunities. Winter access would be improved by grooming along North Junction Road to accommodate both snowmobiling and snowcoaches. Plowed vehicle access would continue from Mazama Village to Rim Village. Increases in numbers or impacts to resources or visitors could warrant changes in management actions.

In addition to reaching out to groups in nearby communities and those on tours, use of a shuttle bus system would be explored. The shuttle would be integrated with recreational opportunities to create a wide range of visitor opportunities. The shuttle would also be integrated with the interpretive program to expand the park experience. For example, visitors could park at Mazama and take a shuttle to and around Rim Drive. The shuttle stops could be connected with the trail system, allowing visitors to have short stops, short hikes, or successively longer outings, as they chose. The road section between Cleetwood Cove and Kerr Notch could be one way for private vehicles. This could create an area where visitors could ride bikes in one lane with a high degree of safety.

Increases in visitor contact and contact with the resource would stimulate a shift toward increased interpretive and ranger services. Some interpretive functions could be based in nearby communities where partnerships with the tourism industry have established off site interpretive programs. For example,

interpretive programs could be presented in local hotel meeting rooms, schools, or community buildings. Use of most current facilities would continue. Treatment of historic structures and cultural landscapes under this alternative would be similar to the no-action alternative, although such resources could be affected by construction of additional trails, installation of new interpretive signs and other media, and expanded tour programs.

Adequate space would be provided for the curation and storage of the park's museum collections, which would be stored in an onsite facility that met professional and National Park Service museum standards. Although adequate storage and workspace would be provided to improve curation and protection of the collections, and staffing would be upgraded to reduce the cataloging backlog, park-related collection materials not currently owned or managed by the National Park Service would generally not be acquired. Access to the collections, both for NPS and non-NPS researchers, would be limited by availability of museum staff to assist in use of the collections.

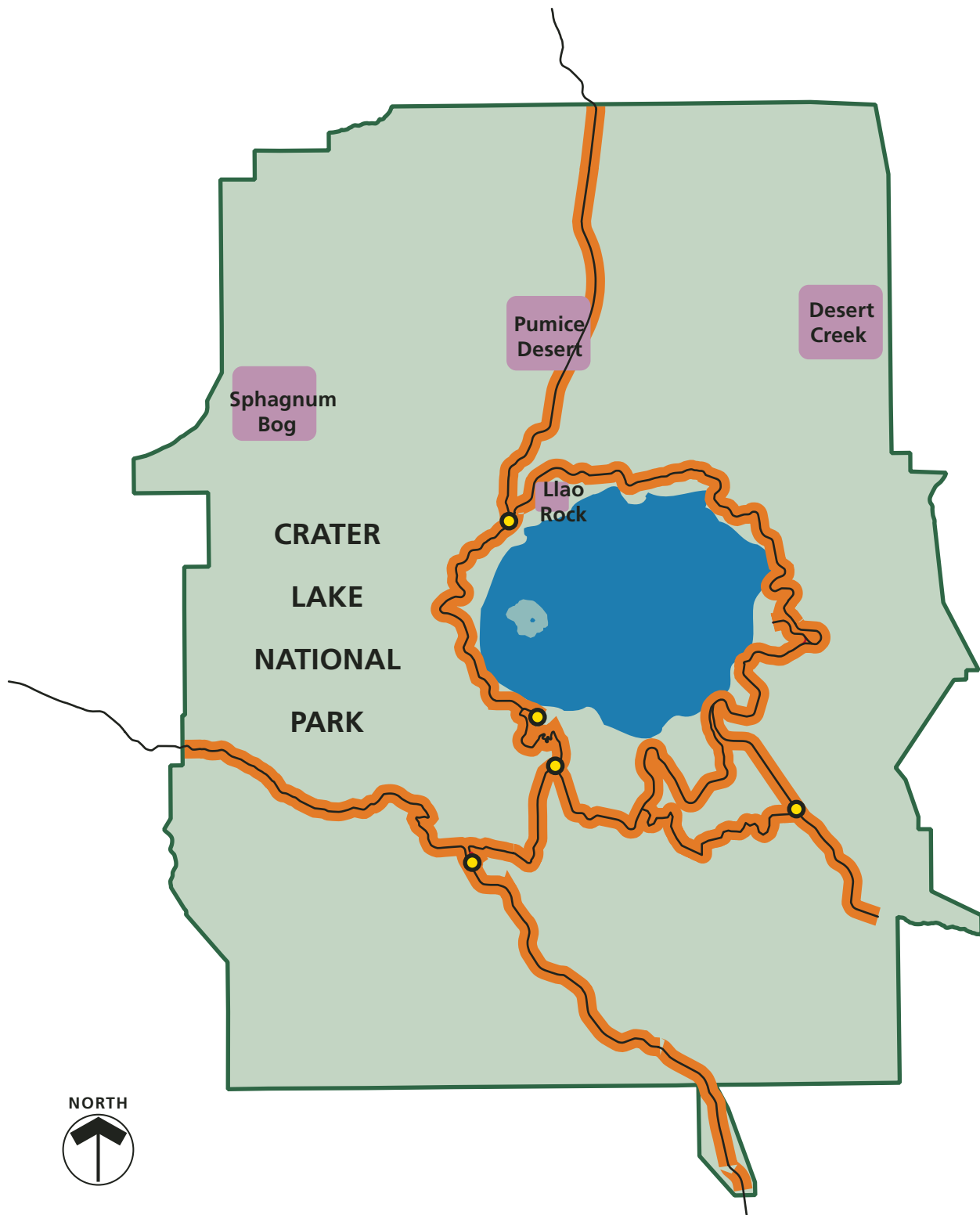
MANAGEMENT ZONING

Summer

The zone allocation would be similar to alternative 2, with the following exceptions. The Grayback Road would be included in the transportation zone to accommodate continued motorized recreational opportunities. In addition, a corridor along the park's road system would be zoned frontcountry to allow for increased visitor opportunities, such as hiking and picnicking, in these corridors. (Please see the Alternative 3 — Summer map.)

Winter

The zone allocation would be similar to alternative 2, where the backcountry zone would be expanded to include those portions of the park's road system and visitor facilities that would be closed in the winter. However, the frontcountry zone would be applied along the entire OR62 and south access road corridors to support increased winter use opportunities.



NORTH



Legend

-  Park Boundary
-  Lake/Caldera
-  Transportation
-  Development
-  Front Country
-  Research
-  Back Country (Summer)

Alternative 3 Summer Emphasis on Enjoyment of the Natural Environment Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20143



Legend

-  Park Boundary
-  Lake/Caldera
-  Transportation
-  Development
-  Front Country
-  Research
-  Back Country (Winter)

Alternative 3 Winter Emphasis on Enjoyment of the Natural Environment Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20144

ALTERNATIVE 4 — EMPHASIS ON PRESERVATION AND RESTORATION OF NATURAL RESOURCES

CONCEPT AND RELATED ACTIONS

Park management would be focused on the preservation of native species and natural processes and the restoration of biodiversity and natural processes where altered. The park would be an active partner in a regional conservation strategy that would include other agencies and environmental groups. Most park operations and visitor contact facilities could be outside the park and shared with other agencies and communities.

Resource preservation and restoration would be the overriding consideration in the park. Evaluations, surveys, and monitoring would be conducted to ensure protection of park resources. Areas that have been altered would be restored to their natural conditions. Research within the park would be nonmanipulative. Cultural resources would be preserved at the highest level possible. Preservation of historic fabric would be an overriding factor. Adaptive reuse, which permits additions or alterations to a historic structure to accommodate a compatible contemporary use, would occur only where it can be accomplished in accordance with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation*.

The volume of the park's museum collections would be increased as a result of the expanded park research activities as well as acquisition of pertinent park-related collection materials not currently owned or managed by the National Park Service. The museum collections would be stored in an offsite facility that met professional and National Park Service

museum standards. Thus, provision for adequate storage and workspace would be provided to improve curation, protection, and access to the collections, and staffing would be increased to reduce the cataloging backlog.

The visitor experience would stress activities that have low environmental impact on and are harmonious with the resources. Existing trails would be routed away from sensitive areas. The trail system would be reviewed and new trails may be provided (e.g., low elevation nature trails). Some trails could be eliminated and the area rehabilitated. If not eligible for the National Register of Historic Places, the Grayback Road would be closed and restored to natural conditions. Existing services would continue, however, there would be more emphasis on self-guided and discovery education. Environmental sensitivity would serve as a strong theme. Interpretive programs would focus on stewardship within the park and on the protection of resources, while incorporating this philosophy into everyday life.

Vehicular transportation would be altered to reinforce the visitor experience. The Rim Road would be closed between Cleetwood Cove and Kerr Notch. The area between the two sides would provide visitors with opportunities for hiking and solitude along the rim.

To reduce the human presence on the natural landscape, the trend would be toward fewer buildings and facilities. Facilities that are not historic and not essential to park functions would be removed and the area rehabilitated. Functions that are by necessity park-based, such as maintenance and law

enforcement, would be retained in the park. The composition of the staff would increase in the areas of resource preservation, restoration, protection, and education activities.

Winter use of the park would change to allow natural processes to proceed with less disturbance than current management practices allows. Winter plowing of the road to the rim would stop, except for spring opening. Winter access to the rim would begin from the Mazama parking lot and would be via snowcoach. Grooming of the road would probably be needed to ensure access by snowcoach. Snowmobiling along North Junction Road would no longer be allowed.

MANAGEMENT ZONING

Summer

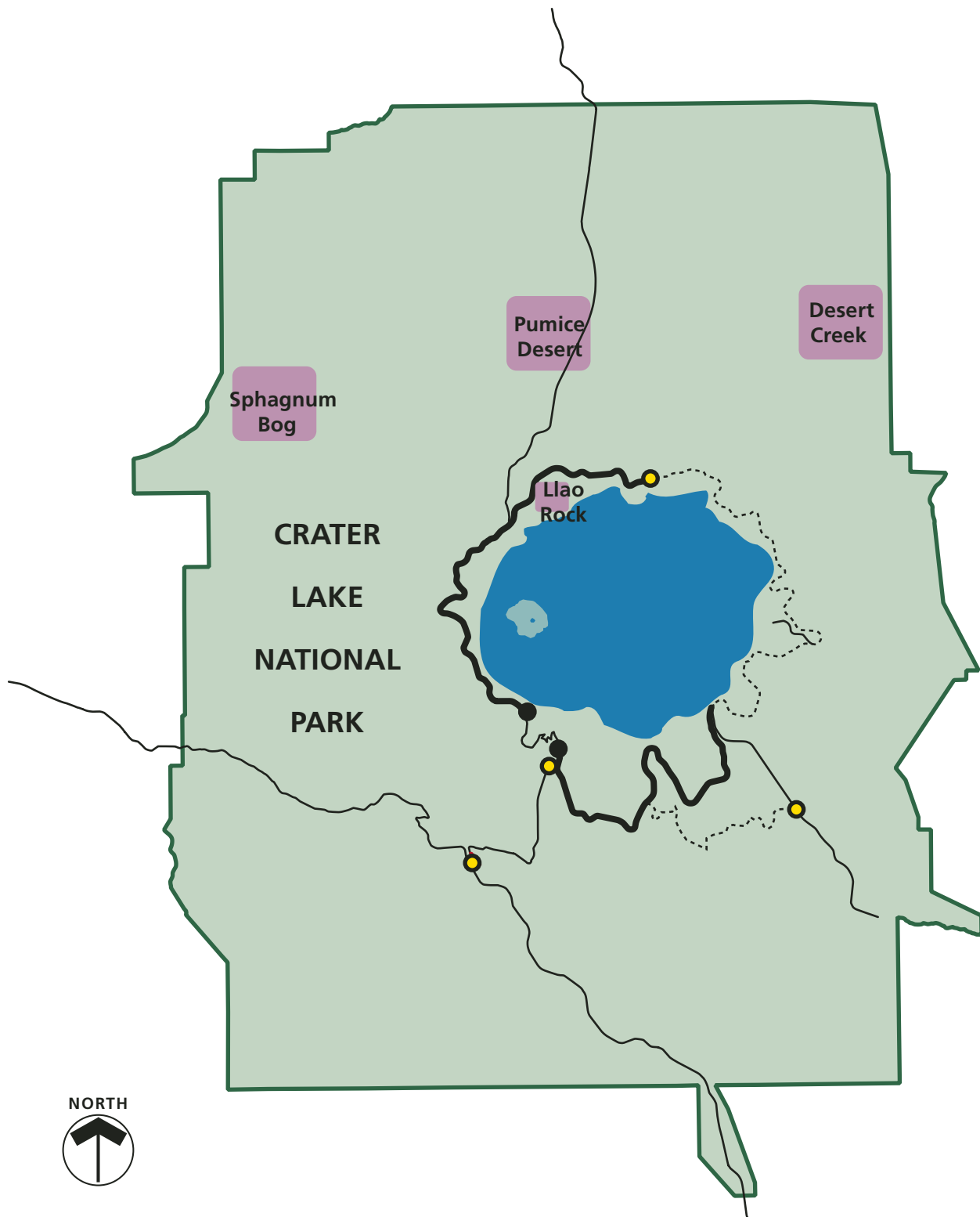
As under alternatives 2 and 3, most of the lands within the park would be managed under the backcountry management zone, which would include most lands contained in the 1974 wilderness recommendation (see the Alternative 4 — Summer map). The Grayback Road, which would be closed and restored if not eligible for the national register, would

also be zoned backcountry. The research natural zone would be applied to the four areas in the park that possess unique habitats and extraordinary ecological values. This management zone would include the remaining lands contained in the 1974 wilderness recommendation not zoned as backcountry. Crater Lake would be zoned lake and caldera.

To preserve cultural resources at a higher level, Rim Drive, Rim Village, and the Munson Valley Historic District would be included in the cultural heritage zone. The developed zone would include visitor and administrative facilities at Munson Valley, Mazama Village, and Lost Creek. The transportation zone would include corridors along the park road system, excluding Rim Drive.

Winter

The backcountry zone would be expanded to include those portions of the park's road system and visitor facilities that would be closed in the winter, including the North Junction road. The south access road, between OR 62 and the rim, would be zoned transportation but would restrict motorized access to snowcoach only.



NORTH



Legend

Park Boundary

Lake/Caldera

Transportation

Development

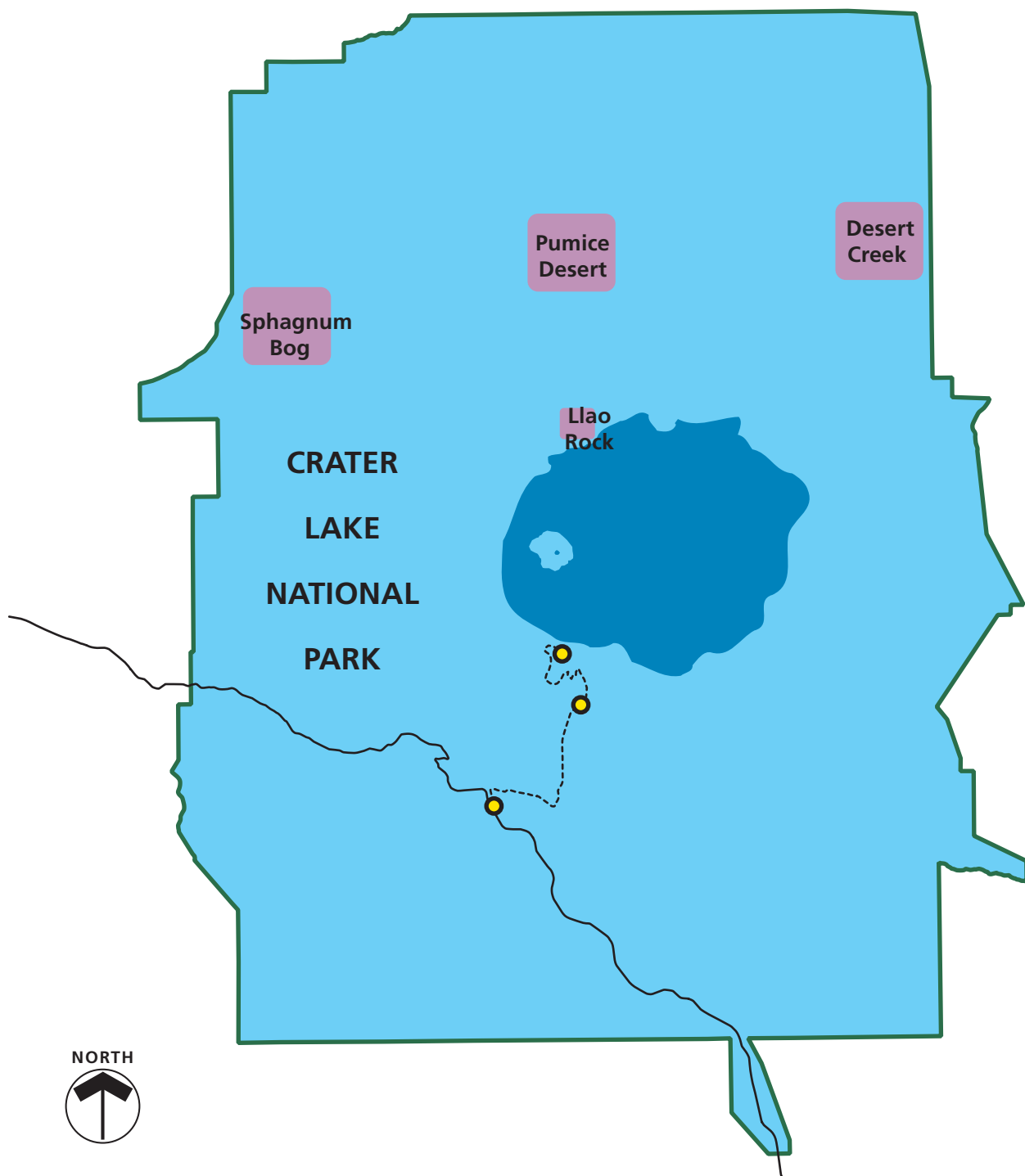
Cultural

Cultural/Non Motorized

Back Country (Summer)

Alternative 4 Summer Emphasis on Preservation & Restoration of Natural Processes Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20145



Legend

-  Park Boundary
-  Lake/Caldera
-  Transportation
-  Development
-  Cultural/Non Motorized
-  Back Country (Summer)

Alternative 4 Winter Emphasis on Preservation & Restoration of Natural Processes

Crater Lake National Park

United States Department of the Interior ■ National Park Service
DSC / MAR 04 / 106 / 20146

MITIGATING MEASURES

The general management plan provides a management framework for the park. Within this broad context, the alternatives include the following practicable measures to minimize environmental harm. These measures are common to all alternatives and are based on the analysis of impacts of the alternatives presented in the “Environmental Consequences” section. However, additional appropriate mitigation would be identified as part of implementation planning and for individual construction projects to further minimize resource impacts.

CULTURAL RESOURCES

Adverse impacts on properties listed in, or determined eligible for listing in, the National Register of Historic Places, would be avoided if possible. If adverse impacts could not be avoided, these impacts would be mitigated through a consultation process with all interested parties.

Mitigation includes the avoidance of adverse effects to cultural resources. Avoidance strategies may include the application of the *Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation*. Presented below is a description of typical mitigation measures.

Archeological Resources

Wherever possible, projects and facilities would be located in previously disturbed or existing developed areas. Facilities would be designed to avoid known or suspected archeological resources. If avoidance of archeological sites was not possible, mitigation strategies would be developed in consultation with all

interested parties to recover information that makes sites eligible for inclusion in the National Register of Historic Places.

Archeologists would monitor ground-disturbing construction in areas where subsurface remains might be present. If previously unknown archeological resources were discovered during construction, work in the immediate vicinity of the discovery would be halted until the resources could be identified, evaluated, and documented and an appropriate mitigation strategy was developed, if necessary, in consultation with the Oregon State Historic Preservation Office and any associated Indian tribes. In the unlikely event that human remains, funerary objects, or objects of cultural patrimony were discovered during construction, applicable provisions of the Native American Graves Protection and Repatriation Act would be implemented.

Historic Structures/Buildings

All project work relating to historic structures/buildings would be conducted in accordance with the guidelines and recommendations of the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. Typical mitigation measures for historic structures/buildings include measures to avoid impacts, such as rehabilitation and adaptive reuse, designing new development to be compatible with surrounding historic properties, and screening new development from surrounding historic resources to minimize impacts on cultural landscapes and ethnographic resources.

Cultural Landscape

All project work relating to cultural landscapes would be conducted in accordance with the guidelines and recommendations of the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. Typical mitigation measures for cultural landscapes include measures to avoid adverse impacts, such as designing new development to be compatible with surrounding historic properties and screening new development from surrounding cultural landscapes to minimize impacts on those landscapes.

Ethnographic Resources

The National Park Service would continue to consult with park associated American Indian tribes to develop appropriate strategies to mitigate impacts on ethnographic resources. Such strategies could include identification of and assistance in providing access to alternative resource gathering areas, continuing to provide access to traditional use or spiritual areas, and screening new development from traditional use areas to minimize impacts on ethnographic resources.

Museum Collections

Mitigation measures related to museum collections consist of preventative conservation of a collection through proper storage, handling, and exhibit of objects as specified in the NPS *Museum Handbook* and NPS *Director's Order No. 24, Standards for NPS Museum Collections Management*.

NATURAL RESOURCES

General

New facilities would be built in previously disturbed areas or in carefully selected sites with as small a construction footprint as possible.

New facilities would be built on soils that are suitable for development. Soil erosion would be minimized by limiting the time that soil is left exposed and by the use of various erosion control measures, such as erosion matting or silt fencing. Once work is completed, construction areas would be revegetated with native plants in a timely period

Interpretive displays and programs, ranger patrols, and regulations on visitor use would be used to minimize impacts caused by visitors.

Areas used by visitors (e.g., trails) would be monitored for signs of native vegetation disturbance. Public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers would be used to control potential impacts on plants from trail erosion or social trailing.

A long-term data gathering and monitoring program to evaluate winter use and associated impacts would be implemented to ensure long-term protection of park resources. Management actions, such as restrictions on off-trail use, specific area closures, or limits on party sizes, would be taken as necessary to address impacts.

Water Resources

Best management practices such as the use of silt fences, would be followed to ensure that construction related effects were

minimal and to prevent long-term impacts on water quality, wetland, and aquatic species.

Equipment would be regularly inspected for leakage of petroleum and other chemicals.

Revegetation plans would be developed for areas impacted by construction activities or other human disturbance and would include the use of native species, as well as salvaging of plant and topsoil.

Air Quality

The best available clean fuel technology for boat operations would be applied (as it becomes available) to the extent feasible.

Dust abatement measures such as watering and revegetation of disturbed areas, as well as requiring machinery to meet emission standards, would be employed.

Native Vegetation and Wildlife

Facilities would be designed and sited to use previously disturbed sites and to avoid sensitive resources such as wetlands or whitebark pine stands to the extent practicable. Other individual management actions to avoid or minimize the extent and severity of impacts would also be implemented, such as localized area or seasonal use restrictions and confining or directing use through use of barriers, trails, and designated camping sites.

Restoration of native vegetative communities would rely on natural regeneration and succession as well as active measures. The principle goal is to assist natural regeneration in reestablishing a sustainable native plant community.

Areas used by visitors would be monitored for signs of native vegetation disturbance and the introduction of non-native species. Public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers would be used to control potential impacts from visitors along roads, trails, or social trailing.

A variety of techniques would be employed to minimize or avoid impacts to native vegetation and wildlife, including visitor education programs, ranger patrols, and use restrictions (permitted activities, locations, and times) in areas with rare plants, vegetative communities, and/or sensitive wildlife populations and habitats.

Wetlands would be delineated by qualified NPS staff or certified wetland specialists and marked if construction of new facilities were to occur near them.

New developments would not be built in wetlands if feasible. If avoiding wetlands is not feasible, other actions would be taken to comply with Executive Order 11990 ("Protection of Wetlands"), the Clean Water Act, and Director's Order 77-1 ("Wetland Protection").

Special precautions would be taken to protect wetlands from damage caused by construction equipment, erosion, siltation, and other activities with the potential to affect wetlands. Construction materials would be kept in work areas, especially if the construction takes place near natural drainages.

Threatened, Endangered, and Sensitive Species

These species include those listed by the U.S. Fish and Wildlife as threatened or species of concern, and by the state of

Washington as threatened, endangered, or sensitive. Also included are species on the Oregon Natural Heritage Program List 1 or 2.

Surveys would be conducted for special status species before implementing any action that might affect these species. Facilities would be designed and sited to avoid or minimize adverse impacts. In consultation with the U.S. Fish and Wildlife Service and Oregon Department of Natural Resources, measures would be taken to protect any sensitive species and their habitats.

Management practices to protect, restore, and monitor special status species would continue to be implemented, such as closing areas of the park near nest sites, restoring bull trout populations, and monitoring species status. The National Park Service would continue to work cooperatively with the U.S. Fish and Wildlife Service to identify and implement appropriate mitigation measures to protect nesting areas within the park.

Where visitor use near rare plant populations would occur such as along the rim, and there is the likelihood of disturbance to plants, visitors would be alerted about the need to stay on trails. If necessary, populations would be protected by placement of signs and fencing. New developments, including trails, would be sited to avoid disturbing or providing access to rare plant populations.

SUSTAINABLE DESIGN

Crater Lake National Park would strive to incorporate the principles of sustainable design and development into all facilities

and park operations. Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations.

Sustainable practices minimize the short- and long- term environmental impacts of developments and other activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques.

The National Park Service's *Guiding Principles of Sustainable Design* (1993), which provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook describes principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. Crater Lake National Park would adhere to these principles and especially strive to reduce energy costs, eliminate waste, and conserve energy resources by using energy efficient and cost effective technology whenever possible. Energy efficiency would also be incorporated into any decision-making process during the design or analysis and value engineering, including life cycle cost analysis, would be performed to examine energy, environmental, and economic implications of proposed development. In addition, the park would encourage suppliers, permittees, and contractors to follow sustainable practices.

ALTERNATIVES OR ACTIONS CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

Some comments received during public scoping suggested that the Park Service should consider increasing the number of roads in the park that are open to snowmobile use. Currently, snowmobiles are allowed along the North Entrance Road to North Junction to accommodate winter lake-viewing access. Other park visitors also enjoy being able to cross-country ski and snowshoe along the rim without encountering motorized vehicles and to enjoy the solitude and quiet of winter lake viewing. Expanding

snowmobile use along the Rim Road would result in conflicts with other users. Snowmobilers also have a substantial network of roads and trails available for recreational use outside of the park. Consequently, increasing the extent of roads open to snowmobile use in the park was dropped from further consideration. The alternatives do examine the possibility of improving access along the North Entrance road to accommodate both snowmobiling and snowcoaches.

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

EVALUATION

In order to develop the preferred alternative, all of the alternatives were evaluated. To minimize the influence of individual biases and opinions, the planning team used an objective analysis process called “Choosing by Advantages” (CBA). This process, which has been used extensively by government agencies and the private sector, evaluates different alternatives by identifying and comparing the relative advantages of each according to a set of criteria.

One of the greatest strengths of the CBA system is its fundamental philosophy: decisions must be anchored in relevant facts. For example, the question “Is it more important to protect natural resources or cultural resources?” is “unanchored,” because it has no relevant facts on which to make a decision. Without such facts, it is impossible to make a defensible decision.

The CBA process instead asks which alternative gives the greatest advantage. To answer this question, relevant facts were used to determine the advantages the alternatives provide. To ensure a logical and trackable process, the criteria used to evaluate the alternatives were derived from the impact topics in the EIS. Alternatives were evaluated to see how well they would

- maximize protection of cultural resources (archeological resources, ethnographic resources, historic structures/buildings, cultural landscapes, and museum collections)
- maximize protection of natural resources (biotic communities, threatened and endangered

species, water resources and, air quality)

- provide visitor experience (diversity of visitor activities, interpretation and orientation, visitor facilities and services and visitor experience values)
- limit effects on neighbors (park neighbors; local, state, and land/resource managing agencies)
- improve operational efficiency (staffing, infrastructure, visitor facilities and services, and the role of commercial operators)

Alternatives were rated on the attributes relating to each of the factors just listed. Then the advantages of the attributes were compared. Alternative 2 served as the basis for the preferred alternative. It was modified to add aspects of alternatives 3 that provided the greatest advantages.

COSTS

Costs are also a consideration in the selection of a preferred alternative. A GMP provides a framework for proactive decision making, including decisions on visitor use, natural and cultural resource management, and park development. The plan prescribes resource conditions and visitor experiences that are to be achieved and maintained over time. Park development is considered in general needs rather than in specifics. For the purposes of cost estimating, general assumptions were made regarding amounts and sizes of development. These assumptions are then carried across to all alternatives so that comparable costs can be considered for each alternative.

Costs identified in the GMP are not intended to replace more detailed

consideration of needs, sizes, and amounts of future development. They should not be used as a basis for money requests until further analysis has been completed. Costs and items considered are shown in appendix C.

Comparative costs for the alternatives include both initial development costs and total life-cycle costs. Initial development costs are the estimated construction costs of the alternatives. Demolition, labor, and materials for buildings, roads, trails,

exhibits, and parking are included. Estimated costs are based on costs for similar types of development in other parks from the Denver Service Center Class “C” Estimating Guide. Life-cycle costs consider the costs of each alternative over a period of time. Life-cycle costs include the costs of operating buildings, the staffing required, maintenance, and replacement costs of alternative elements. The life-cycle costs below are for a 25-year period.

Table 2: Summary of Comparative Costs (FY 2002 Dollars) (Summarized from Appendix C)				
	Alternative 1	Alternative 2 (Preferred)	Alternative 3	Alternative 4
Ongoing Actions and Projects	\$7,906,900	\$7,906,900	\$7,906,900	\$7,906,900
Initial Development Costs	\$ 3,800,000	\$4,743,000	\$3,934,000	\$3,941,000
Total Life Cycle Costs (Present Worth)	\$ 3,800,000	\$12,905,000	\$21,495,000	\$8,479,000

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in section 101 of the National Environmental Policy Act. In the National Park Service, the environmentally preferred alternative is identified by (1) determining how each alternative would meet the criteria set forth in section 101(b) and (2) considering any inconsistencies between the alternatives analyzed and other environmental laws and policies (DO 12, 2.7E). Section 101 states that "... it is the continuing responsibility of the Federal Government to ...

- fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
- assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings
- attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
- preserve important historic, cultural, and natural aspects of our national heritage, and, wherever possible, maintain an environment that supports diversity and variety of individual choice
- achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities

- enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources." (Criteria 6 was determined to be not applicable to this planning effort.)

Taken as a whole, the preferred alternative (alternative 2) would best satisfy the five remaining goals and is the environmentally preferred alternative. The preferred alternative would enhance the park's ability to carry out its mission through developmental and programmatic activities while limiting the amount of new environmental impacts from development and use. Current visitor experiences would still be available but with a greater depth and range, and there would be increased opportunities for both recreational diversity and learning about park resources. Buildings would be adaptively used for new functions thus maximizing visitor opportunities without expanding the developed areas. Thus the preferred alternative would satisfy national goals 2, 3, 4, and 5 to a high degree, ensuring for the long-term that visitors coming to the park see an esthetically and culturally pleasing area, providing a wide range of opportunities for visitors to learn and enjoy the area with minimal adverse impacts, while preserving and enhancing the understanding and preservation of the park's important natural and cultural resources and fulfilling the Park Service's responsibilities as trustee of the environment (goals 1 and 4).

Alternative 1, the no-action alternative, would continue to preserve important cultural and natural resources (goals 1 and 4), although it would not enhance the Park Service's ability to achieve these goals to

the same degree as under the preferred alternative. Educational, informational, and research opportunities would remain limited by lack of facilities and programs and would thus not fulfill goals 2, 3, 4, and 5 as well as the preferred alternative.

Alternative 3 would provide the greatest range and flexibility in visitor recreational opportunities, thus meeting goals 2, 3, 4, and 5. However, alternative 3 would not have the emphasis on both research based educational opportunities and recreational diversity that the preferred alternative would offer. Providing these opportunities and associated new facilities would also result in more extensive and dispersed resource impacts and a greater likelihood that resource management would become more reactive rather than proactive in addressing issues. Thus this alternative would not provide as great a degree of protection for resources (goals 1 and 4) compared to the preferred alternative.

Alternative 4 would provide the highest degree of protection for the park's natural and cultural resources, primarily by removing nonhistoric facilities and restoring areas to more natural conditions, expanding resource management programs and data collection, and generally preserving cultural resources at the highest level possible, with preservation of historic fabric a priority. Thus goals 1 and 4 would be best served by this alternative. Although some visitor opportunities would be enhanced, particularly nonmotorized opportunities, overall there would be a narrower range and fewer opportunities for all visitors to fully enjoy the park and its resources (goals 2, 3, 4, and 5) compared to the other alternatives.

TABLE 3: SUMMARY OF ALTERNATIVE ACTIONS

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
Concept	Continuation of existing management	Education, research, and learning about park resources and the park's national and international context would be emphasized. Recreational opportunities would be increased.	Visitors would experience the park resources through recreational opportunities and education.	Park management would be focused on preservation and restoration of natural processes.
Visitor Opportunities	Existing visitor recreational opportunities and interpretive programs in the park would continue.	Provide additional ways to experience the park – nonmotorized and low impact Additional frontcountry areas would provide enhanced interpretation and access to the backcountry. Additional interpretive experiences would offer a greater depth and range of information based on new research.	Recreational opportunities form the basis +or interpretation and education. Experiences would provide a wider range of visitor experiences and reach out to a greater diversity of visitors. A broad range of programs would accommodate all ages and abilities and economic and ethnic groups.	Environmental sensitivity would serve as the primary interpretive theme. More emphasis would be placed on self-guided and discovery education.
Transportation/Access	Grayback Road would remain unpaved and open to one-way traffic	Grayback Road would become a nonpaved trail to accommodate hikers and bicyclists. Sections of East Rim Drive would be closed in the fall.	A shuttle around Rim Village would integrate with recreational opportunities and interpretive programs. An additional shuttle would connect Mazama and Rim Village. East Rim Drive could be converted to one way.	Rim Road would be closed between Cleetwood Cove and Kerr Notch. The Grayback Road would be restored to natural conditions, if not eligible for the National Register of Historic Places.

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
Winter Access	Winter access to Rim Village in private vehicles would be on plowed road. Winter snowmobile and snow coach access along North Junction to the Rim would continue.	Same as no-action alternative	Winter access for snowmobiles and snowcoaches would be enhanced by improved grooming.	Winter access to Rim Village would be via snow-coach from Mazama Village. Snowmobile and snowcoach access along North Junction to the Rim would not be allowed.
Facilities	Existing buildings and facilities would be adaptively used.	Same as no-action alternative.	Same as no-action alternative.	Facilities that are not historic and not essential to park functions would be removed and the area rehabilitated.
Administrative	Park functions would remain in existing facilities inside the park.	Administrative and other functions that are not park-based, would be moved to surrounding communities as needed.	Some interpretive functions would be based in surrounding communities.	Park-based functions would be retained in the park. Other functions would be moved to surrounding communities.
Partnerships	Partnerships with academia and other outside research interests would continue.	Partnerships would be targeted toward universities, scientists, and educational groups.	Partnerships would be formed with the tourism and hospitality industry.	Partnerships would be developed with other agencies and environmental groups.
Staffing	Existing staff would remain.	Staffing increases in research, education and interpretation	Staffing increases in interpretation and ranger services.	Staffing increases would increase in resource preservation, restoration, protection and education.
Research	Research activities would continue.	Facilitate research that is focused, purposeful and significant to resources. New research would form the basis of a more substantive interpretive and educational experience for visitors.	Same as no-action alternative	Research would be non-manipulative.

TABLE 4: SUMMARY COMPARISON OF IMPACTS OF IMPLEMENTING THE ALTERNATIVES

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
Cultural Resources	There would be no adverse effects on archeological resources, cultural landscapes, ethnographic resources, or museum collections. Rehabilitation of the superintendent's residence would result in adverse, minor, permanent impacts due to some loss of historic fabric. Adaptive use of the structure would ensure its long-term preservation and thus moderate, beneficial impact on the building.	Same as alternative 1, except for museum collections. Increased volume due to research and acquisition along with improved storage and workspace would have beneficial, minor to moderate, long-term impacts on museum collections.	Same as alternative 1, except for museum collections. Improved storage would have minor to moderate benefits on the curation and protection of the collections.	There would be no adverse effect on archeological or ethnographic resources. Overall, this alternative would have minor to moderate, long-term, beneficial impacts on historic structures/ buildings. Impacts to the superintendent's residence would be the same as alternative 1. Increased volume due to acquisition, along with improved storage and workspace, would have beneficial, minor to moderate, long-term impacts on museum collections.
Natural Resources	The no-action alternative would have a minor, long-term, adverse impact on biotic communities, primarily in existing areas of concentrated use and development. It would not adversely affect and could beneficially affect threatened or endangered species if additional	Greater emphasis on research, partnering, and visitor education under this alternative would indirectly contribute to moderate long-term beneficial effects on biotic communities and could result in some adverse impacts on some threatened and endangered species. Long-term adverse	This alternative would result in some adverse impacts on some threatened and endangered species or biotic communities. Long-term adverse impacts from construction and use of new facilities would be localized and minor. Actions in this alternative would have	The greater emphasis on reduction in development restoration would contribute to improved resource conditions within the park, potentially having localized minor to more widespread moderate long-term beneficial effects on biotic communities. It would also have positive

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
	protection measures were implemented. The water quality within the park would remain good; there would be a negligible adverse effect on water quality and quantity due to continuing maintenance activities and a slight increase in visitation, but there would be no impairment to water resources. This alternative would have a negligible, long-term adverse effect on air quality from a small increase in vehicle use within the park.	impacts from construction and use of new facilities would be localized and minor. Actions in this alternative would have negligible, long-term impacts on water quantity, water quality, and air quality.	negligible, long-term impacts on water quantity, water quality, and air quality.	effects on threatened and endangered species and their habitat.
Visitor Experience	Visitor access, recreational opportunities, education, and visitor facilities and services would continue unchanged in this alternative. Potential increases in visitation over the life of the plan could have moderate, long-term impacts on the visitor's ability to access some areas of the park and enjoy scenic vistas in quiet, uncrowded conditions.	Increased visitor opportunities for recreation, educational, and interpretive programs, and access to park facilities and services would provide major beneficial impacts. Some visitors would experience minor long-term adverse impacts due to the seasonal closure of Rim Drive. The same action would create major beneficial impacts for a small number of visitors to enjoy scenic views. The	Alternative 3 would have a major beneficial impact on the diversity of visitor experience. There would be a reduction in the range of interpretive programs resulting in moderate long term adverse impacts to visitor enjoyment of interpretive programs. Access to park facilities and services would increase resulting in a major beneficial impact to visitors' enjoyment of park	Alternative 4 would have a moderate long-term adverse impact on the diversity of visitor opportunities, visitor accessibility, and on the ability of visitors to participate in educational and interpretive programs. There would be moderate long term adverse impacts on visitor enjoyment of park facilities and services.

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
		cumulative actions in conjunction with the no-action alternative would result in an overall major, long-term, beneficial impact.	facilities. There would be minor, long term, adverse impacts to visitors' perceptions of soundscapes. Opportunities for scenic views would be expanded, resulting in minor, beneficial impacts to visitors.	
Park Operations	Continuation of existing management would result in minor, long-term impacts to park operations. Reconfiguration of Rim Village and adaptive reuse of historic structures would result in overall moderate, long-term beneficial cumulative impacts.	Benefits of reconfiguration of Rim Village and adaptive reuse of historic structures would be the same as alternative 1. More functions would be accomplished outside the park, resulting in increased difficulties in communication and coordination. This would be offset by increased efficiencies in developing partnerships. Overall, this alternative would result in moderate, beneficial impacts on park operations.	Same as alternative 1 with small additional amounts of maintenance resulting from new frontcountry trails and closure of a portion of Rim Drive to two-way traffic.	Alternative 4 would result in moderate beneficial impacts to park operations.
Concession Operations	Alternative 1 would have negligible impacts to concession operations. Reconfiguration of Rim Village, Mazama Village,	Same as Alternative 1.	Increased partnering with commercial operators would provide for increased opportunities for concession/commercial	Winter access to the rim would be via snowcoach rather than private vehicles, resulting in a moderate, long-term adverse impact .

	Alternative 1 No-Action	Alternative 2 Preferred Alternative Emphasis on Increased Opportunities	Alternative 3 Emphasis on Enjoyment of the Natural Environment	Alternative 4 Emphasis on Preservation and Restoration of Natural Resources
	and Cleetwood Cove would have moderate, long-term, beneficial, cumulative impacts.		operations, which would result in a moderate, long-term beneficial impact.	
Socioeconomic	The no-action alternative would continue to have a minor to moderate, short-term, beneficial impact on the socioeconomic climate of the gateway communities and regional area due to development projects. In the long term, the park would continue to be an important visitor attraction and contributor to the tourism industry in the three-county region.	Increased staff levels and moving some functions to nearby communities would have a moderate impact on the local economy and a negligible impact on the regional economy. Ongoing and approved projects could result in moderate to major, short-term, beneficial impacts to individual firms and employees with some beneficial effects on the region and adjacent communities.	Same as alternative 2.	Moving some functions to nearby communities would have a moderate impact on the local economy and a negligible impact on the regional economy. Ongoing and approved projects could result in moderate to major, short-term, beneficial impacts on individual firms and employees with some beneficial effects on the region and adjacent communities.

AFFECTED ENVIRONMENT



CULTURAL RESOURCES

ARCHEOLOGICAL RESOURCES

Prehistoric occupation of the Crater Lake area could date to more than 10,000 years ago, when extensive mountain glaciers began to recede and hunters followed big game into present-day southeastern Oregon. The great eruption of Mount Mazama, more than 7,700 years ago, left the area around it temporarily uninhabitable. Until Euro-Americans arrived in the area, prehistoric populations from the eastern and western sides of the Cascade Mountains intermittently used the area. Prehistoric uses included hunting, traveling to trade materials such as obsidian (volcanic glass used to make some stone tools), gathering resources such as huckleberries, and practicing traditional spiritual activities in the higher elevations and around Crater Lake.

Archeological survey work has been conducted in the national park since the mid-1960s, and to date less than 1% of the land area has been examined. Until 2001 only ten archeological sites in the park had been officially recorded. These consisted of one lithic scatter, five “vision quest” rock feature sites, three rock feature sites constructed within the last ten to thirty years, and one obsidian source area. Complementing these sites were 18 isolated finds, most of which have been curated by park personnel. These isolates included two finds of obsidian raw materials (chunks or nodule); one isolated obsidian flake; a find of two cryocrystalline (CCS) flakes; 11 obsidian tools or tool fragments; and three CCS tools. The tools are mainly hunting related implements, consisting of ten point and point fragments (projectiles or knives), with one utilized flake, two bifaces, and one unifacially modified flake.

During 2001 a new archeological resource property type — grades and artifacts associated with railroad logging — was discovered and recorded during a contracted survey of prospective burn units in the park’s northeast quadrant. That area of the park was transferred from Winema National Forest to Crater Lake National Park in 1980 and is part of a much larger logging railroad “network” developed during the 1920s.

Although only a small portion of the park has been surveyed for archeological resources, an archeologist working for the National Park Service has made some predictions about where archeological sites are likely to occur. These sites include small base camps near water resources that are indicated by scatters of stone tools; rock features, such as cairns or piles, stacks, and rings on mountain peaks and high ridges (probably associated with spiritual activities); and hunting sites throughout the park that are indicated by isolated tools such as projectile points. To date, the archeological finds in the park conform to the hypotheses set forth in this predictive model.

None of the archeological sites in the park have been evaluated for listing in the National Register of Historic Places.

ETHNOGRAPHIC RESOURCES

Three Native American groups bordered the Crater Lake area on the west – Molala, Upper Umpqua, and Takelma – while the Klamath Tribes lived to the east. The Klamath Tribes are a confederated tribe that includes people of Klamath, Modoc, and Yahooskin Paiute ancestry as well as descendants of the southern Molalas. Indian lifeways, before disruption by

Euro-American contact, involved seasonal movements from lower-elevation winter villages to hunt and gather a variety of fish, plant, and animal resources throughout their territories. Use of the Cascade Range, such as the present-day Crater Lake National Park area, included the establishment of warmer season camps to hunt animals, gather plant products such as huckleberries, and conduct traditional spiritual activities. Raiding by various Native American groups also occurred in the park area.

Spirit quests took Indian people to isolated places that were believed to possess the powers of certain physical forces and animals that, when acquired, brought success in activities such as gambling, romance, and healing. Those on quests retreated alone to particular places to fast, stay awake for long periods, undertake certain physical activities, and pray, while waiting for an answering vision. Some activities included running, stacking rocks into high piles, and swimming in water bodies thought to possess a sought-after power.

An ethnological overview of the park found Crater Lake to have been an important place of power and danger, highly regarded as a spirit quest site. This study referred to the lake as an important sacred place or landscape; such sites are called “traditional cultural properties” by cultural resource managers, although the boundaries of Crater Lake as a traditional cultural property have yet to be defined and documented. Parts of the lake are associated with mythical events and characters, and parts may be used for contemporary spirit quest rituals.

Members of the Klamath Tribes have identified Mount Scott, Crater Lake, and Huckleberry Mountain as important to

traditional use activities. Some plant collection and harvesting probably occurred as a tribal use within park boundaries. Tribal staff have not yet formalized a request to further evaluate these sites as traditional cultural properties under National Register criteria, with the exception of Huckleberry Mountain. The request was transmitted to Rogue River National Forest, although an ongoing traditional use/ethnographic study indicates tribal activities associated with Huckleberry Mountain, the most significant harvesting area on the immediate western edge of present-day Crater Lake National Park, also included portions of the national park within the Union Creek drainage. The ongoing traditional use/ethnographic study has several related components — an appendix funded by the U.S. Forest Service for interviews with tribal members on Huckleberry Mountain, a separate study of anthropogenic fire regimes along the park’s western boundary underwritten by the Crater Lake Natural History Association, and a separately contracted exhibit plan focusing on traditional use through consulting with park-associated tribes.

The National Park Service will continue to consult with concerned Indian tribes to learn about possible traditional cultural property sites and how to avoid them. Consultation with the Klamath Tribes will be extended to include National Park Service activities affecting “ceded lands” — areas of the park within the boundaries established by a treaty negotiated in 1864 with the Klamath and Modoc and a group of the Northern Paiutes that ceded vast territories to the federal government and created in compensation a reservation of approximately 1.1 million acres. The treaty established the federally recognized Klamath Tribes and delineated “peak to

peak” — Thielson to Scott and Scott to Pelican Butte — boundaries that include most of the park’s southeast quadrant.

HISTORIC STRUCTURES/ BUILDINGS

The documented historic structures/buildings in Crater Lake National Park are primarily associated with development of the area as a national park. Most of the historic structures and districts in the park represent the activities of the National Park Service or the park’s concessioners. These resources, which include some of the nation’s best examples of blending rustic architecture and other built features with a national park setting, are located at Rim Village and at park headquarters in Munson Valley.

Historic Structures/Buildings Listed in the National Register of Historic Places

Rim Village. Rim Village Historic District was listed in the National Register of Historic Places in 1997. The historic district, which includes seven contributing structures and other individual features that comprise a designed historic landscape in terms of form and function, are listed under Criterion A for their association with the historical development of Crater Lake National Park and Criterion C for their association with site planning and design by NPS landscape architects and as outstanding examples of rustic naturalistic design in the areas of architecture and landscape architecture. The structures and features were constructed over a 15-year period beginning in 1921.

The seven historic structures in Rim Village are: Crater Lake Lodge, Sinnott Memorial Building, Plaza Comfort Station, Comfort Station behind the Cafeteria (Comfort Station No. 4), Kiser Studio,

Community House, and a crenelated stone masonry wall that delineates the promenade and creates a parapet with three observation bays of varying configurations that extend into the caldera.

Individual features that are historically important to the rustic character of the designed landscape at Rim Village are listed by category. The features listed under the circulation category include roads and parking areas (vehicular circulation) and walkways and four hiking trails (pedestrian circulation) which begin at various points in the district. A promenade extending 3,450 linear feet along the edge of the caldera is the primary pedestrian circulation system for Rim Village. The features listed under vegetation include planting concepts, which illustrate the philosophy behind all plantings in the district, and plant materials, which are the material forms of that philosophy. Small scale features include a variety of detail elements — free standing boulders, stone benches, and masonry details, such as steps and curbing.

Munson Valley. The Crater Lake superintendent’s residence at Munson Valley was designated a national historic landmark (NHL) in 1987 because it is an outstanding example of rustic architectural design. According to the National Park Service’s *Architecture in the Parks National Historic Landmark Theme Study* (1986), the superintendent’s residence “remains an architectural gem – a remnant of an ambitious development project that gave a strong architectural identity to a large park.”

The Munson Valley Historic District, which contains the park headquarters area, was listed in the National Register of Historic Places in 1988 under criteria A and C. This nomination designated 18

buildings that contribute to the significance of the district. The structures, which represent prime examples of rustic architecture, were built between 1926 and 1949, although most were designed and constructed between 1928 and 1933. Subsequent landscape analyses have expanded on the significance of this district as a designed landscape and have established its historical significance under national register criteria A, B (for its association with significant persons), C, and D (for the significant information it has yielded or may be likely to yield).

The 18 historic structures that contribute to the significance of the historic district include: administrative building, ranger dorm building, mess hall, warehouse, machine shop, meat house, superintendent's residence (national historic landmark), naturalist's house, six employees' residences, stone woodshed/garage, hospital, transformer building, and comfort station.

Watchman Lookout Station. The Watchman Lookout Station, located on an 8,000-foot peak on the west side of Crater Lake, was listed in the National Register of Historic Places in 1988 under criteria A and C. Constructed during 1932 and designed as both a museum and fire lookout, the building is a unique example of rustic architecture as applied to a specialized building type. The National Register boundary extends 200 feet away from the lookout and trailside museum in all directions.

Historic Structures/Buildings Considered/Determined Eligible for Listing in the National Register of Historic Places

Rim Drive. In June 2003 the Oregon state historic preservation officer determined that Rim Drive was eligible for listing in the National Register of Historic Places. More specifics concerning contributing and non-contributing features will be available as work on the current Rim Drive cultural landscape report and a related corridor management plan for the Volcanic Legacy Scenic Byway continues. Structures and features that contribute to Rim Drive's significance include the roadway's width and right-of-way, embankments, slopes, associated turnouts, and stone retaining and parapet walls. Contributing features included several trails (Castle Crest Wildflower, The Watchman, Mount Scott, Sentinel Point, and Discovery Point) already listed in the cultural landscape inventory.

Jacksonville-to-Fort Klamath Military Wagon Road. In June 2003 the Oregon state historic preservation officer determined that the Jacksonville-to-Fort Klamath Military Wagon Road was eligible for listing in the National Register of Historic Places. The Jacksonville-to-Fort Klamath Military Wagon Road was constructed in 1865 to improve transportation routes in the region. An intermittent, but still ongoing, archeological survey is aimed at documenting features of the main route and spurs totaling some 22 miles in the national park. The main route of the military wagon road parallels State Highway 62 in places, but some segments veer some distance away from the highway, especially the spurs to Rim Village and Thousand Springs. Segments of the historic road are observable in or near various developed areas of the park,

including Rim Village, Munson Valley, the abandoned Annie Spring campground, and Mazama Village. Potential character-defining features include roadbed segments, retaining or embankment walls, blazed trees, campsites, and artifacts associated with use of the road between 1865 and 1915.

Munson Valley Road. In June 2003 the Oregon state historic preservation officer informed the National Park Service that it appears likely that the Munson Valley Road is eligible for listing in the National Register of Historic Places as a linear historic district and that bridges associated with the road should be evaluated as contributing or non-contributing within that district. The Munson Valley Road extends from Annie Spring to Rim Village and is the same road described as the South Entrance Road in this document.

CULTURAL LANDSCAPES

To date the National Park Service has identified 13 cultural landscapes in Crater Lake National Park that are considered potentially eligible for listing in the National Register of Historic Places. These landscapes include what are referred to as “parent” landscapes and “component” landscapes:

Parent/Component
 Annie Spring
 Lost Creek Campground
 Munson Valley/Castle Crest
 Wildflower Trail, Munson Valley
 (Bridle) Trail, Superintendent’s
 Residence
 Rim Drive/Grayback Road, Mount
 Scott Trail, The Watchman
 Rim Village/Garfield Peak Trails
 Wizard Island

Of these landscapes, Munson Valley, Rim Drive, The Watchman, Castle Crest Wildflower Trail, and Rim Village have been documented with a preliminary statement of significance and an existing conditions site plan. The superintendent’s residence has been documented with a history narrative, full statement of significance, analysis and evaluation, and a consensus determination of eligibility by the Oregon state historic preservation officer. The aforementioned landscapes are in fair condition with the exception of the Castle Crest Wildflower Trail that is considered to be in good condition and the Lost Creek Campground and Rim Village landscapes which are considered to be in poor condition.

MUSEUM COLLECTIONS

The Crater Lake National Park museum collection consists of more than 200,000 objects divided into two major components — the natural history collection and the cultural collection. The natural history collection consists of biological and geological objects, while the cultural collection consists of archeological, ethnological, historical, and archival objects.

Lack of storage and workspace meeting National Park Service museum standards continues to frustrate efforts to improve care of and access to the collections. Due to limited staffing, the cataloging backlog continues to increase.

Natural History Collection

Collection and maintenance of documented natural history specimens and all associated records in the museum collection are designed to support the park’s research/resource management and interpretive programs. The natural history

collection includes representative specimens of taxa found in the park, voucher specimens, and environmental monitoring samples. Currently, no paleontological resources have been identified. Hence, the natural history collection is comprised of biological and geological specimens.

Biological Objects. The biological collections include Monera and Protista, plants and fungi, and animals. Collections made of the Monera and Protista, such as phytoplankton samples obtained in association with the park's lake research, comprise a significant part of the park's museum collection.

The Applegate Collection, the core of the park's vascular plant herbarium, represents the baseline for the park's vascular plants. In addition, the park's museum collection includes ecosystem collections of plants and fungi from research projects in the park's Sphagnum Bog and Pumice Desert areas and mosses collected during lake research projects since the 1930s. The museum collection contains more than 2,000 herbarium sheets containing some 6,000 botanical specimens.

The animal collection contains more than 220 specimens of mammals, representing approximately 70% of the 52 mammal species known to occur in the park. The bird collection contains more than 215 specimens, representing approximately 70% of the 112 bird species known to occur in the park. The reptile and amphibian collection contains more than 375 specimens, representing all of the 14 reptiles and amphibians known to occur in the park. The fish collection contains more than 60 specimens, representing all of the five fish species known to occur in the park. The insect and arachnid collection

contains about 1,500 insect and arachnid specimens representing approximately 750 taxa. In addition, the museum collection contains some 340 zooplankton samples and about 40 specimens of other invertebrates.

Geological Objects. The park's museum collection stores some 420 geological specimens onsite. These consist of representative samples of rock types and formations exposed in the park. The U.S. Geological Survey (USGS) office in Menlo Park, California, currently maintains the samples collected by and for Dr. Charles Bacon's continuing research on the national park's geologic history. Due to the size of the collection, it will continue to be stored and used outside the park unless a more suitable facility is found. Evidence indicates that other USGS research has resulted in the collection of geological specimens, in particular collecting done by Dr. Hiroki Kamata of the Vancouver, Washington, office. An estimated 2,000-plus, uncataloged geological specimens collected under previous collection permits are housed by USGS in offsite repositories.

Cultural Collection

The purpose of the cultural collection is to preserve a portion of the national park's cultural heritage and to increase knowledge and appreciation of that heritage through park research, exhibits, and interpretive programs. This collection contains materials from the disciplines of archeology, ethnology, and history (which includes archival/documentary material, photographs and negatives, decorative and fine arts, and historic objects).

Archeological Objects. The museum collection contains more than 20 archeological objects, all occasional finds,

which are primarily prehistoric and of mineral composition.

Ethnographic Objects. The museum collection contains several ethnographic objects — baskets of unconfirmed tribal origin, possibly from the Rogue River region.

Historical Objects. Museum archival and manuscript collections include personal papers, organizational archives, assembled manuscript collections, resource management records, and subofficial records.

The national park's museum collection contains the assembled collection and personal papers of William Gladstone Steel, generally considered to be the park's founder. This collection forms the core of the archival materials already in the museum collection. The Francis G. Lange Collection contains blueprints, tracings, drawings, sketches, correspondence, and photographs that highlight the rustic architecture at Crater Lake and other parks. While the museum collection currently does not contain any organizational records, the archival collections of the Crater Lake Natural History Association, Crater Lake Community Club, or Mazamas would be appropriate collections to consider for inclusion. The museum collection currently contains more than 500 photographs and negatives, some 170 lantern slides, and more than 100 booklets/handbills/reports compiled by various collectors. The museum collection also contains the theses of several individuals who completed research in the park. A large quantity of resource management records (defined as vital non-official records generated by NPS employees, volunteers, contractors, cooperating associations, and other

institutions to record information on cultural and natural resources for the purposes of reference or exhibition) that should become part of the museum archives is stored elsewhere in the park as well as at offsite locations. The museum collection contains some subofficial records (defined as copies or duplicates of documents that are useful for reference, administrative histories, interpretation, and research) as a portion of the collections of past NPS employees. The museum collection contains 13 paintings and 20 framed photographs relating to historical figures and scenic views associated with the park's history. The museum collection contains some 30 historic objects, including Steel's signature stamp, wooden benches constructed by the Civilian Conservation Corps, conference table, and parts of the "Cleatwood," the first boat used by explorers on the lake.

LIST OF CLASSIFIED STRUCTURES

The List of Classified Structures (LCS) is a computerized, evaluated inventory of all historic and prehistoric structures having historical, architectural, or engineering significance in which the National Park Service has or plans to acquire any legal interest. Included are structures that individually meet the criteria of the national register or are contributing resources of sites and districts that meet national register evaluation criteria. Also included are other structures — moved, reconstructed, and commemorative structures as well as structures achieving significance within the last 50 years — that are managed as cultural resources, because of management decisions that have been made pursuant to the planning process.

The following structures (with the exception of the Stone Walls Around Reservoir, Garfield Peak, all of these

structures are individually listed in, or determined eligible for listing in, the national register or they are listed as contributing resources of national register-listed sites and districts) are listed in the park's LCS. These include

Rim Village

Sinnott Memorial and Sinnott
Memorial Plaque
Kiser Studio
Crater Lake Lodge
Mather Memorial
Stone Guard Rail Behind Lodge
Stone Curbs and Parapet Walls
Stone Stairs in Auto Parking Area
Walls and Stairs to Sinnott
Memorial
Plaza Comfort Station
Comfort Station behind the
Cafeteria (Comfort Station No. 4)
Community House

Munson Valley

Administration Building
Ranger Dormitory
6 Employee's Residences
Superintendent's Residence
Meat House
Mess Hall
Road Culvert Head Walls
Trail Bridge
Rock Walls
Lady of The Woods

Naturalist's Residence
Comfort Station
Machine Shop
Transformer Building
Garage and Woodshed
Hospital
Warehouse

Rim Village and Munson Valley
5 Drinking Fountains

Rim Drive

Stone Retaining Walls and Pull-
outs

Watchman Peak

Watchman Fire Lookout
Stone Parapet Walls and Trail
(Watchman Lookout)

Garfield Peak

Stone Walls Around Reservoir

As a result of recently conducted condition assessments, possible additions to the LCS include the Wineglass Patrol Cabin (constructed in 1934) and the Mount Scott Lookout (constructed in 1952). Because the Goodbye Bridge (constructed in 1954) has been identified by personnel of the Historic American Engineering Record as the earliest glue-lam bridge in the national park system, it is likely that this structure will be added to the LCS in the future.

NATURAL RESOURCES

BIOTIC COMMUNITIES

The flora of Crater Lake National Park is typical of the vegetation found throughout the Southern Cascades. Generally, the vegetation of the region reflects a mosaic of forested areas and open non-forested areas. Climate, topography, soil development, and fire history all affect the composition and distribution of existing plant communities. Because of this natural species diversity, the park is regarded by many as a sanctuary for native forest and meadow communities, with limited introductions of non-native species. Approximately 20,250 hectares (50,000 acres) of late seral forest exist throughout the park. Fire suppression and historic logging activities have altered forest structure and species composition throughout portions of the park and surrounding areas.

Crater Lake National Park ranges in elevation from about 3,800 feet in the southwest corner of the park to just over 8,900 feet at Mount Scott. Most of the rim area is situated near the 7,000 foot elevation level, although, the Watchman and Hillman Peak areas on the western side of the lake are slightly in excess of 8,100 feet. Vegetation grades from a mixed conifer forest dominated by ponderosa pine at the south entrance to high elevation mountain hemlock and whitebark pine forest at the rim. Other forest types include lodgepole pine, white fir, Douglas fir, and shasta red fir.

Ponderosa pine forest principally occurs on the southeastern edge and northeastern corner of the park, up to elevations of 5,500 feet. The ponderosa pine is commonly associated with white fir and in the lower elevations with sugar pine and some Douglas fir. Along the margin of ponderosa pine communities, particularly

at meadow edges where cold air tends to have a large ecological effect, lodgepole pine may be found in association with ponderosa pine. The white fir forest is concentrated in the southern portion of the Park and has a major component of ponderosa pine, as well as sugar pine. Historic fires favored the survival of pines over white fir, and most of these stands, concentrated in the southern portion of the park, were historically dominated by ponderosa pine. The Douglas-fir type is not a common type in the park and occurs in relatively inaccessible areas in the southwestern portion of the Park, where it occurs in a complex mixture with red fir, climax lodgepole, and white fir forests. Increasing in elevation, lodgepole pine forest type sometimes covers vast areas and is found from 5,000-6,500 feet and is associated with shasta red fir and mountain hemlock.

Climbing still higher, to the very rim of Crater Lake, and up the slopes of the surrounding peaks, the forest becomes more scattered and the trees smaller and more stunted. Only a few species endure the low temperature, high winds, and deep snows at these altitudes, the principal ones being mountain hemlock, and white-bark pine. Mountain hemlock stands are the highest elevation continuous forests at Crater Lake and become dominant at about 6000 feet. Whitebark pine extends from about 7500 ft to the top of Mt. Scott, the highest point in the park (8,929 ft) and is more an open woodland than a forest. Whitebark pine is uncommon in the park and is in decline throughout its range due to a non-native pathogen that causes white pine blister rust in five-needle pines. Information is being collected throughout the Cascades Range that will help land managers to develop appropriate

management plans to provide for preservation of this species.

The abundant and diverse vegetation of the park constitutes a large block of relatively undisturbed habitat that supports various populations of native wildlife species. The park has significant populations of Roosevelt elk, black tail deer, pronghorn, coyote, and porcupine. Periodic sightings of black bear, pine marten, weasel, and mountain lion are reported in the summer months. A variety of other small animal species are seen in the backcountry of the Park.

Soil properties are integral components of determining the species diversity, productivity, and regenerative capacity of vegetation types. Therefore soil resources are also included in this impact topic. The Natural Resources Conservation Service (NRCS) completed inventory and mapping of the soils of Crater Lake National Park in 2001. Twelve soil types that fall into six general categories were identified within the park. The categories

are: 1) soils on uplands, formed in air-fall deposited ash and pumice; 2) soils on uplands, formed in air-fall deposited ash and pumice over glacial deposits; 3) soils in valleys, formed in ash flow deposits consisting of ash, pumice and cinders; 4) soils on cinder cones; 5) soils on upland meadows with intermingled forests; and 6) soils in seeps and on stream terraces. In general, the soils have a low water holding capacity and nutrient levels. These soil conditions combined with a short, relatively dry growing season make reestablishment of vegetation very difficult. Soils are in general not highly erodible.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

A number of species may be affected by the alternatives that are considered threatened or endangered in Oregon, that inhabit, or for which potential habitat exists in the park.

Table 5: Threatened, Endangered, and Sensitive Species

Species	Federal Status	State Status	Oregon Natural Heritage Program List*
Canada lynx <i>Lynx canadensis</i>	Threatened	Threatened	
California Wolverine <i>Gulo gulo luteus</i>	Species of Concern	Threatened	List 2
Pacific Fisher <i>Martes pennanti pacifica</i>	Species of Concern	Sensitive Species	List 2
Bald eagle <i>Haliaeetus leucocephalus</i>	Threatened	Threatened	List 2
Northern spotted owl <i>Strix occidentalis caurina</i>	Threatened	Threatened	List 1
Peregrine falcon <i>Falco peregrinus</i>		Endangered	List 2
Northern Goshawk <i>Accipiter gentilis</i>	Species of Concern	Sensitive Species	List 2
Bull Trout	Threatened	Sensitive Species	List 1

Species	Federal Status	State Status	Oregon Natural Heritage Program List*
<i>Salvelinus confluentus</i> (Klamath River and Columbia River population segments)			
Crater Lake rockcress <i>Arabis suffrutescens</i> var. <i>horizontalis</i>	Species of Concern	Candidate	List 1
Shasta arnica <i>Arnica viciosa</i>			List 2
Pumice grapefern <i>Botrychium pumicola</i>		Threatened	List 1

*List 1 contains taxa that are endangered or threatened throughout their range or which are presumed extinct. The status of taxa on this list represents its status throughout its range. List 2 contains species that are threatened, endangered or possibly extirpated from Oregon, but are stable or more common elsewhere.

Canada Lynx

The park has over 34,000 acres of potential Canada lynx habitat, consisting of a mosaic of old growth stands providing denning sites and lodgepole forest and meadow foraging habitat. Although the park has conducted three years of extensive surveys for Canada lynx in the park, none have been detected. There is evidence from the past suggesting that lynx previously foraged in the park. The Smithsonian Institute has a Canada lynx pelt in its collection that dates back to 1898. It was trapped along the Wood River just south of the park. Lynx sightings have been reported in the Klamath Basin as recent as 2000, but have not been verified with other substantive evidence such as photos, tracks, or hair.

California Wolverine and Pacific Fisher

These species all have large home ranges, are capable of moving long distances, tend to avoid areas with human activity or development, and require relatively undisturbed habitats that are uncommon outside of the park. Because of large-scale loss of natural habitats throughout both species' ranges, the high-elevation

coniferous forests of Crater Lake that provide forage, denning, and travel habitat for these small carnivores park may be important to their distribution and abundance in Oregon. Although information on these species is limited, old forest structure, including large woody debris for denning (both logs and snags), is an important structural characteristic of habitat for these animals. Ongoing surveys initiated over the past 5 years to determine if wolverines are present in the park have only detected pine martens, although a reliable sighting of a wolverine was made in 2000 by a state biologist visiting the park.

Bald Eagle

There is a historic nest site on Wizard Island, and one currently active nest site along the shoreline of Crater Lake. Tour boats are restricted from areas on the lake that are near the nest site. The Klamath Basin has over 70 eagle nest sites and these birds forage in the park. Bald eagles are observed in the Park from early spring, April or May, to fall, usually sometime in October. None are present during the winter months.

Northern Spotted Owl

This old-growth dependent species is at the eastern end of its range in Crater Lake National Park. There are approximately 32,260 acres of lower elevation mixed conifer forests that are considered suitable spotted owl habitat in the Park. This habitat is found in patches throughout the park, with higher density of patches and larger patch sizes southwest of a diagonal line connecting the northwest and southeast corners of the park. All currently known nest locations have been found within areas identified as potential habitat on the west and south sides of the park, but occasional sightings have been documented outside of these areas. The park conducts an annual monitoring program to assess the nesting and reproductive status of owl pairs living in the park. Since 1992, 17 owl pairs have been tracked.

Northern Goshawk

This hawk is rare in Crater Lake National Park. Little is known of the specific habitat requirements for goshawks in Crater Lake National Park but the following general forest management activities are helpful in conserving habitat for Northern Goshawks: (1) retain the upper canopy trees at known or suspected nest sites; (2) retain down wood and logs for prey, particularly squirrel species; and (3) manage stands for understory removal and canopy retention.

Peregrine Falcon

Peregrines nest on cliffs, often near water and forage on a diverse avian prey base. Most habitat and reported activity in the park are from within the caldera. One active peregrine nest site exists within the caldera. Tour boats are restricted from

areas on the lake that are near the nest site. There are many potential nest sites available on the cliffs in the caldera. The park conducts annual monitoring of falcon habitat, to determine relative abundance within the park.

Bull Trout

The bull trout is the only known fish species native to Crater Lake National Park. Bull trout are located only in Sun and Lost Creeks. Annie Creek is also within this species range and is considered bull trout habitat, although bull trout do not currently occur there. The park has an active restoration program in progress. This program has resulted in elimination of non-native brook trout from Sun Creek 2000. Follow-up surveys indicate that bull trout are responding well in the wake of their restoration in the creek.

Pumice Grapefern, Shasta Arnica, and Crater Lake Rockcress

All three plants occur in isolated populations along the rim. Pumice grapefern is endemic to raw pumice-gravel substrates which are subject to harsh climatic extremes (intense sunlight, dessicating winds, cold nights, etc.). Shasta arnica occurs on dry talus slopes of the rim, often with an eastern aspect. Crater Lake rockcress is found in dry, rocky pumice and intermixed with sparse, open, mountain hemlock forest.

WATER RESOURCES

Crater Lake is near the midpoint of the Sierra Cascade Mountain province of the Pacific mountain system. The park is influenced by Pacific Ocean weather. The majority of storm fronts that pass the north Pacific Coast each winter will result in moisture at Crater Lake. Summer

weather is generally mild with clear skies except for occasional thunderstorms, which seldom occur with enough force or volume to produce damaging rains or hail. Daytime summer high temperatures usually range from 60°F (15°C) to 70°F (21°C) and seldom exceed 85°F (29.4°C). Approximately 70% of the annual precipitation falls from November through March, with less than 6% from June through August. During the dry months — June, July, and August — an average of only five days will have precipitation greater than 0.10 inch. Snow has fallen every month of the year. Annual snowfalls can total over 800 inches, and long-lasting snow depths of 100 to 200 inches accumulate.

Waters from the slopes of Mt. Mazama flow into the Klamath, Rogue, and Umpqua River Systems. Runoff channels are broad and poorly defined with rounded contours. This is because surface runoff in the Park from rain and melting snow is negligible. Water sinks almost immediately into the porous volcanic soils and glacial debris and is released only slowly through evaporation, plant use, seeps, and a few springs, some of which emerge within the caldera and flow directly into the lake.

Annie Spring, near the Mazama campground, has been the park's water supply since 1976. Water is pumped from the spring to storage facilities at Rim Village, Mazama Village, and Munson Valley. The source of water for Annie Spring is shallow groundwater originating as snowmelt; the spring's output is reduced during years when the winter snowpack is low (Century West Engineering Corporation 1994). The average low flow is about 1,565,000 gpd, or 2.4 cfs. Annie Creek joins with the Wood River and eventually flows into the Klamath River system south of the park.

Crater Lake

Crater Lake lies inside the caldera of Mount Mazama and is surrounded by steep-walled cliffs that range from 500 to 2,000 feet above the lake's surface. At 1,943 feet, it is the seventh deepest lake in the world and the deepest in the United States and noted for its extreme water clarity and deep blue color. The lake has no surface outflows and only minor surface groundwater inflows as springs along the caldera walls. The main source of water for the lake is precipitation, averaging 70 inches per year.

Results of the ongoing Crater Lake Long-Term Limnological Program indicate that Crater Lake is a complex and dynamic system. No unidirectional change in the parameters monitored (lake and spring water chemistry, nutrients, chlorophyll, primary productivity, phytoplankton, zooplankton, fish, water clarity, light penetration, and temperature) has been detected. The monitoring program has also provided valuable data and recommendations on a number of other management issues including the extent and significance of submerged hydrothermal resources (relative to a proposed geothermal power development along the park boundary), boat and automobile petroleum hydrocarbon inputs to the lake, water quality of springs entering the lake below developed areas along the caldera rim, and the potential impact of introduced fishes.

AIR QUALITY

Crater Lake National Park is a class I air shed designated by the 1977 Clean Air Act amendments. As a class I area, the park is subject to the most stringent regulations of any designation. Results from the park's air quality monitoring indicate that the

condition of the park's airshed is good, one of the cleanest airsheds in the U. S. There is relatively little impact from fine particulates and visibility is high. The elevation and geography make the park susceptible to winds, which tend to disperse particulates and other pollutants. The clean air allows spectacular views of the

surrounding Cascades and Klamath Basin. A major air quality concern is the pollutants from industrial areas introduced at Crater Lake in the form of acid rain and snow. These pollutants threaten both land and water resources, particularly the lake clarity.

VISITORS AND THE PARK

OVERVIEW

Visitors primarily come to Crater Lake National Park to view the lake. As one of the first national parks, Crater Lake was the focus of early NPS publicity efforts to promote visitation. Since the establishment of the park in 1902, Crater Lake has been accessible by automobile, and the park's road system has enabled visitors to drive to scenic destinations within the park, including Annie Spring, Munson Valley, and parts of the crater rim. In 1917 the Park Service issued an automobile guide map to the park's features and successfully promoted visitation to the park in combination with travel on the Southern Pacific Railroad. Early 20th century visitation to the park was also encouraged by the National Parks Highway Association with the development of an automobile tour path linking western national parks in a route that became known as the Park Highway. In combination with road accessibility the park also offered visitor accommodations at campgrounds and concessioner lodging which supported travel to Crater Lake National Park.

Visitation to Crater Lake National Park in the early years was restricted by the relative isolation of the park and the long snowy winters that limited the travel season to a few short months in the summer. Due to heavy snow loads, roads into the park were often not in condition for regular travel until July or August and were frequently closed by October. With the development of Rim Village at the crater in the 1920s, visitation to the park steadily increased. It was possible to drive

completely around the lake beginning in 1918 and visitors did so while the Rim Drive was being built. In the winter of 1935 1936, the highway into the park from Medford and Klamath Falls was kept open, making the park accessible to motorists the entire year for the first time in the park's history. In the late 1930s, the Rim Road was extended and improved enhancing the visitors' drive around the lake during the summer months. Weather continues to play a role in determining the extent of park visitation and shaping the visitor experience.

The number of park visits continued to increase in the years before World War II, and visitor use of the park expanded to include winter snow play as well as summer season activities of nature-viewing, camping, hiking, and auto-touring. Following the war, as visitation to the park returned to pre-war numbers, improvements were made to the park's roads and to visitor accommodations. Annual park visitation reached a plateau of 500,000 in the early 1960s but can fluctuate as much as 25% from year to year. Visitation did reach a high near 700,000 in the 1970s. In 2000 park visitation was 432,993.

Based on a continuation of existing trends in visitation, the number of visitors to the park is expected to increase slightly over the long term and continue to fluctuate from year to year. It is anticipated that the bulk of visitation to the park will continue to occur in June, July, and August and that most visits would continue to be less than four hours in duration. Any increase in annual visitation would likely result in more visitors during peak-use days within the peak period, and would continue to be concentrated between 10:00 A.M. and 4:00

P.M. Developed areas in the park, including Mazama Village, Munson Valley, and Rim Village, would continue to be popular and could see increased use. Increases in annual visitation could also result in more visitor use on off-peak days. There could also be more visitation during the limited spring and fall shoulder seasons.

Crater Lake National Park is a vital element in the regional recreational environment. Many high quality recreational opportunities are available in or near the park and many visitors stop at the park as part of a north-south automobile trip. Seventy-five percent of visitors polled in the 2001 visitor survey said their primary reason for visiting the area was to visit Crater Lake National Park (*Crater Lake National Park Visitor Study*, 2001). The most common sources of information visitors use to plan a visit to Crater Lake National Park are travel guides and tour books as well as word of mouth. Three major rivers, the Rogue, Klamath, and Umpqua Rivers, flow through the region. To the east of the park seven wildlife refuges are located in the Klamath Basin. The area offers summer and winter attractions, including cultural events, boating and rafting, hiking, fishing, hunting, and skiing. Regional visitors tend to visit other areas for specific activities, but include Crater Lake in their itinerary.

WHO VISITS THE PARK AND WHEN THEY COME

In the summer of 2001, the University of Idaho Cooperative Park Studies Unit gathered demographic information about visitors to Crater Lake National Park. The survey was conducted August 3rd through the 9th in the summer of 2001. A total of 656 visitor groups were contacted, 600 of these groups agreed to participate in the survey, and 484 questionnaires were

completed and returned for a response rate of 80.7%. The study found that a majority of visitors (71%) were from the states of Oregon, California, and Washington. International visitors represent 3% of the total park visitation. Slightly over one-third (36%) of international visitors to the park are from Canada. The majority of visitors surveyed (65%) indicated that they were either first-time visitors to the park or had not visited the park within the past two to five years. Over half of all visitors to the park (59%) are older than 36 years of age. Children, ages 15 or younger, representing a fifth (20%) of the visiting public. At least 70% of visitors to the park identified themselves as family groups, 14% as friends, and 8% as being by themselves. Less than 2% of park visitors indicated that they were with a guided tour group.

The 2001 survey found that Crater Lake National Park is principally a day use area. Eighty-one percent of visitors to the park spend less than a day. For most visitors, the park is a stopover rather than a terminal destination area, however, 75% of visitors indicated that Crater Lake National Park was the primary reason for their visit to the region and 39% of respondents stay at least one night outside the park. Visitation to the park is highest between Memorial Day and Labor Day. Fifty-six percent of visitors spend four or more hours in the park and 75% of all visits occur during a five-hour period in the middle of the day (10:00 A.M. to 3:00 P.M.). Weather restricts access to the park during the winter months. Rim Drive is closed by snow usually from mid-October to early July. Vehicle access during the winter is maintained only from the south and west on Route 62 to Rim Village. Road closures, particularly between Munson Valley and the rim, are common during the

winter and closures of up to three days are not unusual.

DIVERSITY OF RECREATIONAL OPPORTUNITIES

The 2001 visitor survey profiled Crater Lake National Park visitors to better understand the experiences that visitors sought and attained. Information was gathered on what activities visitors engaged in, places visited, areas of the park visited, the use and importance of interpretation and park orientation, visitor facilities and services, and the importance of selected visitor experience values.

The 2001 survey found that the most common visitor activities are scenic driving (94%), viewing Crater Lake (71%), and photography (63%). The least common activity is overnight backpacking. Other visitor activities included swimming, shopping, watching the orientation film at the visitor center, and hiking down to the lake at Cleetwood Cove. The most common activity during the winter is cross-country skiing and the least common winter activity is snowshoeing. The most visited places in the park are Rim Village (85%), West Rim Drive (70%), and Rim Village Visitor Center (61%). East Rim Drive receives about 25% less use than the West Rim Drive. Grayback Motor Nature Trail is the least used road. During the summer, there is moderate use of the short interpretive trails along the crater rim. Hiking, taking the boat tour, viewing the lake, picnicking, attending ranger-lead activities, nature study, and overnight backpacking were identified as less important, but desired activities for future visits to the park.

VISITOR ACCESS AND CIRCULATION

For the majority of visitors park roads mold and define the visitor experience. The 2001 visitor use survey indicates that Crater Lake National Park is primarily a day use area for approximately 81% of its annual visitors and that a stop at Crater Lake is a part of a north-south auto trip. Most visitors arrive at the park during the summer months and auto touring remains the predominant visitor activity. In the summer, automobile access to Crater Lake National Park from the north is via Oregon Route 138, from the south the park is reached via Oregon Route 62 from Medford and Klamath Falls.

The park entrance at Annie Spring is 76 miles from Medford and 56 miles from Klamath Falls. The most used entrance into the park is the South Entrance Road from Highway 62, followed by the North Entrance from Highway 97. The most used exit from the park is the North Entrance to Highway 97. Both the south and north access roads lead to Rim Drive, a 33-mile road encircling the caldera rim. Numerous pullouts and/or parking areas along Rim Drive provide scenic lake views. The Pinnacles Road is a 6-mile spur road from Rim Drive that leads to an area of volcanic spires known as The Pinnacles. The 10-mile North Entrance road crosses the Pumice Desert. The 4-mile South Entrance road follows Annie Creek Canyon. The 3.5-mile gravel surfaced Grayback Drive diverges from East Rim Drive at Vidae Falls, crosses Grayback Ridge, and connects with the Pinnacles Road at Lost Creek Campground.

Rim Drive at Crater Lake National Park is linked to other Cascade Mountain volcanic areas by its 1997 designation by the Oregon Department of Transportation

as part of the Volcanic Legacy Scenic Byway. The Volcanic Legacy Scenic Byway joins the Shasta Volcanic Scenic Byway at Highway 97 at the Oregon border. These scenic byways connect Crater Lake National Park with Lassen Volcanic National Park in Shasta County, California and extend the “volcano to volcano” connection. In 1998, the Federal Highway Administration named Rim Drive an All-American Road. Rim Drive receives one of the highest visitor uses in the park. During the summer months scenic pullouts and parking areas along Rim Drive can become crowded. Parking areas subject to crowding include Cleetwood, Phantom Ship Overlook, and the Watchman. Because it is located at the only access point to the lakeshore, Cleetwood Trail parking is especially prone to congestion because boat tour participants and hikers compete for parking spaces. Parking at Rim Village and Mazama Village is also congested during the summer months.

Almost one-half of visitors (48%) participating in the 2001 survey said it was unlikely that they would be willing to ride a shuttle bus rather than drive their own vehicle on Rim Drive. Forty-six percent of the visitors said they would be willing to ride a shuttle bus around Rim Drive if it included a park interpreter to inform them as they traveled around the lake. Although most visitors indicated they had not visited Crater Lake in the winter, 51% said they would be willing to pay a modest fee to take an over-snow vehicle to the rim in winter.

Visitors can access a minimally altered environment from frontcountry trails. The main access to the backcountry is from the Pacific Crest Trail that bisects the park north to south. The park has approximately 20 miles of frontcountry hiking trails, most of which are accessed

from Rim Drive. Crater rim trails ascend Garfield Peak, the Watchman, and Mount Scott, which is the highest point in the park. There is moderate use of these frontcountry trails. The one-mile Cleetwood Trail receives more use than other rim trails because it provides the only access to the lake. Other short interpretive trails are located near Mazama Village at Godfrey Glen and Annie Creek. A short trail at Munson Valley, the Castle Crest Trail, introduces visitors to park flora. There is also a park headquarters historic walking tour available that involves a loop trail that goes past the Lady of the Woods. Twenty-six miles of the Pacific Crest Trail traverse the park. The Pacific Crest Trail and the Bald Crater Loop trail are the only trails in the park that allows stock use.

Backcountry trails, most originally built in the 1930s, crisscross the backcountry connecting with the Pacific Crest Trail. The most commonly hiked trails in the park are Cleetwood Cove Lake Trail, Watchman Peak, and Castle Crest Wildflower Trail. The least hiked trail is the Munson Valley Historical Trail. Other trails receiving moderate use are Wizard Island, Rim Trail, Sun Notch, and Pinnacles Trail (NPS, Crater Lake NP Visitor Study, 2001). Park facilities accessible to visitors with disabilities include road scenic pullouts, the visitor information building, and some frontcountry trails, primarily at Rim Village.

Boat tours on the lake were initiated in 1907 to provide an opportunity for visitors to better experience the lake and caldera. The boat tour operation was moved from the Rim Village area to Cleetwood Cove in 1960 to take advantage of a less steep grade and a southern exposure for the access trail to the lake. The Cleetwood Trail is about a mile long and provides the only access to the lake. From mid to late June

through September the concessioner offers 1 ½ hour commercial boat tours of the lake accompanied by an NPS interpreter. The boat tour begins at Cleetwood Cove and circles the inside of the caldera with a stop at Wizard Island and a close-up look at a rock formation in the lake known as Phantom Ship. The concession-owned tour boats accommodate 48 passengers. There are seven boat tours a day. Limited parking for the tours is available at the rim, however the Cleetwood parking lot is often congested and many visitors park along Rim Drive when spaces in the parking lot are unavailable.

Access to winter recreational opportunities at the rim, including cross-country skiing and snow play on unplowed roads, occurs during the winter months. The Munson Valley Road to Rim Village is kept open during the winter months. Rim Village remains the focal point of visitor activity; however snow levels usually reduce lake-viewing opportunities. Viewing the lake from Rim Village in winter can be difficult because of snow levels and accumulated snow from plowing operations. Currently a large metal pipe culvert is placed on supports at the edge of the rim to create a tunnel through the snow bank allowing visitors a view of the lake. In heavy snowfalls the viewing window on the culvert can become obstructed. Snowmobiles are permitted on the North Entrance road. A snowmobile study conducted at the park in 1997 estimated that about 3,500 snowmobile visitors entered the park from November to April that year. The park issues incidental business permits for snowmobile and snow-cat tours along the North Entrance Road, as well as for cross-country skiing operations within the park.

EDUCATION/INTERPRETATION AND ORIENTATION

Education/interpretation and orientation to the park are provided throughout the year, however most interpretative activities occur during the summer. During the summer passive interpretation is provided at observation areas along the rim. Sinnott Memorial, on a precipitous cliff overlooking the lake, provides visitors with unobstructed views of Crater Lake. Interpretive talks are presented here during the summer. Two visitor centers, one at Munson Valley and one at Rim Village, provide orientation to the park during the summer. Interpretive activities also take place on boat tours operated by the park concessioner, and on ranger-led walks and talks on frontcountry trails and at a campground amphitheater.

Education/interpretation and orientation opportunities at the park are reduced during the winter. Winter orientation to the park is provided at the Visitor Information Building at Munson Valley. The only visitor facility open year-round at Rim Village is the concessioner - operated cafeteria. Interpretative outreach programs are conducted throughout the year, with a primary focus during the winter when programs are made available to schools.

SOUNDSCAPES AND SCENIC QUALITY

The 2001 visitor survey asked respondents to rate the importance of ten selected park attributes. Attributes that received a high importance rating include natural quiet / sounds of nature and solitude. Eighty-nine percent of respondents to the 2001 visitor survey indicated that natural quiet and sounds of nature were either very or extremely important park attributes that

should be considered in preservation planning for Crater Lake National Park. Seventy-five percent of participants stated that solitude was either a very or an extremely important park attribute. The predominant visitor activity at Crater Lake National Park is lake viewing. Ninety-four percent of respondents reporting sightseeing and scenic driving as very important activities during their visit. In addition, 63% of visitors indicated that sightseeing and scenic driving would be important parts of any future visits to the park.

Expansion of parking at Rim Village has resulted in an expanse of asphalt and a concentration of visitors at the rim. During the summer pedestrians at Rim Village are constantly exposed to the sight, sound, and smell of vehicle traffic and must cross

traffic lanes and parking areas to reach lake viewpoints and scattered facilities. Rim Drive hugs the caldera rim for much of its length although there are quite a few stretches where a view of the lake is not possible from the road. Development of the Rim Drive and its associated overlooks and pullouts at The Watchman, North Junction, Steel Bay, Cleetwood Cove, Grotto Cove, Skell Head, Cloudcap Overlook, Cottage Rocks, Sentinel Point, Reflection Point, Kerr Notch, Phantom Ship Overlook, and Discovery Point has concentrated lake-viewing opportunities and trail access to a few areas. Excellent opportunities to experience natural soundscapes and scenic views are abundant in the backcountry, but a view of the lake is always shared with the sight and sounds of motor vehicle traffic.

OPERATIONS

PARK OPERATIONS

Crater Lake National Park is managed by a park superintendent headquartered at Munson Valley. The superintendent is responsible for the day-to-day operations of the park and is supported by a concessions manager and secretary. Management of the park is organized into the following divisions: administration, resource and visitor protection, resource preservation and research, maintenance, and interpretation / cultural resources. Staff in each division is stationed at park headquarters. Satellite offices are also maintained by some divisions at Klamath Falls and at Ashland.

Administrative functions, including payroll, budget and finance, procurement, contracting, property management, information technology services, and human resources, are accomplished at park headquarters. There are eight administrative personnel.

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, resolving disputes, providing emergency medical services, fighting structural fires, managing visitor use in the park, building and maintaining trails, educating visitors about park resources, and performing search-and-rescue activities. Staff in this division also participate in resource management activities, including fire and wilderness management. There are 12 permanent resource and visitor protection staff employees. Another 35 seasonal employees work for the division during the summer months, and about 50 volunteers

support the work of this division throughout the year.

The Resource Preservation and Research Division is responsible for preserving and managing the natural resources of the park and coordinating scientific research. They are responsible for resource inventory, monitoring and evaluation, impacts mitigation, restoration, and wildlife management. Facilities necessary to support resources management activities and programs include office and storage space, vehicle parking, and employee housing. Eight permanent or term and approximately 10 seasonal Crater Lake employees are currently assigned to the Resource Preservation and Research Division. Several of the natural resource management staff also work at offices in Klamath Falls and Ashland, Oregon.

Maintenance staff conducts preventive and corrective maintenance on park infrastructure and equipment. Park infrastructure includes water, wastewater treatment facilities, electric utilities, roads, parking, campgrounds, administrative and public buildings and structures within the park, and employee housing. All maintenance operations are based in Munson Valley.

The Maintenance Division includes the following functions:

- Buildings and utilities function maintains structures, housing, campgrounds, and park utility infrastructure.
- Roads function has responsibility for preventive and corrective maintenance on NPS administered roads. An important function of this branch is snow removal on park roads and responsibility for equipment maintenance.



Facilities that support the needs of the maintenance staff include equipment and replacement parts storage, vehicle maintenance and repair shops, parts and supplies storage, warehouse facilities, boneyards, and office space. Approximately 20 permanent and 20 seasonal employees are currently assigned to the Facilities Management Division.

Interpretation and Cultural Resources Management staff facilitates connections between the public and park resources through programs, exhibits, written material, and the park's website. This staff also provides for the preservation and management of the park's cultural resources, including historic structures, cultural landscapes, museum and archives collection, and archeological sites.

Interpretive programs are presented in the park on a regular schedule during the summer months, and educational outreach programs are conducted throughout the

year. Summer programs include ranger-led walks, talks, boat tours, and children's activities. Snowshoe walks are conducted for the public and school groups during the winter.

Facilities associated with interpretive programs include two visitor centers, one public museum with interpretive exhibits, one building for hosting programs and exhibits, and one amphitheatre. Other facilities include the park library and the museum and archives collection. One employee provides division management and is split between the disciplines of interpretation and education and cultural resources. Two full-time employees are currently assigned to interpretation and education, while the park historian and museum curator focus on cultural resource functions. Typically this division hires approximately 12 seasonal interpretive employees. A seasonal archeologist is hired when project funding is available.

CONCESSION OPERATIONS

All concession facilities and services at Crater Lake National Park take place at Rim Village, Mazama Village, and Cleetwood and are operated by a private concessioner. The park's concessioner is Xanterra Parks and Resorts. Snacks, meals, and gifts are sold daily in Rim Village. During the summer season at Mazama Village, camper supplies, gifts, and snacks are sold. The summer season concession operations is generally from mid-May through mid-October. Depending on snow conditions, the concessioner may open earlier in the spring or stay open later in the fall. Traditionally, the concessioner generates more than 90% of its total sales during the summer season. In the winter, most concessioner facilities are closed by heavy snow. Although the road to Rim

Village is maintained and plowed by the park, the low visitation and frequent weather closures necessitate the reduction in the level of service at the rim. The cafeteria and gift shop, located in one multipurpose building, offer limited food and gift shop services, and also serve as the concessioner warehouse and storage facility. Winter hours at the Rim Village cafeteria and gift shop are 10:00 A.M. to 4:30 P.M. snow conditions permitting. No concessioner-provided lodging is available in the park during the winter.

Crater Lake Lodge, located at the crater rim, offers summer season accommodation and dining from mid-May to late September or mid-October. The lodge has 71 guestrooms and a 78-seat restaurant and bar. The concessioner employs approximately 240 staff, many of whom are housed in an employee dormitory on the east side of Rim Village. The concession operation at Mazama Village includes operation of the 213-site Mazama Campground and a camper services building providing a grocery and sundries store for camper supplies, coin-operated public showers and laundry, a commercial laundry, and limited snack food services. The store at Mazama Village is open from early June to mid-October. The camper services building serves as the concessioner's only laundry facility for the lodge and the concessioner-constructed 40-unit Mazama Village Motor Inn. Other concession-operated visitor services at Mazama Village include a gasoline station. Like Rim Village, Mazama Village is open only in the summer. Lodging at the motel is available from early June to mid-October.

Cleetwood is on the north shore of Crater Lake and is accessed from Rim Drive. It is about 6 miles east of the North Junction where Rim Drive intersects the North

Entrance Road. Cleetwood includes a parking area, a nonpermanent ticket sales structure, and a portable restroom at the rim. A trail descends the side of the caldera to the lake. The concessioner offers commercial boat tours of the lake accompanied by NPS interpreters. The concessioner owns and operates three 48-passenger boats from mid- to late June through mid-September. There are seven scheduled boat tours, plus one trip to Wizard Island for passenger pickup. During the winter months the boats and other equipment are stored at docking facilities on Wizard Island.

PARK INFRASTRUCTURE AND FACILITIES

Crater Lake National Park's List of Classified Structures (LCS) includes 38 structures ranging from comfort stations to the Crater Lake Lodge. The LCS is an evaluated inventory of all historic and prehistoric structures that have historical, architectural and/or engineering significance within the park. Twelve listed structures are located at Rim Village. These include Kiser Studio Building, Sinnott Memorial, Comfort Station, Walls and Stairs to Sinnott Memorial, Sinnott Plaque, Stone Curbs and Parapet Walls, Stone Guard Rail behind Lodge, Mather Memorial Drinking Fountains, and Crater Lake Lodge. Twenty-two of the listed structures are located in the Munson Valley Historic District. These include the Administration Building, Ranger Dormitory (Steel Information Center), Mess Hall, Warehouse, Machine Shop, Meat House, superintendent's residence, Naturalist's Residence, six employee residences, garage and woodshed, hospital, Transformer Building, Comfort Station, and Lady of the Woods. Also located in Munson Valley is the main maintenance facility containing vehicle

repair and parking bays, shops, and equipment storage. Permanent housing is located at Steel Circle near the Munson Valley Historic District. There are seven duplex housing structures representing a total of 14 residences along Steel Circle as well as a community building. Across the South Entrance Road from Steel Circle is a group of eight duplexes with 16 residential units built in the 1970s and currently used primarily for seasonal housing known as Sleepy Hollow. Structures located on or near Rim Drive include Watchman Fire Lookout, Stone Parapet Walls and Trail at Watchman, and Stone Retaining Walls and Pull Outs along Rim Drive.

Annie Spring, located near the Mazama campground, has supplied high-quality water to the park since the 1870s. Water is pumped from the spring to storage facilities at Rim Village, Mazama Village and Munson Valley. The park operates three water treatment facilities. Two are located under the bridge near the Annie Spring water intake and one is located at Lost Creek Campground. The two Annie Springs water treatment facilities serve Mazama Village, Munson Valley, and Rim Village. The Lost Creek Campground water treatment facility serves only Lost Creek Campground. The park operates two sewage treatment systems. One is south of Steel Circle and serves Park Headquarters and Rim Village. This system has four lagoons. The second sewage treatment system is located southeast of the Mazama Dormitory Complex and serves all of Mazama Village.

This system has three lagoons. There is a septic system near Lost Creek Campground to serve Lost Creek Campground.

Crater Lake National Park has approximately 84 miles of roads. The road system within the park is generally in fair condition. The system has some safety and operational issues, including areas that are difficult to clear of snow. Seventy miles of primary roads, of which the circuit around the rim accounts for a little over 32 miles, comprise the bulk of the road system. Secondary and paved service roads in the park amount to about 14 miles. The primary roads in the park were designed and constructed to provide visitor access to the park's scenic features which are mostly concentrated along the rim of Crater Lake. In the winter snowplowing operations keep access to the rim open via Oregon Route 62 and the Munson Valley road to the rim.

There are 97 miles of maintained hiking trails in the park. Of this total, 77 trail miles are designated backcountry trails, including 33 miles of the Pacific Crest Trail (PCT) which bisects the park from north to south. The remaining 20 miles of maintained trails are front-country trails. In addition to the maintained trails, there are also 63 miles of unmaintained backcountry trails. Trails are only maintained during the summer months. In the winter, when Rim Drive is covered with snow, it is used for cross-country skiing and in effect becomes a designated winter-use trail.

SOCIOECONOMIC ENVIRONMENT

INTRODUCTION

Crater Lake National Park is located in southwest Oregon astride the Cascade Mountain Range. This rectangular shaped park is completely bordered by state and national forests. Rouge River National Forest abuts the park on the west and parts of the north and south sides. Umpqua National Forest forms the middle third of the park's northern boundary. Winema National Forest borders the park on part of the north, almost all the east, and middle part of the south border. Sun Pass State Forest on southeast completes the public forest encirclement. Sky Lakes Wilderness (part of the Rouge River and Winema National Forests) is on the southern edge of the park and Mount Thielsen Wilderness (part of the Umpqua and Winema National Forests) lies to the north.

Access to the park is via State Route 138 through the north entrance or by State Route 62 from the west or south. The road from the north entrance and the crater rim road are open only during the summer season due to heavy snows. Highway 62 is open year round. The Pacific Crest National Scenic Trail runs north and south through the park with side trails leading to Crater Lake.

Most of the park is contained in west-central Klamath County with small areas spilling over into Douglas and Jackson Counties. The communities in these counties are closest to the park's boundaries and serve as gateways to the park, providing a variety of goods and services for visitors to the park. The park's location makes the three-county area the economic region under consideration for this planning effort. Any socioeconomic

impacts from the action alternatives would have the most impact on these counties. Such impacts are marginalized farther from the park,

Klamath Falls is the county seat of Klamath County and is about 50 miles south of the park via route 62 and US 97. Medford (county seat of Jackson County) is about 75 miles southwest of the park, traveling west and then southwest on route 62. Visitors traveling north and then west about 100 miles on route 138 reach Roseburg, also a county seat. These three cities are primary business, transportation, and service centers in their respective counties.

A number of smaller unincorporated communities — Beaver Marsh, Diamond Lake, Fort Klamath, Prospect, and Union Creek — are much closer to the park. Beaver Marsh is northeast of the park about 19 miles from the north entrance.¹ The store and gas station have been closed for over three years. Less than 150 people live in Beaver Marsh. Diamond Lake is a resort community about 5 miles north of the north entrance. The resort structures and summer homes are within the Umpqua National Forest on land leased from the U.S. Forest Service. Year-round residents are estimated to be less than 20. Fort Klamath is approximately six miles south of the park astride Highway 62. There is a store and gas station. The 60 permanent residents are joined by summer folks to increase the population to about 200. Prospect is 12 miles south of Union Creek and about 20 miles from the park's

¹ Mark, Steve. May 2003. E-mail communication forwarded on May 27, 2003. Most of the information in this paragraph represents his personal knowledge of the area surrounding the park.

west entrance. A high school, several churches, a gas station, a store, and three restaurants are found here. This is the largest of the local gateway communities; having a population estimated at between 200 and 250 persons. Union Creek is also a resort and summer home community located within Rogue River National Forest on leased federal land managed by the U.S. Forest Service. The historic resort complex contains a store and there is also a restaurant nearby. Some government housing is found within this community. Approximately 50 permanent residents live here.

Population

The three counties in the affected region for socioeconomics are predominantly rural, with large areas in federal ownership as a national park and national forests

(managed by the U.S. Forest Service). This three-county area had a combined population of more than 345,000 persons in the year 2000 (table 6). The three county seats accounted for 102,633 of these residents. The rest are scattered among many smaller communities. The population of the state of Oregon in 2000 was more than 3.4 million, which ranked it 27th in the nation. The affected three-county area contains about 10.1% of the state's population. This area grew at a much lower rate (15.6% compared to 20.4%) than the state as a whole during the 1990s. Only Jackson County, with an annual growth rate of 2.2%, led by Medford growing 34.5% over the decade, outpaced the state average (1.9%) for growth. Klamath and Douglas Counties had annual growth rates of only 1.0% and 0.6%.

TABLE 6: AFFECTED AREA POPULATION FOR COUNTIES AND SELECTED TOWNS

Counties/Cities	1990	2000	% Change 1990 to 2000	Annual rate of growth
Douglas County	94,649	100,399	6.1%	0.6%
Roseburg	17,032	20,017	17.5	1.6
Jackson County	146,389	181,269	23.8	2.2
Medford	46,951	63,154	34.5	3.0
Klamath County	57,702	63,775	10.5	1.0
Klamath Falls	17,737	19,462	9.7	0.9
Three-County Region	298,740	345,443	15.6	1.5
Oregon	2,842,321	3,421,399	20.4%	1.9%

Source: U.S. Census Bureau 2000a and 1990a.

MAJOR INDUSTRIES BY EARNINGS

Earnings are the sum of wage or salary income and the net income from self-employment. A person's earnings represent the amount of income received regularly before deductions for income taxes, social security, etc. In 2001, the most important industries for earnings in Douglas County were Manufacturing, Local Government, and Health Care and Social Assistance. These industries accounted for 44.2% of the total of \$1.34 billion in earnings by county residents. Earnings for Klamath County were concentrated to a somewhat lesser degree (34.4% of the total of \$0.79 billion) in these same three industry sectors. Jackson County had the most earnings at \$2.82 billion; which represented 57% of all earnings in the three-county region. The largest sectors in Jackson County were health care and social assistance, retail trade, and manufacturing. The regional total earnings were \$4.95 billion. Douglas County contributed \$1.34 billion or 27% and Klamath County accounted for about 16%, or \$0.79 billion.

Regionally, the top industry sectors were health care and social assistance (12.6% of the total), manufacturing (12.3% of the total), local government (11.5% of the total), and close behind is retail trade (at 11.0% of the total). This region accounted for nearly 7.2% of Oregon's \$69,035,322,000 total earnings in 2001.

MAJOR INDUSTRIES BY EMPLOYMENT

The affected region provided nearly 187,000 full- and part-time jobs in 2001. This figure represented about 9% of the state total of 2.1 million jobs. Retail trade, health care and social assistance, manufacturing, and local government

were the sectors employing the most workers (about 43% of the total) in the region. Retail trade accounted for the most positions in Klamath and Jackson Counties (12.1% and 15.9% of the total). Retail trade was a close second in Douglas County providing 6,365 jobs (11.9% of the total) verses manufacturing's 6,365 (12.3% of the total). Over 55% of the region's jobs were in Jackson County; less than 18% were in Klamath County.

UNEMPLOYMENT

Oregon had an unemployment rate in 1990 that matched the national average unemployment rate of 5.6 % (see table 7). Unfortunately, each county had significantly higher unemployment rates. In fact, all three counties have had higher unemployment rates than the state and national averages for the selected years. The national average fell to 4.0% in 2000. However the next year it rose to 4.8%.

Unemployment rose and fell for the three counties and Oregon during the 1990s and continued this pattern in 2000 and 2001. In 2001 the state average and that of Jackson County both rose to 6.3%. Statewide, this unemployment rate represented about 115,300 persons being out of work. For Jackson County, out of a workforce of 91,900, nearly 5,800 people were looking for work but not finding suitable employment. Douglas and Jackson Counties' unemployment figures rose to 9.0% (almost 4,000 people) and 9.5% (nearly 2,700 people). With over 12,000 persons out of work, the regional unemployment rate for 2001 was over 7.5%, significantly higher than the state or national averages.

TABLE 7: UNEMPLOYMENT RATES FOR SELECTED YEARS

Area	1990	1993	1995	1997	2000	2001
Douglas County	10.2%	11.8%	8.0%	8.8%	7.8%	9.0%
Jackson County	6.8	8.6	6.5	7.6	5.3	6.3
Klamath County	9.1	10.9	7.4	9.8	8.1	9.5
Oregon	5.6	7.3	4.8	5.8	4.9	6.3
United States	5.6%	6.9%	5.6%	4.9%	4.0%	4.8%

Source: Bureau of Labor Statistics 2003

POVERTY

The national average for persons living in poverty in 1989 was 13.1% (table 8.). This figure represented 31.7 million people out of a population of 242.0 million. The poverty rate for Oregon was more than seven-tenths of a percentage point lower, at 12.4%. Over the years shown, the poverty rate for Oregon was consistently lower than the national rates. For the selected years, the poverty rates in the

three counties were all higher than the state rates. For the most part the poverty rates in the counties were also higher than the national figures. In 1999 poverty in the three counties ranged from one person in eight in Jackson County to one person in six in Klamath County. These figures represented more than 47,500 people living in poverty in the region. This region accounted for more than 12.5% of all people living in poverty in Oregon in 1999.

TABLE 8: PERCENT OF PEOPLE LIVING IN POVERTY

Area	1989*	1993**	1995**	1997**	1999*
Douglas County	14.9%	15.6%	16.0%	14.6%	13.1%
Jackson County	13.2	14.4	14.6	13.8	12.5
Klamath County	16.7	17.1	17.2	15.9	16.8
Oregon	12.4	13.2	12.5	11.6	11.6
United States	13.1%	15.1%	13.8%	13.3%	12.4%

* = Census Data ** = Census Estimates

Source: US Census Bureau

ENVIRONMENTAL CONSEQUENCES



INTRODUCTION

The National Environmental Policy Act (NEPA) mandates that environmental impact statements disclose the environmental effects of proposed federal actions. In this case, the proposed federal action would be the adoption of a general management plan for Crater Lake National Park. This “Environmental Consequences” chapter analyzes the potential effects of four management alternatives on cultural resources, natural resources, the visitor experience, park and concession operations, and the socioeconomic environment. By examining the environmental consequences of all alternatives on a relative basis, decision-makers can decide which approach creates the most desirable combination of the greatest beneficial results with the fewest adverse effects on the park.

The alternatives provide broad management directions. Because of the general nature of the alternatives, the potential consequences of the alternatives are analyzed in similarly general terms using qualitative analyses. Thus, this environmental impact statement should be considered a programmatic analysis. Consistent with the National Environmental Policy Act, the National Park Service would conduct additional environmental analyses with appropriate documentation before implementing site-specific actions.

The existing conditions for all of the impact topics analyzed here were identified in the “Affected Environment” chapter. All of the impact topics are

assessed for each alternative. For each impact topic, there is a description of the positive (beneficial) and negative (adverse) effects of the alternative, a discussion of the cumulative effects when this project is considered in conjunction with other actions occurring in the region, and a brief conclusion.

The no-action alternative (continue current management) sets the baseline of existing impacts continued into the future against which to compare impacts of action alternatives. The three action alternatives were then compared to the no-action alternative to identify the relative magnitude and intensity of potential impacts that would occur as a result of changes in park facilities and management. At the end 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. A brief summary of the impacts of each alternative was provided in table 6 at the end of the “Alternatives, Including the Preferred Alternative” chapter.



METHODOLOGY FOR ANALYZING IMPACTS

The planning team based the impact analysis and the conclusions in this chapter largely on information provided by experts in the National Park Service, park staff insights and professional judgments, and on the review of existing literature and studies. The team's method of analyzing impacts is further explained below. It is important to remember that it is assumed in the analyses that the mitigation measures described in the "Alternatives, Including the Preferred Alternative" chapter would be applied to minimize or avoid impacts. If these measures were not applied, the potential for resource impacts and the magnitude of those impacts would increase over those described here.

The environmental consequences for each impact topic were defined based on impact type, intensity, context, and duration. Cumulative effects also were identified, but are discussed later in this section.

Effects can be either *adverse* or *beneficial* for the topic being analyzed and are referred to as impact type. The effects also can be *direct* or *indirect*. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later or farther away, but are still reasonably foreseeable.

Impact *intensity* refers to the degree or magnitude to which a resource would be positively or negatively affected. Each impact was identified as negligible, minor, moderate, or major in conformance with the criteria for these classifications provided below by impact topic. Because this is a programmatic document, the intensities were expressed qualitatively.

Context refers to the setting or area within which an impact would occur, such as the affected region or locality. In this document most impacts are either localized (site-specific) or parkwide. Cumulative impacts are either parkwide or regional (e.g., biotic community impacts).

Impact *duration* refers to how long an impact would last. The planning horizon for this general management plan is approximately 20 years. Unless otherwise specified, 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 a year or less, such as 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 the construction of a new facility

IMPACTS TO CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In this environmental impact statement, impacts to archeological and ethnographic resources, historic structures/buildings, cultural landscapes, and museum collections are described in terms of type, context, duration, and intensity which is consistent with the regulations of the CEQ that implement the provisions of the National Environmental Policy Act. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In

accordance with the Advisory Council on Historic Preservation's (ACHP) regulations implementing Section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*), impacts were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or determined eligible for listing in the National Register of Historic Places (NRHP); (3) applying the criteria of adverse effect to affected cultural resources either listed in or determined eligible for listing in the national register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations a determination of either adverse effect or no adverse effect must also be made for affected national register-listed or determined eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the national register, e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by actions of an alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of no adverse effect means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the national register.

CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order No. 12) also call for a discussion of the

appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections for archeological and ethnographic resources, historic structures/ buildings, and cultural landscapes (Section 106 determinations of effect are not provided for museum collections because such resources are generally ineligible for listing in the national register). The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based on the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations. Future Section 106 compliance would be completed as warranted as individual actions are implemented.

CULTURAL RESOURCES

Archeological Resources

Negligible – Impact is at the lowest levels of detection – Barely measurable with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor – Adverse impact: Disturbance of a site(s) results in little, if any, loss of significance or integrity and the national register eligibility of the site(s) is unaffected. For purposes of Section 106, the determination of effect would be no adverse effect. **Beneficial impact:** Maintenance and preservation of a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate – Adverse impact: Disturbance of a site(s) does not diminish the significance or integrity of the site(s) to the extent that its national register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be adverse effect. **Beneficial impact:** Stabilization of a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.

Major – Adverse impact: Disturbance of a site(s) diminishes the significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the national register. For purposes of Section 106, the determination of effect would be adverse effect. **Beneficial impact:** Active intervention to preserve a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.

Historic Structures/Buildings

Negligible – Impact(s) is at the lowest levels of detection, barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor – Adverse impact: Impact would not affect the character defining features of a National Register of Historic Places-eligible or listed structure or building. For

purposes of Section 106, the determination of effect would be no adverse effect. **Beneficial impact:** Stabilization/preservation of character defining features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate – Adverse impact: Impact would alter a character defining feature(s) of the structure or building but would not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be no adverse effect. **Beneficial impact:** Rehabilitation of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be no adverse effect.

Major – Adverse impact: Impact would alter a character defining feature(s) of the structure or building, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the national register. For purposes of Section 106, the determination of effect would be adverse effect. **Beneficial impact:** Restoration of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of Section 106, the determination of effect would be no adverse effect.

Cultural Landscapes

Negligible – Impact(s) is at the lowest levels of detection – barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be no adverse effect.

Minor – Adverse impact: Impact(s) would not affect the character defining patterns and features of a National Register of Historic Places-eligible or listed cultural landscape. For purposes of Section 106, the determination of effect would be no adverse effect. **Beneficial impact:** Preservation of character defining patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be no adverse effect.

Moderate – Adverse impact: Impact(s) would alter a character defining pattern(s) or feature(s) of the cultural landscape but would not diminish the integrity of the landscape to the extent that its national register eligibility is jeopardized. For purposes of Section 106, the determination of effect would be no adverse effect. **Beneficial impact:** Rehabilitation of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be no adverse effect.

Major – Adverse impact: Impact(s) would alter a character defining pattern(s) or feature(s) of the cultural landscape, diminishing the integrity of the landscape to the extent that it is no longer eligible to

be listed in the national register. For purposes of Section 106, the determination of effect would be adverse effect. **Beneficial impact:** Restoration of a landscape or its patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be no adverse effect.

Ethnographic Resources

Negligible – Impact(s) would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination of effect on Traditional Cultural Properties or TCPs (ethnographic resources eligible for listing in the national register) would be no adverse effect.

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 alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination of effect on TCPs would be no adverse effect. **Beneficial impact:** Would allow access to and/or accommodate a group's traditional practices or beliefs. For purposes of Section 106, the determination of effect on TCPs would be no adverse impact.

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. For purposes of Section 106, the determination of effect on TCPs would be adverse effect. **Beneficial impact:** Would facilitate traditional access and/or accommodate a group's practices or beliefs. For purposes of Section 106, the determination of effect on TCPs would be no adverse effect.

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. For purposes of Section 106, the determination of effect on TCPs would be adverse effect. **Beneficial impact:** Would encourage traditional access and/or accommodate a group's practices or beliefs. For purposes of Section 106, the determination of effect on TCPs would be no adverse effect.

Museum Collections

Negligible – Impact(s) is at the lowest levels of detection – barely measurable with no perceptible consequences, either adverse or beneficial, to museum collection.

Minor – Adverse impact: Would affect the integrity of a 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.

NATURAL RESOURCES

The natural resource impact topics that are analyzed in this document include biotic communities, water resources, air quality, and threatened and endangered species. Information on known resources was compiled and compared with the locations of proposed developments and other actions. The impact analysis was based on the knowledge and best professional judgment of planners, resource specialists, data from park records, and studies of similar actions and impacts when applicable. The planning team qualitatively evaluated the impact intensities for all of the natural resource impact topics.

Biotic Communities(vegetation, wildlife, soils)

Negligible – The impact on biological communities, natural processes, soils, or species would be at the lower levels of detection or not measurable.

Minor – The impact would be detectable and could affect the abundance or

distribution of individuals in a localized area, but would not affect the viability of the local population or overall community size, structure, or composition. Changes to natural processes would be limited and affect only a localized area. For soils, the impact would change soil characteristics (e.g., soil profile, productivity) in a relatively small area and would not increase the potential for erosion of additional soil.

Moderate – The impact would be clearly detectable and could have appreciable effect on the resource. This would include impacts that effect the abundance or distribution of local populations, but would not affect the viability of the regional population. Changes to community size, structure, or composition and ecological processes could be substantial and occur over a larger area. For soils, the impact would appreciably change soil characteristics (e.g., soil profile, productivity) in specific area and would increase the potential for erosion of additional soil.

Major – The impact would be severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, or composition and ecological processes would be highly altered and landscape level changes could be expected. For soils, the impact would appreciably change soil characteristics (e.g., soil profile, productivity) over an extensive area and would greatly increase the potential for erosion of additional soil.

Crater Lake and Water Resources

Negligible – The impact on water quality or the timing or intensity of flows would be at the lower levels of detection or not measurable.

Minor – The impact would have detectable effects on water quality or the timing or intensity of flows.

Moderate – The impact would have clearly detectable effects on water quality or the timing or intensity of flows and potentially would affect stream species.

Major – The impact would have severely adverse or exceptionally beneficial effects on water quality or the timing or intensity of flows and potentially would affect stream species on a regional or watershed scale.

Air Quality

Negligible – The impact would be at the lower levels of detection or not measurable.

Minor – The impact would have a slight, localized effect on air quality or visibility.

Moderate – The impact would have clearly detectable effects on air quality or visibility over a more widespread area of the park.

Major – The impact would have severely adverse or exceptionally beneficial effects on air quality or visibility and potentially would affect the regional air shed.

Threatened, Endangered, and Sensitive Species

For federally and state-listed species the following impact intensities apply. These

definitions are consistent with the language used to determine effects on threatened and endangered species under the federal Endangered Species Act:

no effect – when the proposed actions would not affect special status species or critical habitat

not likely to adversely affect – when effects on special status species are discountable (i.e., extremely unlikely to occur) and or insignificant (not able to be meaningfully measured, detected, or evaluated) or completely beneficial

likely to adversely affect – when any adverse effect to special status species may occur as a direct or indirect result of proposed actions and the effect is not discountable, insignificant or completely beneficial

VISITOR USE

The discussions of visitor use in this document evaluate four aspects: (1) diversity of activities, (2) interpretation and orientation, (3) facilities and services, and (4) soundscapes and scenic quality. Analysis is conducted in terms of how the visitor experience might vary by applying different management zones in the alternatives. Analysis is qualitative rather than quantitative because of the conceptual nature of the alternatives.

1. Analysis of effects on the diversity on visitor activities is based on whether there was a complete loss, addition, expansion, or a change in the number and range or availability of a recreational opportunity and how the application of management zones would affect group and individual opportunities.

2. Analysis of interpretation and orientation is based on whether there would be a change in the availability of interpretive and educational information and education programs resulting from management zone application or other action.
3. Analysis of visitor facilities and services discusses impacts on access to visitor facilities and services provided by the Park Service and commercial services in relation to management zone application and other actions.
4. Analysis on visitor experience values is associated with visitor experience values based on whether there would be a change in opportunities for solitude, tranquility, challenge, adventure and the freedom to travel throughout the park to experience primary resources and their natural and cultural settings, including scenic quality, natural sounds, views, and night skies.

For impacts to visitor use the following thresholds apply:

Negligible: Visitors would not be affected or there would be no noticeable change in visitor experience or safety. Changes in the natural sound environment would be so slight they would not be of any measurable or perceptible consequence to visitor experiences.

Minor: Changes in visitor experience or safety would be detectable, although the changes would be slight. The changes would affect a relatively small number of visitors, be localized in area, or have barely perceptible consequences to the majority of visitors. A detectable change would occur to the natural sound environment, although the effects would be small, localized and of little consequence to visitor experiences.

Moderate: Changes in visitor experience or safety would be readily apparent and would affect a relatively large number of visitors. A change in the natural sound environment would be readily detectable, affecting the experience of a large number of visitors.

Major: Changes in visitor experience or safety would be severely adverse or exceptionally beneficial, highly noticeable, and would affect relatively large numbers of visitors. A change in the natural sound environment would be obvious, be severely adverse or exceptionally beneficial, and affect the health of visitors, or cause a substantial, highly noticeable effect on the experience of large numbers of visitors.

PARK AND CONCESSION OPERATIONS

The impact evaluation was based on a qualitative evaluation of the effects on park and concession operations from changes in providing visitor and administrative facilities, services, or programs under the alternatives. Impacts were determined by examining the affects of changes on staffing, infrastructure, visitor facilities and services and the role of commercial operators in providing services. The intensity of the impact considers whether the impact would be negligible, minor, moderate, or major. Impact intensities for the park and concession operations impact topic have been defined as follows:

Negligible Park and/or concession operations would not be affected or there would be no measurable or perceptible change in operations.

Minor Changes in park and/or concession operations would be perceptible, although the changes would be slight and localized, and would not be expected to have an overall effect on the ability of the park or concessioner to provide desired services and facilities.

Moderate Changes in park and/or concession operations would be readily apparent, would have appreciable effects on park or concession operations, and could have an effect on the ability of the park to provide some desired services and facilities.

Major Changes in park and/or concession operations would be readily apparent and would highly reduce or increase the ability of the park or concessioner to provide desired services and facilities.

SOCIOECONOMIC ENVIRONMENT

Crater Lake National Park is a part of the socioeconomic environment of Douglas, Jackson, and Klamath Counties. Socioeconomic impacts for the three-county area were determined based on applied logic, professional expertise, and professional judgment. Economic data, historic visitor use data, expected future visitor use, and future developments within the park were all considered in identifying and discussing potential impacts. A mostly qualitative analysis is sufficient to compare the effects of alternatives for decision-making

purposes. However, the estimated costs of various projects do provide basic quantitative measures of the direct economic impacts of each of the alternatives on the region.

Changes in the three-county regional economy would include impacts on the regional socioeconomic base due to changes in park operations and other management or development actions. The socioeconomic base includes such factors as population, income, employment, earnings, etc. Park development and removal projects during the life of the general management plan would benefit the regional construction industry. Programmatic initiatives may require additional funding and/or personnel.

Changes at the park may also affect the socioeconomic conditions of any of the local gateway communities. The size, configuration, and relative isolation of the park has led to only three separate and dispersed entrances being developed to provide automobile access to the park. Several small local communities are associated with each of the travel corridors to these access points. These communities provide some resort opportunities as well as limited range of goods and services for the visiting public. Impacts on concession operations within the park could occur and would probably be considered local impacts.

Each alternative would have different staffing and budget needs, which could affect the adjacent communities and/or the region as a whole. For example, adding new staff positions at a particular location may lead to new hires seeking goods and services including housing in an associated community, these new expenditures provide limited benefits for the local economy.

A recent study of the tourism spending by visitors to Crater Lake National Park provides some measure of the impact such spending has had on the three-county region. In 2001, visitors were found to have spent some \$30.7 million within-in 100 miles of the park.² The multiplier effects resulted in \$34.3 million in direct sales; \$11.5 million in personal income, \$18.3 in value added and supported 863 jobs.³ To put these figures in perspective, visitor spending (\$30.7 million) related to the park visits accounted for about 6% of total tourism spending in the three-county region in 2001.⁴ During the same year, total personal income for the region amounted to over \$8.4 billion, and the three-county work force consisted of 164,225 persons of which 12,387 were unemployed. The economic impacts related to park visitors vary from year to year and are dependent upon the numbers of visitors coming to the park, their participation in various activities, their expenditure patterns, prices of goods and services, and changes in the park and surrounding communities that may affect visitor use of the park.

Context, Intensity, and Duration

Context, intensity, and duration of impacts compare the action alternatives to the no-action alternative. *Context* refers to the relative area within which impacts would occur. For the most part, impacts

² Stynes, Daniel and Ya-Yen Sun. November 2002. Impacts of Visitor Spending on Local Economy: Crater Lake National Park, 2001. Department of Park, Recreation and Tourism Resources, Michigan State University, East Lansing, MI 48824-1222.

³ Stynes, Daniel and Ya-Yen Sun. Multiplier effects are the result of money spent by tourists being re-circulated within the local economy multiplying the effect of the direct expenditures.

⁴ Stynes, Daniel and Ya-Yen Sun. November 2002.

would affect the regional area (Douglas, Jackson, and Klamath Counties) or the local area (e.g., the Fort Klamath gateway community).

Impact *intensity* is the degree to which a topic is positively or negatively affected (see impact thresholds below). Impacts on the socioeconomic environment were qualitatively evaluated and described for this analysis. However, cost estimates for additional development and increased staffing levels do provide a measure of the direct fiscal impact of each alternative.

The *duration* of an impact is described as either short-term or long-term. Short-term impacts would last less than three years. Long-term impacts last more than three years (and some result in a permanent change in conditions).

Socioeconomic Impact Thresholds

The following four levels of description are used to evaluate and describe impacts on the socioeconomic environment.

Negligible — No effects occur or the effects on socioeconomic conditions are below or at the level of detection.

Minor — The effects on socioeconomic conditions are small but detectable, and only affect a small number of firms and/or a small portion of the population. The impact is slight and not detectable outside the affected area.

Moderate — The effects on socioeconomic conditions are readily apparent. Any effects result in changes to socioeconomic conditions on a local scale (e.g., a gateway community or a single county) within the affected area.

Major — The effects on socioeconomic conditions are readily apparent. Measurable changes in social or economic conditions at the county or three-county regional level would occur. The impact is severely adverse or exceptionally beneficial within the affected area.

CUMULATIVE IMPACTS

The Council on Environmental Quality regulations implementing NEPA define a cumulative impact as “...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.” Each cumulative impact analysis is additive, considering the overall impact of the alternative when combined with effects of other actions (inside and outside the park) that have occurred or would occur in the foreseeable future.

These include ongoing and planned actions and projects in the park and surrounding lands: Cumulative impacts were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at Crater Lake National Park and, if applicable, the surrounding region. The primary projects and actions that could contribute to cumulative effects are summarized below.

- The combination of widespread logging and suppression of natural fires has affected the natural forest stands throughout portions of the park

and surrounding areas. Such changes may also have altered wildlife distribution, frequency, and use of habitat from that which existed prior to the Park's establishment.

- Beneficial effects to late-successional forest species are expected from implementation of the President's NW Forest Plan (NFP). The plan includes development of a network of forest reserves across the Pacific Northwest to protect late-successional forest species where habitat conditions are relatively intact and provide for the regeneration of late-successional forest habitat where habitat is extremely limited and the associated plant and wildlife populations are low.
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- Past introduction of various non-native fish species into Crater Lake and the park's streams has altered the aquatic ecology and adversely affected bull trout, the only known fish species native to the park. Although Crater Lake was originally barren of fish, fish stocking took place between 1888 and 1941. Of the number of species that were stocked, only kokanee salmon and rainbow trout still exist in the lake. Brook trout were introduced in park streams and persist where they have not been eliminated by park management. The park's bull trout restoration program has recently culminated in the elimination of non-native brook trout and reestablishment of bull trout in Sun and Lost Creeks. Some adverse effects to bull trout such as loss of individuals would likely occur. Appropriate mitigation is included as part of the restoration program to minimize the potential for adverse effects
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- Implementation of prescribed fire as part of the park's recently approved

Fire Management Plan would increase landscape and habitat diversity relative to fire and reduce the potential for catastrophic fire. Some adverse effects to wildlife such as loss of individuals or food sources may occur. Appropriate mitigation for sensitive species is included as part of that plan.

- Ongoing trails rehabilitation and relocation would reduce localized resource impacts such as soil and vegetation loss and trampling and erosion.
-
- Planned construction projects include replacement of the waterline from Munson Springs to Garfield, improvement of the lagoon at Munson Valley, rehabilitation of Highway 62 West, and rehabilitation of superintendent's residence.
 - Other planned construction associated with implementation of the 1999 Crater Lake National Park Visitor Services Plan (e.g., rehabilitate cafeteria building, relocate parking and road to area behind cafeteria building, convert existing parking lot to pedestrian open space, construct new visitor contact station for year-round information and interpretation). The 1999 plan identifies the levels and kinds of NPS and concession visitor services and facilities within the developed areas of the park. These projects would have both adverse and beneficial localized effects. For instance, rehabilitation of the cafeteria building and relocation of rim parking would result in some disturbance to soils and vegetation within a previously impacted area, but would also restore historic visitor-use patterns on the rim.
-

- Designation of Rim Drive as a Scenic Byway and All American Road and the potential nomination of the Rim Drive as a cultural landscape would likely enhance treatment of Rim Drive.

IMPAIRMENT OF PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the preferred and other alternatives, NPS policy (NPS 2001: *Management Policies*, section 4.1) requires analysis of potential effects to determine whether or not actions would impair resources of the unit.

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 park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park

resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. However, an impact would more likely constitute an impairment to the extent 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 park or to opportunities for enjoyment of the park; or
- identified as a goal in the Park's General Management Plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. A determination of impairment is made in the "Environmental Consequences" section in the conclusion section for each resource impact topic.

IMPACTS OF IMPLEMENTING ALTERNATIVE 1 – NO ACTION

CULTURAL RESOURCES

Archeological Resources

Under alternative 1 archeological sites would be surveyed, inventoried, and evaluated under National Register of Historic Places criteria of evaluation to determine their eligibility for listing in the national register as staff and funding permit. All ground-disturbing activities would be preceded by site-specific archeological surveys, and, where appropriate, subsurface testing to determine the existence of archeological resources and how best to preserve them. Known archeological resources would be avoided whenever possible.

Although impacts to archeological sites would be monitored and efforts would be undertaken to minimize or mitigate potential impacts from National Park Service actions, visitor activities, and natural causes, an unknown number of archeological sites would continue to be subject to negligible to minor long-term and permanent adverse impacts from current and ongoing visitor activities, such as unintentional disturbance, vandalism, and looting, erosion as a result of wildfire, wind, heavy snowmelt and runoff, and other climatic conditions

Cumulative Effects. In the past, the relative isolation of the national park and the lack of sufficient monitoring have provided opportunities for looters and vandals to engage in pot-hunting and intentional pilfering, and visitors, as well as natural erosion from fire, wind, heavy snowmelt and runoff, and other climatic conditions, have contributed to inadvertent disturbance of archeological resources. Because much of the park has

not been surveyed and inventoried for archeological resources, decisions about site development have been made that, in hindsight, may not have been best for archeological resources. Such decisions included the placement and location of campgrounds, trails, roads, and other visitor use facilities, which may have been constructed on top of or near archeological resources. Current and ongoing National Park Service activities, such as prescribed burns, trails rehabilitation and relocation, replacement of a waterline from Munson Springs to Garfield Peak, a lagoon project at Munson Valley, and rehabilitation of State Highway 62 West, could potentially result in minor to moderate impacts to archeological resources.

Actions under this alternative, when combined with other past, present, and reasonably foreseeable future undertakings in the park and surrounding region, would contribute to cumulative negligible to moderate, long-term and permanent adverse effects to any overall cumulative impact on archeological resources.

Conclusion. Archeological investigations would be undertaken before development to ensure that archeological resources were understood and that they would not be damaged or lost as a result of National Park Service actions. However, an unknown number of archeological resources would be subject to negligible to minor, long-term and permanent adverse impacts under this alternative as a result of various National Park Service operations and actions, visitor activities, and natural causes.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with archeological resources.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on archeological resources would be no adverse effect.

Historic Structures/Buildings

Historic structures/buildings in the national park would continue to be surveyed, inventoried, and evaluated under National Register of Historic Places criteria of evaluation to determine their eligibility for listing in the national register as National Park Service staff and funding permit. Historic structures/buildings listed in, or determined eligible for listing in, the national register would continue to be managed to preserve their documented values in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and to support National Park Service activities or visitor use. As a result, actions under alternative 1 would generally have negligible to moderate long-term beneficial impacts on national register eligible structures and buildings.

Rehabilitation of the superintendent's residence, a national historic landmark located in Munson Valley, and its conversion for use as a science and

learning center would result in adverse minor permanent impacts to the structure because some historic fabric (both exterior and interior) would be lost. However, rehabilitation and adaptive use of the structure would ensure its long-term preservation and thus have a moderate beneficial impact on the building.

Cumulative Effects. In the past lack of appropriate preservation treatment, impacts of weathering and other natural phenomena, and adaptive use have resulted in the loss of some historic fabric to historic structures/buildings in the national park. Thus, the documented values of some historic structures/buildings have resulted in cumulative minor to moderate adverse long-term and permanent effects.

Actions under this alternative such as the rehabilitation of the superintendent's residence and comfort station no. 4, when combined with the impacts of implementing the recommendations of the 1999 *Visitor Services Plan, Crater Lake National Park* (including among other things the rehabilitation of the Sinnott Memorial, Community House, Plaza Comfort Station, Kiser Studio, and Promenade at Rim Village) would contribute beneficial minor to moderate long-term effects and an adverse minor permanent impact to any overall cumulative effect on historic structures/buildings.

Conclusion. Actions under alternative 1 would generally have negligible to moderate, long-term beneficial impacts on historic structures/buildings in the park because they would continue to be surveyed, inventoried, and evaluated for their eligibility for listing in the National Register of Historic Places, and listed, as well as determined eligible, structures/buildings would be managed to preserve

their documented values in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

Rehabilitation of the superintendent's residence, a national historic landmark located in Munson Valley, and its conversion for use as a science and learning center would result in adverse minor permanent impacts to the structure because some historic fabric (both exterior and interior) would be lost. However, rehabilitation and adaptive use of the structure would ensure its long-term preservation and thus have a moderate beneficial impact on the building.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with historic structures/buildings.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on historic structures/buildings would be no adverse effect.

Cultural Landscapes

Cultural landscapes in the national park would continue to be surveyed, inventoried, and evaluated under National Register of Historic Places criteria of evaluation to determine their eligibility for

listing in the national register as National Park Service staff and funding permit. Multiple property national register nomination forms for cultural landscapes, including (but not exclusively limited to) Munson Valley, Rim Drive, and Rim Village, would be prepared, and the National Park Service would recommend listing of these cultural landscapes in the national register. The National Park Service would implement resource management policies that preserve the natural resource values of these landscapes as well as their culturally significant character defining patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. Thus, the overall impacts to cultural landscapes under this alternative would be minor to moderate, long-term, and beneficial.

Cumulative Effects. In the past, lack of concern for the preservation of cultural landscapes in the national park has resulted in decisions about site development and resource management that, in hindsight, may not have been best for cultural landscape values and preservation. Such decisions include the placement and location of campgrounds, trails, parking lots, and other visitor use and administrative facilities (such as those at Rim Village) that have compromised some of the character defining patterns and features of the cultural landscapes in the national park.

Actions under this alternative such as the recommendation that the Rim Village, Rim Drive, and Munson Valley cultural landscapes be listed in the national register and managed to preserve their documented values, when combined with the impacts of implementing the recommendations of the 1999 *Visitor Services Plan*, Crater Lake

National Park (including among other things the rehabilitation of the Sinnott Memorial, Community House, Plaza Comfort Station, Kiser Studio, and Promenade and redesign of the picnic area in Rim Village) would have cumulative beneficial minor to moderate long-term effects on cultural landscapes.

Conclusion. Actions under alternative 1 would generally have minor to moderate, long-term, beneficial impacts on cultural landscapes in the national park because they would continue to be surveyed, inventoried, and evaluated for their eligibility for listing in the National Register of Historic Places and listed, as well as determined eligible, cultural landscapes would be managed to preserve their documented values in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with cultural landscapes.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on cultural landscapes would be no adverse effect.

Ethnographic Resources

Native American groups regard Crater Lake and Mount Scott, as well as other sites in the park, as significant sacred sites or landscapes and important traditional use activity areas. National Park Service development and administrative/maintenance operations, as well as increasing visitor use of the national park, have interrupted and are continuing to interrupt access to ceremonial or gathering areas, thus generally having negligible to minor long-term adverse impacts on ethnographic resources in the park. However, the National Park Service is currently undertaking consultation and coordination with the Klamath Tribes and other Native American groups to address these matters of mutual concern on parklands and encourage tribal members to participate in the preparation of programs, exhibits, replica artifacts, and literature to assist the park staff in accurately interpreting the cultural history of the early inhabitants of the park area. The National Park Service would continue to allow access to and/or accommodate the groups' traditional practices and beliefs and facilitate reburial of ancestral remains, both those exposed by natural weathering and those recovered from pot-hunters, under the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA). An ongoing traditional use/ethnographic study would enable the Park Service to carry out consultations more effectively to preserve and protect ethnographic resources in the national park. Therefore, actions under this alternative would generally have negligible to minor, long-term, beneficial impacts on ethnographic resources in the park because of the ongoing consultation and coordination activities between the National Park Service and the Klamath Tribes and other Native American groups.

Cumulative Effects. National Park Service development and administrative/maintenance operations, as well as increasing visitor use of the national park since its establishment, have had and are continuing to have cumulative adverse negligible to minor long-term effects on ethnographic resources. As sacred sites in south-central Oregon have been lost over time, those remaining in the park have become more significant to the Klamath Tribes and other affiliated Native American groups. Actions under this alternative such as ongoing consultations with the Klamath Tribes and other affiliated Native American groups to address matters of mutual concern would contribute negligible to minor, long-term, beneficial effects to any overall cumulative impact on ethnographic resources.

Conclusion. Actions under alternative 1 would generally have negligible to minor, long-term, beneficial impacts on ethnographic resources in the national park because the National Park Service would continue ongoing consultation and coordination with the Klamath Tribes and other Native American groups to address matters of mutual concern in the national park and allow access to and/or accommodate the groups' traditional practices and beliefs.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation; (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with ethnographic resources.

Section 106 Summary. No Traditional Cultural Properties are affected by actions under this alternative. Thus, Section 106 determinations are not necessary.

Museum Collections

Alternative 1 would not provide additional storage and workspace meeting professional and National Park Service museum standards for the preservation and curation of, as well as access to, the park's museum collections. Thus, this alternative would generally have minor long-term adverse impacts on the park's museum collections. Some park-related museum collection materials would continue to be housed and managed by other organizational entities in offsite facilities where their condition is unknown and their ownership obscured.

Cumulative Effects. Since the park was established the combination of limited staffing and lack of storage and workspace meeting professional and National Park Service museum standards have frustrated, and are continuing to hinder, endeavors to improve care of and access to the museum collections and address the ever-increasing cataloging backlog. Thus, the park's museum collections have been subjected to minor to moderate long-term adverse effects. Because existing conditions would not change, actions under this alternative would not contribute to the impacts of the aforementioned actions; thus, there would not be cumulative effects on museum collections under this alternative.

Conclusion. Actions under alternative 1 would generally have negligible to minor long-term adverse impacts on museum collections because of the lack of storage and workspace meeting professional and National Park Service museum standards

and limited staffing to address the ever-increasing cataloging backlog.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with museum collections.

NATURAL RESOURCES

Biotic Communities

Continued maintenance of existing roads, trails, and structures and increasing visitor use could result in additional disturbance to vegetation and soils, such as soil compaction and erosion, trampling and loss of vegetative cover, and introduction and spread of non-native species. Wildlife populations and habitat could also be affected to varying degrees by continuing maintenance activities and visitor use that could affect natural movements of wildlife, habitat, and food sources. Most maintenance and visitor activities would continue to occur along existing trails, roads, and in the developed areas. These areas have been previously disturbed. Visitation is not expected to increase appreciably and would likely have little additional effect on the extent of impacts. The low incidence of collisions between vehicles and wildlife would not likely increase. Also, management actions to avoid or minimize the extent and severity of impacts would continue to be employed, such as localized restoration efforts, confining or directing use through use of signs, trails, and designated parking areas, and continued monitoring and early corrective action to

address invasive non-native plants. Consequently, additional long-term adverse impacts would be minor.

Winter recreational activities occur during the time when wildlife is stressed by cold weather and food shortages. Disturbance or harassment of wildlife during this sensitive time can have negative effects on individual animals, and in some cases populations, particularly when populations are low. Winter recreation such as snowmobiling and skiing can create added energetic stress in winter when most wildlife species are already stressed (NPS 1999d). The effects of winter recreational activities in the park are unknown, although, disturbance would likely be limited because visitor use levels are expected to remain relatively low and would continue to occur within very limited areas within the park. The park service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of park resources. Management actions, such as restrictions on off-trail use, specific area closures, increased patrols, visitor education, or limits on use or party sizes, would be taken as necessary to address impacts. Consequently, long-term impacts from continuing or increasing winter activities would be offset by increased protection measures that would benefit wildlife, although the extent of potential beneficial effects would likely be localized and minor.

Cumulative Impacts. Cumulative actions would contribute to both beneficial and adverse impacts to biotic communities. Some ongoing and future site-specific restoration work (e.g., trail relocation and rehabilitation and rim restoration following removal of the employee dorm on the

rim) would have long term benefits to resources by restoring vegetation and wildlife habitat. The fire management program may have short-term impacts on animal populations in the vicinity of any fire by eliminating cover, food sources, and habitat. However, in the long term, reintroducing fire would provide for greater habitat diversity and less catastrophic habitat loss. Fisheries management has reestablished the native fishery in Sun Creek. Other cumulative beneficial effects would occur outside the park from implementation of the NFP which is expected to provide for smaller, yet more stable and better distributed populations of late-successional forest species. Overall, these programs would result in major, long-term benefits.

Fire suppression and historic timber harvest have adversely impacted lands surrounding the park. Impacts on biotic communities have been long term, major, and adverse primarily because of widespread alteration of forest structure, wildlife habitat, species composition and fragmentation of habitats. Proposed development projects within the park (e.g., replacement of the waterline from Munson Springs to Garfield, rehabilitation of Highway 62 West) would have minor, site-specific, construction-related impacts based on implementation of best management practices such as erosion and sediment controls and revegetation.

Overall the past, present, and reasonably foreseeable actions in combination with the no-action alternative would have both long-term, major adverse and beneficial effects. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs affecting lands both

action alternative would contribute a minor adverse increment to the overall cumulative impact.

Conclusion. The no-action alternative would have a minor, long-term, adverse impact on biotic communities, primarily in existing areas of concentrated use and development. Increased protection measures could result in minor benefits to wildlife during the winter. The past, present, and reasonably foreseeable actions in combination with the no action alternative would have both long-term, major adverse and beneficial impacts. The no-action alternative would contribute a minor, adverse, and beneficial increment to the overall cumulative impact.

In accordance with the criteria for determining impairment, there would be no major adverse impacts on resources or values, and there would be no impairment of resources or values associated with biotic communities, including vegetation, soils, and wildlife resources.

Threatened, Endangered, and Sensitive Species

Most maintenance and visitor activities would continue to occur along existing trails, roads, and in the developed areas. These areas have been previously disturbed. Visitation is not expected to increase appreciably and there would be no new development under this alternative. Also, NPS actions to manage and protect special status species would continue to be employed, such as monitoring and restoration programs and restrictions on visitor use near nest sites. Consequently, there would be no change in the habitat or disturbance to special status species within the park as a result of the no action alternative.

As discussed under the biotic communities impact topic, the Park Service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of threatened and endangered species. Because of a number of factors such as limited occurrence, small populations, low densities, and/or low birth rates, these species are more vulnerable to impacts than general wildlife populations. Some species (lynx, wolverine, fisher) could benefit from increased protection measures, although the extent of potential beneficial effects is unknown. Greater beneficial effects would occur if for example, den sites were located and measures were taken to protect them from disturbance.

Cumulative Impacts. Cumulative actions would contribute to both beneficial and adverse impacts to threatened and endangered species. Within the park, the fire management program would perpetuate the natural role of fire in preserving threatened and endangered species habitat and would reduce the threat of catastrophic habitat loss. For instance, prescribed natural fires at Crater Lake tend to be patchy in terms of fire severity. This patchiness historically was associated with habitat improvement for small carnivores, and would likely be associated with habitat maintenance for them in the future. Some species would be negatively influenced by fire management activities in the short term, due the possible loss of individuals or short-term alteration of suitable habitat, such as elimination of a multilayered understory in some locations that may result in suboptimal spotted owl habitat. However, species specific mitigation strategies would be implemented for sensitive species to minimize these effects. Although the park's bull trout restoration program has

had short-term adverse impacts due to the loss of some individual fish, the program has lead to the elimination of non-native brook trout and reestablishment of bull trout in Sun Creek. The NFP is expected to provide for smaller, yet more stable and better distributed populations of threatened and endangered late-successional forest species such as the northern spotted owl, which would also contribute beneficial effects. Overall, these programs would adversely affect some individuals or habitat in the short-term, but would not likely adversely affect threatened and endangered species in the long-term because long-term effects would be beneficial.

None of the threatened or endangered animal species are endemic to Crater Lake National Park, and the "threats" to their existence have largely occurred due to land management activities elsewhere, such as old growth forest loss affecting northern spotted owls. Fire suppression and historic timber harvest have adversely affected habitat and threatened and endangered species populations on lands surrounding the park primarily due to widespread alteration and fragmentation of forests. Park construction and rehabilitation proposals would not affect most special status species because there would be no disturbance within known areas of occurrence or suitable habitat. Some inconsequential impacts such as localized disturbance to vegetation within suitable habitat could occur, but would not likely adversely affect any threatened and endangered species. Site-specific surveys would be conducted to determine if special status species were present and the park service would consult with the U.S. Fish and Wildlife Service and Oregon Department of Natural Resources to determine mitigation.

Impacts of the above actions in conjunction with the no-action alternative would result in both long- and short term adverse and beneficial effects. The no-action alternative would not likely contribute to adverse effects on threatened or endangered species and could contribute beneficial long-term effects to the overall cumulative impacts.

Conclusion. The no-action alternative would not adversely affect and could beneficially affect threatened or endangered species. Thus this alternative may affect, but would not likely adversely affect or result in impairment to any threatened or endangered species. Impacts of other actions in conjunction with the no-action alternative would result in both long- and short-term, adverse and beneficial effects. The no-action alternative would not likely contribute to adverse effects on threatened or endangered species and could contribute beneficial long-term effects to the overall cumulative impacts.

Crater Lake

Minimizing development within the caldera and lake drainage would prevent addition of sediments, minerals, or contaminants that could reduce water quality. Current restrictions on access and boating would continue to minimize contaminants that could reduce water quality.

The long-term limnological program would continue to monitor a diverse array of chemical, physical, and biological properties of the lake and springs, including water chemistry, nutrients, secchi clarity, light transmission, temperature, light penetration, lake level, meteorological conditions, chlorophyll concentration, primary productivity,

phytoplankton, zooplankton, and fish. Long-term special studies would include global climate change, nutrient dynamics, and lake mixing. Most of the sample and data collection would continue to occur in the summer months when the lake is easily accessible. Occasional winter studies are also conducted. The program would continue to add devices capable of year-round sample and data collection to gain a better understanding of processes occurring during the winter months. Sample and data processing, along with data analysis and trend monitoring, would occur on a regular basis. Periodic program review by scientists from universities, the NPS, and other state or federal agencies has been incorporated into the long-term program. The latest review of the LTLMP was conducted by a panel of professional aquatic ecologists in 2000. Continued monitoring would result in long-term, negligible, beneficial impacts on water quality.

Cumulative Impacts . Cumulative actions would contribute both adverse and beneficial impacts to water quality.

As called for in the Visitor Services Plan, only essential services would be provided at the rim. Included in this plan is the proposal to relocate the cafeteria parking behind the cafeteria. This would decrease the snow blown into the caldera during snowplowing and thereby decrease possible hydrocarbons and vehicle related contaminants. The plan also calls for a reduction in the number of daily concession boat tours.

In 2003 the park's new concessioner replaced the aging tour boat fleet. This resulted in a major technological upgrade with conversion to improved fuel-injected 4-stroke engines, which will operate more efficiently and cleanly. The new boats also incorporated a number of other design

features to prevent accidental fuel leakage or spills into the lake environment. The park is also closely tracking the developments in alternative fuels technology, i.e., fuel cell, to eventually enable a conversion to engines not reliant on fossil fuels. The fuel system servicing the boat dock has recently been upgraded to provide increased protection from fuel leaks and contamination to the lake. Access to the lake would continue to be provided by a single access. Water quality could benefit from these increased protection measures, although the extent of potential beneficial effects is unknown, but would likely be localized and minor.

Conclusion. The no-action alternative would have a negligible, long-term, beneficial effect on water quality within Crater Lake. In accordance with the criteria for determining impairment, there would be no major adverse impacts on water quality, and therefore no impairment of water quality.

Water Resources

Continued maintenance of existing roads, trails, and structures and a slight increase in visitor use would result in little new disturbance to vegetation and soils that could potentially contribute to increased turbidity or sedimentation of park waters. Increased visitation would lead to only a minimal increase in vehicles in the park and associated increase in deposition of petroleum products routed into drainages that could affect water quality. Effects on water quality would be negligible.

A minimal increase in water use could occur from some increased visitation, although overnight accommodations, which utilize more water, would not increase. Water conservation efforts within the park would continue. Impacts

on the quantity of water in Annie Creek would be negligible. Snowmobiles use along the North entrance road would continue. Snowmobiles raise concerns about long-term impacts from high pollution emissions. Emissions from 2-stroke engine exhaust include monoxide, hydrocarbons, nitrous oxides, and particulate matter (NPS 1999e). These concerns include the possibility that accumulations of pollutants in the snowpack and resultant snowpack runoff may be having adverse impacts on water quality and associated aquatic systems, although impacts from snowpack runoff that is contaminated with snowmobile pollutants have not been found. Impacts on water quality are likely short term and localized along travel routes because of the low volume of use and because snowmobiles are restricted to the north entrance road, which does not follow near any streams. Although snowmobile use is not expected to appreciably increase, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study. Management actions to mitigate nonpoint source pollution would be implemented if necessary. Water quality could benefit from increased protection measures, although the extent of potential beneficial effects is unknown, but would likely be localized and minor.

Cumulative Impacts. The geographical area included in the cumulative analysis for water resources is the park. All streams within the park, including Annie Spring, originate within the park. Effects on water quality and quantity outside the park from actions associated with this alternative would be negligible and likely not measurable.

The park's fire management program may adversely impact water quality (e.g., sedimentation, erosion) due to the effects of fires, particularly high intensity fires. Park construction and rehabilitation proposals would also contribute to adverse impacts from increased surface runoff and erosion. Best management practices such as erosion and sediment controls would be employed to minimize these impacts. Impacts would be localized, short-term, and minor. Minor, localized, beneficial cumulative actions would include ongoing trails rehabilitation and relocation within the park that would reduce localized erosion and runoff.

The replacement of the waterline from Munson Springs to Garfield would likely reduce water loss by the system. Implementation of actions within the *Visitor Services Plan* would also reduce water use within the park. Reductions in water use would have a minor beneficial effect on water quantity in Annie Creek.

Impacts of the above other actions in conjunction with the no-action alternative would result in localized, minor, adverse and beneficial impacts on water quality and minor, beneficial effects on water quantity in Annie Creek. The no-action alternative could contribute a negligible adverse impact on water quality and negligible decrease in Annie Creek water flow to the overall cumulative impact.

Conclusion. The water quality within the park would remain good and the no-action alternative would have a negligible adverse affect on water quality and quantity due to continuing maintenance activities and slight increase in visitation, but would not result in impairment to water resources. The impacts of other actions in conjunction with the no-action alternative would result in localized,

minor, adverse and beneficial impacts on water quality and quantity. The no-action alternative could contribute a negligible adverse impact on water quality and negligible increase in water use within the park to the overall cumulative impact.

Air Quality

Slight increases in visitation would lead to only a small increase in vehicles in the park and associated increase in vehicle emissions. The increase in emissions would be small and would not measurably change the air quality. Snowmobile use along the North entrance road would continue. Snowmobiles raise concerns about long-term impacts from high pollution emissions. Impacts on air quality are believed to be short term and localized along travel routes because of the low volume of use and lack of large congregation sites coupled with winds which tend to disperse particulates and other pollutants. The Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts. Management practices to mitigate nonpoint source pollution would be implemented as necessary. Air quality could benefit from increased protection measures, although the extent of potential beneficial effects would likely be localized and negligible.

Cumulative Impacts. The park's air quality is good with negligible effects from regional pollution sources outside of the park. Forest fires on surrounding lands could contribute particulates for limited periods of time. Degradation of air quality from the park's Fire Management program could result in moderate short-term impacts, but the program would be in conformance with the Clean Air Act, Oregon State Smoke Management Plan, and the Oregon Visibility Protection Plan.

Park construction and rehabilitation proposals would cause localized increases in dust and emissions from construction vehicles and equipment, resulting in localized, short-term effects on air quality. The cumulative actions in conjunction with the no-action alternative would result in short-term, moderate, adverse impacts on air quality. The no-action alternative would contribute a negligible, adverse and possibly negligible, beneficial increment to the cumulative effect.

Conclusion. The no-action alternative would have a negligible, long-term, adverse effect on air quality from a small increase in vehicle use within the park. In accordance with the criteria for determining impairment, there would be no major adverse impacts on air quality, and therefore no impairment of air quality.

The cumulative actions in conjunction with the no-action alternative would result in short-term, moderate, adverse impacts on air quality. The no-action alternative would contribute a negligible adverse and possibly negligible beneficial increment to the cumulative effect.

VISITOR USE

Diversity of Recreational Opportunity

The existing range of visitor experiences would continue unchanged. Activities identified by visitors as important, such as sightseeing, driving, camping, boat tours, and picnicking would continue to be available. Existing hiking opportunities on front and back country trails would continue during the summer months. Opportunities for winter activities (i.e., cross country skiing, snowshoeing) would continue unchanged at Rim Village and along Rim Drive in the winter months. Snowmobile opportunities would

continue along the North Junction road in the winter. There would be no noticeable change in visitor experience or safety, therefore there would be no or negligible impacts on the diversity of visitor experience.

Visitor Access and Circulation

Access to and within the park would be unchanged. There would be no change in management practices to control or manage visitor access. The operation or the location of visitor entrances to the park or the road system used by visitors within the park would not change. Visitors would continue to enter the park from the north and south on Highways 62 and 138. Two-way traffic would continue on Rim Drive and on the Pinnacles Road. The Grayback Drive would remain open to motorized traffic. Scenic driving on the park's road system, particularly year-round private vehicle access to caldera views of Crater Lake at Rim Village, would continue. Visitors would be able to drive from one area in the park to another during the late spring and early fall and would usually be able to be accommodated in existing parking areas. Munson Valley Road to Rim Village would continue to be cleared of snow in the winter. The amount of parking within the park would remain approximately the same as current availability. The number of visitors at peak periods currently causes parking congestion at popular Rim Drive overlooks, particularly Cleetwood Cove, the Watchman, and Phantom Ship. Traffic and parking congestion is also apparent at Rim Village and Mazama Village during the summer months. During congested periods, some visitors are deterred from stopping due to the inconvenient parking and choose to pass by rim pullouts and parking areas, particularly at Cleetwood Cove and the Watchman. Any increase in

congestion would detract from the visitor experience. Perceptions of full parking lots, many vehicles traveling park roads, and traffic noise are important factors in determining the quality of visitor experiences. Access to trailheads and opportunities for day hikes on front country trails along the rim, at Munson Valley, and at Mazama Village would not change. Front country hiking experiences could become crowded during the peak use summer months and change the character of this activity. Visitor surveys indicate that short trails are extremely important to a majority of visitors. Any increase in the use of frontcountry trails during peak periods, particularly along Cleetwood Cove would contribute to congestion and detract from visitor experience. Boat tours would continue at the same levels on the lake and some visitors may not be accommodated due to sold-out tours. Due to anticipated increases in visitor numbers, the change in visitor experience and safety in the way visitors access the park's resources would be readily apparent, and would affect a relatively large number of visitors resulting in moderate long-term adverse impacts to visitor access.

Education and Orientation

Current opportunities for information, interpretation, and education would continue at existing levels and locations. Visitor information would continue to be available throughout the year via personal contact, printed material, and the park's web site. During the summer, visitors would continue to receive information about the park at two visitor centers. Visitor opportunities to learn about park resources would also continue through NPS interpretive programs on the concessioner-operated Crater Lake boat tours. Interpretive outreach programs

including internet information would continue to be upgraded. A science and learning center would be developed at Munson Valley. Learning center opportunities would expand the range of interpretive opportunities but would likely affect a relatively small number of visitors, resulting in a minor, beneficial impact to the diversity of visitor experiences. During the winter, information and orientation to the park would continue at the visitor information building at Munson Valley. Access to interpretative and educational opportunities is important. Sixty-four percent of visitors to Crater Lake use the visitor centers, and 75% of visitors indicated that the availability of information and orientation at the visitor centers was very important to their park experience (Visitor Survey 2001). Over the long term, increased visitation to the park is anticipated during peak periods. Increased visitation could make it more difficult for some visitors to readily obtain park information or to participate in interpretive programs. Changes in visitor experience would be detectable, although the changes would be slight or have barely perceptible consequences to the majority of visitors, resulting in long-term, minor, adverse impacts to visitor interpretive and educational opportunities.

Visitor Facilities and Services

Visitor facilities and services would continue unchanged. Visitors would continue to camp at Mazama Campground and at Lost Creek Campground. Park roads and their associated pullouts and overlooks would be maintained and traffic circulation would be unchanged. Visitors would continue to receive park orientation and information at visitor contact centers at Munson Valley and at Rim Village and would continue to hike both front and back country trails. There would be no

loss, addition, expansion, or change in the number of park facilities. If visitor facilities were not reconfigured or expanded, some crowding along frontcountry trails or in developed areas might occur. Changes in use would be detectable, although the changes would be slight and localized, resulting in minor, long-term, adverse impacts to the visitor's experience of park facilities.

Soundscapes and Scenic Quality

With anticipated increases in visitation the contribution of vehicle noise levels along park roads and at areas of concentrated visitor use, such as Rim Village, Mazama Village, and Cleetwood, would be expected to increase. Any increase in visitation and traffic along Rim Drive would further degrade the opportunity to experience solitude and tranquility while viewing the lake.

A change in the natural sound environment would be readily detectable along transportation corridors and at popular overlooks, viewpoints and trailheads. The changes would affect a relatively large number of visitors but would be localized, resulting in minor long-term adverse impact on soundscapes along park roads. There would be no change in outstanding opportunities for visitors to experience the park's primary resources in their natural and cultural settings. As crowding along Rim Drive escalates, there would be a change in the way many visitors perceive lake views. Because there would be readily apparent changes in viewing the lake under crowded conditions and the change would affect a relatively large number of visitors, a moderate long term adverse impact to the experience of enjoying scenic vistas at the caldera rim is expected under this alternative.

Cumulative Impacts. Past and ongoing projects, including development of front-country trails, reconfiguration of Rim Village, and adaptive reuse of historic structures in Munson Valley and Rim Village, have had long-term, major, beneficial impacts on visitor experience. Reconfiguration of Rim Village would change the way visitors access views of the lake. A walk along the promenade would be possible without having to compete with vehicular traffic. A year-round visitor contact station at the rim would enable winter views of the lake for people of all abilities. Overall these projects have the potential to increase the diversity, of visitor experience, enhance the range of interpretative programs, expand access to park facilities, and to improve the quality of visitor experience values such as sounds of nature and scenic views. The major long-term beneficial impacts of the above other actions, when combined with the impacts of the no-action alternative would result in an overall major, long-term, beneficial impacts. The no-action alternative would contribute a minor to moderate adverse increment as well as a minor beneficial increment to the cumulative impacts to visitor experience.

Conclusion. Overall, under alternative 1 there would be minor to moderate long-term, adverse impacts to the visitor experience. There would also be minor, long-term, beneficial impacts to visitors' educational opportunities. The cumulative actions in conjunction with the no-action alternative would result in major beneficial impacts on visitor experience. The no-action alternative would contribute a minor to moderate adverse and minor beneficial increment to the cumulative effect.

OPERATIONS

Park Operations

Under the no action alternative, no staffing increase is anticipated. Park infrastructure, visitor facilities and services would remain unchanged. Park functions currently stationed in the park would remain in existing park facilities. Some office functions currently conducted in surrounding communities would continue. The relative distribution of disciplines across divisions would remain the same.

The level of effort to protect park resources, maintain park facilities, and to provide for visitor enjoyment is anticipated to slightly increase. Park structures and infrastructure would continue to be supported from the central maintenance facility located at Munson Valley. Munson Valley Road to Rim Village would continue to be cleared of snow during the winter months and Rim Drive would continue to be plowed to allow summer season access as early in the spring as weather dictates. The park would continue to maintain year-round employee residences at Steel Circle and summer season residences at Sleepy Hollow at Munson Valley. Over the long term, the level of resource protection, visitor protection and safety, and the level of education and interpretive effort are expected to slightly increase. The level of staffing as well as the use of facilities and infrastructure would remain unchanged, resulting in a perceptible change in the ability of the park to provide desired services. These changes would be slight but detectable, resulting in minor, long-term, adverse impacts in park operations.

Cumulative Impacts. Past and ongoing projects, including reconfiguration of Rim

Village, adaptive reuse of historic structures in Munson Valley and Rim Village, upgrading the infrastructure at Cleetwood Cove, and highway road improvement projects on Highway 62, have had long-term moderate beneficial impacts on park operations. Overall these projects have the potential to have an appreciable effect on park operations and improve the ability of the park to provide desired services and facilities. Impacts of the above other actions in conjunction with the no-action alternative would result in moderate long-term beneficial cumulative impacts. The no-action alternative would contribute a minor adverse increment to cumulative impacts to park operations.

Conclusion. Overall, under alternative 1 there would be minor long term adverse impacts to park operations. The cumulative actions in conjunction with the no-action alternative would result in moderate, long-term beneficial cumulative impacts. The no-action alternative would contribute a minor adverse increment to cumulative impacts to park operations.

Concession Operations

Under the no-action alternative, existing commercial activities would continue unchanged, although the primary area of commercial activity would shift from Rim Village to Mazama Village. Necessary and appropriate commercial services to meet the needs of visitors and to enhance their enjoyment of the park would continue to be provided at Rim Village, Mazama Village and at Cleetwood Cove. There would be no change in the number or frequency of boat tours on the lake. Because commercial activities would not be affected and there would be no measurable change in operations under

alternative 1, there would be new impacts on concession operations.

Cumulative Impacts. Past actions including restoration of the Crater Lake Lodge, reconfiguration of facilities at Rim Village, Mazama Village, and Cleetwood Cove have had moderate, long-term beneficial impacts on concessioner operations. The no-action alternative would not contribute to cumulative impacts on concession operations.

Conclusion. Overall, under alternative 1 there would be negligible long term adverse impacts to concession operations. The no-action alternative would not contribute to cumulative impacts on concession operations.

SOCIOECONOMIC ENVIRONMENT

Park staffing remains relatively constant at 75 full-time equivalent positions (FTEs). The park's annual budget also remains the same (\$4,027,000 in 2003) except for small increases due to inflation and the rising costs of goods and services utilized by the park. Facilities, park operations, and recreational uses are maintained. Current conditions and trends continue. Most facilities and services within the park would remain essentially the same as now. Without a long-term, comprehensive management plan, park managers would accommodate changing visitor use patterns, uses, and volumes, and changes in resource conditions, as they occurred or in response to pressure from various interest groups. The current upward trend in visitation continues. While visitation can and does fluctuate from year to year, the historic growth rate of approximately 1.4% is assumed to continue for the life of this plan.

Additional funding for specific currently authorized projects would amount to \$7,906,900 (\$6,402,900 federal dollars + \$1,504,000 private dollars, see appendix C). These projects do not occur all at the same time but are phased in over a number of years. The impacts (e.g., increase in income, creation of jobs, etc.) on individual firms and employees could be short term, moderate to major, and beneficial for individuals and affected firms. However, impacts on the regional economy (with nearly \$5.0 billion in earnings and about 187,000 jobs in 2001) as measured by economic indicators (e.g., a substantial increase in income or a decrease in unemployment or poverty, etc.) would be negligible.

Crater Lake National Park would continue to be a substantial contributor to the regional economy and some local gateway communities' economies as a result of jobs provided, and wages and operational expenditures by the National Park Service. In addition, the park serves as a key attraction for the local and regional tourism industry. The visiting public would continue to generate tourism related spending within the regional and local economies, which benefits businesses by generating income and providing employment opportunities.

However, the three-county region would not be affected due to the size and diversity of the regional economy. Individual gateway communities may be affected by specific projects occurring in the park. However, the number and types of businesses located in the local gateway travel corridors are small. Since there are few local businesses that can be affected by the continuing operations of the park, and the park would continue to operate and be open to the public, and this alternative continues current policies and programs,

no changes in the types or amounts of impacts would occur as the result of this alternative.

Cumulative Impacts. Additional changes or shocks (either positive or negative) to the local and regional socioeconomic environment within which the park exists are not expected. No other actions that could have cumulative effects when combined with the impacts of the no-action Alternative have been identified during this planning process, which has included public participation and input. The park continues to be an important visitor attraction bringing visitors to the region resulting in tourism related expenditures in the area. Expenditures by the Park Service to operate and maintain the park continue to contribute positive direct benefits to the local and regional economies. In conjunction with other past, present, and reasonably foreseeable actions, no additional cumulative impacts are expected.

Conclusion. The park's staff levels and base budget would not change under the no-action alternative other than as a result of adjustments for inflation and rising labor and materials costs. Approved projects over and above regular operations of the park, which would be funded under the no-action alternative, would amount to about \$7,906,900 in direct expenditures. These projects would be phased-in over a number of years, so impacts on individual firms and employees could be moderate to major, short term, and beneficial, but impacts on the regional economy would be negligible. The current range and level of impacts (tourism spending and park spending) on adjacent communities would continue to be beneficial providing income, employment, and business

opportunities to the local and regional economy.

The no-action alternative would continue to have a minor to moderate short-term beneficial impact on the socioeconomic climate of the gateway communities and regional area, primarily because of ongoing maintenance of facilities and programs and some limited development projects. The overall current level and types of impacts would remain the same. In the long-term, the park would continue to be an important visitor attraction and contributor to the tourism industry in the three-county region.

UNAVOIDABLE ADVERSE EFFECTS

There would be no unavoidable adverse impacts of major intensity that would result from implementing alternative 1. Alternative 1 would result in moderate adverse impacts to visitor access along Rim Drive and Mazama Village. The negligible and minor impacts are described in the foregoing analysis.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The vast majority of the park would be protected in a natural state and would maintain its long-term productivity. Adverse impacts on the park's soils, water quality, and wildlife from continuing visitor activities could reduce the productivity of the park's natural resources in localized areas over time.

**IRREVERSIBLE OR IRRETRIEVABLE
COMMITMENTS OF RESOURCES**

Construction materials and energy used would be irretrievably lost. There would also be an irretrievable and irreversible

commitment of resources in terms of funds expended on both labor and construction materials. Because it takes so long for soils to form, the loss of soils due to visitor use in localized areas would be an irreversible commitment of resources.

IMPACTS OF IMPLEMENTING ALTERNATIVE 2 – PREFERRED ALTERNATIVE

CULTURAL RESOURCES

Archeological Resources

Implementation of this alternative would generally have the same impacts on archeological resources as those listed under alternative 1, although provision of more diversified visitor experiences along the Rim Drive corridor, including development of new trails, picnic areas, and improved pullouts, parking areas, and overlooks, could have additional minor, long-term and permanent adverse impacts on archeological sites. Development of the new science learning center in the superintendent's residence would also result in additional minor, long-term, and permanent adverse impacts on archeological sites.

Cumulative Effects. Implementation of this alternative would generally have the same cumulative effects on archeological resources as those listed under alternative 1, although development projects and improvements along the Rim Drive corridor, as well as development of the new science learning center in the superintendent's residence, would contribute minor, long-term, and permanent adverse effects to any overall cumulative impact on archeological resources.

Conclusion. Implementation of this alternative would generally have the same impacts on archeological resources as those listed under alternative 1.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the

cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with archeological resources.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on archeological resources would be no adverse effect.

Historic Structures/Buildings

Although implementation of alternative 2 would generally have the same impacts on historic structures/buildings as those listed under alternative 1, rehabilitation and adaptive use of some historic structures/buildings for new functions would have moderate, long-term, beneficial impacts on those structures/buildings.

Cumulative Effects. Implementation of this alternative would have the same cumulative effects on historic structures/buildings as those listed under alternative 1, although rehabilitation and adaptive use of some historic structures/buildings for new functions would contribute moderate, long-term, beneficial effects to any overall cumulative impact on historic structures/buildings.

Conclusion. Implementation of this alternative would have the same impacts on historic structures/buildings as those listed under alternative 1, although rehabilitation and adaptive use of some historic structures/buildings for new functions would have moderate, long-

term, beneficial impacts on those structures/ buildings.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park’s establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this General Management Plan or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with historic structures/ buildings.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on historic structures/buildings would be no adverse effect.

Cultural Landscapes

Implementation of this alternative would generally have the same impacts on cultural landscapes as those listed under alternative 1. Although development of new trails, picnic areas, and improved pullouts, parking areas, and overlooks in the Rim Drive corridor would have some additional minor, long-term, adverse impacts on the Rim Drive cultural landscape. However, management of parking and road congestion along the road by defining and formalizing existing pullouts, parking areas, and overlooks would be expected to have minor, long-term, beneficial impacts on the Rim Drive cultural landscape because the historic character and general design features of the road corridor would be preserved.

Cumulative Effects. Implementation of this alternative would generally have the

same effects on cultural landscapes as those listed under alternative 1. Development projects and improvements along the Rim Drive corridor would contribute minor, long-term, adverse effects to any overall cumulative impact on the Rim Drive cultural landscape. However, improvements along the road to manage parking and road congestion would be expected to contribute minor, long-term, beneficial impacts to preservation of the historic character and general design features of the road corridor.

Conclusion. Implementation of alternative 2 would generally have the same impacts on cultural landscapes as those listed under alternative 1. Although development projects and improvements along the Rim Drive corridor would contribute additional minor, long-term, adverse effects on the Rim Drive cultural landscape, improvement along the road to manage parking and road congestion would be expected to have minor, long-term, beneficial impacts on preservation of the historic character and general design features of the road corridor.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park’s establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with cultural landscapes.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on cultural landscapes would be no adverse effect.

Ethnographic Resources

Implementation of this alternative would generally have the same impacts on ethnographic resources as those listed under alternative 1, although emphasis on expanded and diverse recreational and educational opportunities in the national park for visitors would have minor, long-term, adverse impacts on such resources. Although expanded visitor activities could result in intrusion on significant sacred sites or landscapes, important traditional use activity areas, and ceremonial practices, these impacts would be generally slight but noticeable. However, educational opportunities would be provided to park visitors to heighten their awareness of the importance of ethnographic resources and the need to respect tribal access to such sites as well as a group's ceremonial practices.

Cumulative Effects. Implementation of alternative 2 would have the same cumulative effects on ethnographic resources as those listed under alternative 1. Emphasis on expanded and diverse recreational and educational opportunities for visitors, however, would contribute minor, long-term, adverse effects to any overall cumulative impacts on ethnographic resources.

Conclusion. Implementation of this alternative would generally have the same impacts on ethnographic resources as those listed under alternative 1, although emphasis on expanded recreational opportunities would have minor, long-term, adverse impacts on such resources.

There would no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural

integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this General Management Plan or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with ethnographic resources.

Section 106 Summary. No Traditional Cultural Properties are affected by actions under this alternative. Thus, Section 106 determinations are unnecessary.

Museum Collections

Implementation of this alternative would have beneficial, minor to moderate, long-term impacts on the park's museum collections because the increased volume of the collections that would result from expanded park research activities, as well as acquisition of pertinent park-related collection materials not currently owned or managed by the National Park Service, would be stored in both onsite and offsite facilities that meet professional and National Park Service museum standards. Thus, provision for adequate storage and workspace would be provided to improve curation, protection, and access to the collections, and staffing would be upgraded to reduce the cataloging backlog.

Cumulative Effects. Since the national park was established the combination of limited staffing and lack of storage and workspace meeting professional and National Park Service museum standards have hindered endeavors to improve care of and access to the park's museum collections and address the ever-increasing cataloging backlog, thus having minor to moderate, long-term, adverse impacts on such resources. Actions under this alternative, such as expansion of the collections and their storage in both onsite

and offsite facilities, would contribute beneficial, minor to moderate, long-term effects to any overall cumulative impacts on the park’s museum collections.

Conclusion. Implementation of alternative 2 would have beneficial minor to moderate long-term impacts on the park’s museum collections.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park’s establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with museum collections.

NATURAL RESOURCES

Biotic Communities

The greater emphasis on research, partnering, and visitor education would greatly enhance the opportunities for positive effects on resources within the park. The following actions would potentially have localized minor to more widespread moderate, long-term, beneficial effects on biotic communities. The intensity of the effects would likely be greater over time as more knowledge of the resources is accumulated, partnerships expanded, and resource management actions were implemented that further preserved and restored native species, communities, and processes.

Expanded opportunities for research and greater collaboration and communication between park resource staff and members

of the scientific community would provide valuable information and working relationships relevant to managing and preserving the park’s resources. The quality and quantity of information would be enhanced, as would integration of research and data collection with resources management, which would contribute to more informed and better management decisions. Park management could become more proactive in determining desired resource conditions and identifying and addressing potential impacts or threats. Research and the information gained would allow for not only better management of resources within the context of the park, but within a broader regional and global ecological context as well. All these actions would indirectly contribute to improved resource conditions by enhancing the park service’s knowledge and capabilities for restoring and maintaining native species, communities, and processes. Some adverse impacts to resources from research activities such as vegetation and soil trampling could occur but would be localized and negligible.

Increased partnerships with the scientific community and others would provide a wider base of expertise to draw upon in making management decisions. Increased monitoring and restoration programs would also be possible through partnerships.

Enhanced visitor education opportunities could also indirectly benefit native species, communities, and processes. Improved education and interpretation would increase the public’s appreciation, understanding, and stewardship for these resources, which may reduce the potential for visitor-related impacts. This broader base of public support and advocacy would also aid in accomplishing the park’s

resource protection and preservation programs and initiatives.

Conversion of the Grayback Trail to non-motorized use would have localized long-term benefits because of reduced noise along the trail corridor that may reduce disturbance of nearby wildlife species. Beneficial effects would likely be minor because of the relatively low levels of motorized use that would be eliminated and the continued presence of hikers and bikers along the corridor. Seasonal closure of a section of the Rim Drive to motorized use would have similar effects.

Possible future implementation of alternative transportation systems would reduce or eliminate localized effects on vegetation, soils, and wildlife habitat such as trampling and erosion that were described under the no action alternative. This would result in long-term, negligible to minor benefits.

Adaptive use of existing buildings is expected to result in negligible new resource impacts. These buildings are located in existing, previously disturbed developed areas. Construction and use of new facilities (i.e., picnic areas, short trails) and minor improvements of existing pullouts, parking areas, and overlooks in frontcountry zones along the Rim Drive and other park roads would result in site-specific loss of soils, vegetation, and wildlife habitat. There would also be increased human disturbance to wildlife. Individuals, populations, and species vary in their sensitivity to disturbance and visitor use might disturb or displace some individual animals, particularly those species more sensitive to human disturbance. Certain wildlife may also become habituated to human presence or attracted to the increased food source visitors provide. Specific locations for new

facilities have not been identified; however, siting them primarily in or adjacent to previously developed or disturbed sites within the park and avoiding sensitive resources such as wetlands or whitebark pine stands, would minimize additional loss of vegetation, soils, and habitat and disruption to wildlife. Long-term adverse impacts would be localized and minor. Mitigation measures such as topsoil salvage, erosion control, and revegetation would minimize construction impacts.

Administrative and office functions relocated from the park to nearby communities would be housed in existing structures if possible. However, if new buildings were necessary, construction activities would have short-term effects on soils and vegetation. Depending on whether or not facilities were built on previously disturbed sites, the long-term adverse effects with mitigation would be negligible to minor.

Winter recreational activities occur during the time when wildlife are stressed by cold weather and food shortages. Disturbance or harassment of wildlife during this sensitive time could have negative effects on individual animals, and in some cases populations, particularly when populations are low. Winter recreation, such as snowmobiling and skiing, could create added energetic stress in winter when most wildlife species are already stressed (NPS 1999d). The effects of winter recreational activities in the park are unknown, although, disturbance would likely be limited because visitor use levels are expected to remain relatively low and would continue to occur within limited areas within the park. Snowmobiling would also be restricted to current levels. The park service would initiate a long-term data gathering and monitoring

program to evaluate winter use and associated impacts to ensure long-term protection of park resources. Management actions, such as restrictions on offtrail use, specific area closures, increased patrols, visitor education, or limits on use or party sizes, would be taken as necessary to address impacts. Wildlife could benefit from increased protection measures, although the extent of potential beneficial would likely be localized and minor.

Cumulative Impacts. Cumulative impacts on biotic communities from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). Overall cumulative impacts would be long-term, and both major adverse and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs affecting lands both within and outside of the park. The preferred alternative's contribution to adverse cumulative impacts would be minor. However, actions under alternative 2, particularly increased research, partnering, and visitor education, would promote the further protection, maintenance, and restoration of native communities. Therefore, alternative 2 would also contribute a minor to moderate, beneficial effect to the overall cumulative impacts.

Conclusion. The greater emphasis on research, partnering, and visitor education under this alternative would indirectly contribute to improved resource conditions within the park, potentially having localized minor to more widespread moderate, long-term, beneficial effects on biotic communities. Long-term adverse impacts from construction and use of new facilities would be localized

and minor. Biotic communities would not be impaired by the actions proposed under this alternative.

Cumulative impacts would be long term and both major, adverse, and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park, and beneficial impacts would be from restoration and protection programs affecting lands both within and outside the park. Alternative 2's contribution to adverse impacts would be minor and its contribution to beneficial effects minor to moderate.

Threatened, Endangered, and Sensitive Species

Similar to impacts discussed under biotic communities, greater emphasis on research, partnering, and visitor education under this alternative would also enhance the opportunities for positive effects on threatened and endangered species and their habitat within the park through increased knowledge and better informed management. Any research proposals would be reviewed on a case-by-case basis so that potential adverse effects to these species or their habitats could be avoided.

Some inconsequential changes to habitat or loss of individual sensitive plant species might occur from new development or use as described below. New facilities would be limited and small in scale. They would primarily be placed within currently developed or previously impacted areas or corridors, or where human use is already occurring, thus minimizing the potential for adverse effects. Site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in any proposed

project area. If any were located or if an action occurred within suitable habitat, the National Park Service would consult with the U.S. Fish and Wildlife Service and Oregon Department of Natural Resources to determine mitigation measures to avoid or minimize adverse impacts on the species.

As discussed under the biotic communities impact topic, the Park Service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of threatened and endangered species. Because of a number of factors, such as limited occurrence, small populations, low densities, and/or low birth rates, these species are more vulnerable to impacts than general wildlife populations. Some species (lynx, wolverine, fisher) could benefit from increased protection measures, although the extent of potential beneficial effects is unknown. Greater beneficial effects would occur if for example, den sites were located and measures were taken to protect them from disturbance.

Based on the nature of the actions being proposed along with a commitment to conduct surveys, consultation with the U.S. Fish and Wildlife Service and Oregon Department of Natural Resources, and implementation of appropriate mitigation measures, this alternative would avoid or minimize adverse effects on threatened and endangered species. However, alternative 2 could result in some adverse effects on some threatened or endangered species. (Further rationale is provided below by individual species.)

Canada lynx, California Wolverine, and Pacific Fisher. Although the park has conducted extensive surveys for Canada lynx and wolverine in the park, none have been detected. All these species require

large expanses of land relatively free from human use. Because of the extent of suitable habitat within the park, new development and associated visitor use would likely occur within or near suitable habitat, which would incrementally contribute to habitat loss and fragmentation. Increased human noise and activity could disturb and displace these species. However, development would be located primarily in nonwilderness areas in or adjacent to existing developed areas and roadways. Because of the existing development and use in these areas, adjacent habitat would not be readily used and would probably be avoided by these species. Some new backcountry trail links would be established to connect into the park's backcountry network of trails. These new trails would be zoned for low levels of use, would require only minimal clearing of vegetation and, would impact a relatively small area, potentially affecting only a small fraction of these species' territory or the extent of suitable habitat.

Bald Eagle. There would be little if any adverse impact on the primary food sources (fish and carrion) of the bald eagle. No new development or use would occur near the existing nest site along the Crater Lake shoreline. Tour boats would continue to be restricted from areas on the lake that are near the nest site. The primary area for potential nest sites for this species would likely be within the caldera. Potential new development along the rim, such as trails and picnic areas, could affect potential nest site habitat. However, new development would affect little of the overall amount of suitable habitat along the rim or within the caldera. Prior to new development, surveys would be completed to identify suitable habitat and locate nest sites. New development would be sited and designed to avoid impacts to nesting eagles.

Northern Spotted Owl. Current management practices that would continue under alternative 2 include protecting identified nest sites from human activities. Although new development and associated use could be located within patches of old growth stands identified as suitable habitat, no development would occur near known nest sites or within associated protective buffer zones. Most development would be in or adjacent to existing developed areas and roadways, thus minimizing the likelihood of disturbance. Conversion of the Grayback Trail to non-motorized use could reduce disturbance to a known owl nest site because of reduced noise along the trail corridor, although the nest is located over 1.2 miles away from the road.

Northern Goshawk. Development of frontcountry facilities along roadways (e.g., picnic and parking areas, trails) could result in the loss of goshawk habitat, primarily where facilities were located in forested habitats. These developments would impact a relatively small area and would potentially affect only a small fraction of any nesting pair's much larger territory or the extent of suitable habitat. Surveys to locate nest sites would be completed prior to facility construction and those sites avoided.

Peregrine Falcon. Peregrines are known to be sensitive to disturbances such as human presence above their nest site. No new development would be located in or above the area of the one known nest site within the caldera. Tour boats would also continue to be restricted from areas on the lake that are near the nest site. New development such as trails or picnic areas along the rim could result in visitor use above some caldera cliff faces that could provide potential nest sites. However, new development would affect very little of the

overall amount of suitable habitat along the rim or within the caldera. Prior to new development, surveys would be completed to identify suitable habitat and locate nest sites. New development would be sited and designed to avoid impacts to nesting falcons.

Bull Trout. Some frontcountry development could occur within the Sun and Lost Creek drainage basins near the Grayback and Rim Drive Road intersection and the Lost Creek campground. Runoff from areas disturbed by construction could lead to increased sedimentation that could affect bull trout habitat in Sun Creek. Design and location of facilities would take into consideration such parameters as soil types, slopes, and vegetative cover in order to minimize disturbance and potential runoff. A vegetative buffer would be maintained between facilities and creek headwaters. Best management practices such as erosion and sediment controls and revegetation would be implemented to eliminate or reduce both short- and long-term impacts.

Conversion of the Grayback Trail to nonmotorized use could have localized long-term benefits because the elimination of vehicles would reduce erosion that could affect bull trout habitat in Sun Creek. Beneficial effects would likely be negligible because of the relatively low levels of motorized use and associated impacts that would be eliminated. The park would continue to take actions to stabilize and minimize areas of erosion along this trail.

Pumice Grapefern, Shasta Arnica, and Crater Lake Rockcress. The location of these plants would continue to be protected and the populations monitored. Because of the limited new development and use along the rim that would occur,

disturbance to populations of these plants would be negligible. For example, some small loss of habitat or individual plants might occur where new picnic areas or trails along the rim were developed. However, locations for any new development or trails would be surveyed for the presence of these species, and measures to avoid or minimize adverse impacts would be implemented.

Cumulative Impacts. Cumulative impacts on threatened and endangered species from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). Overall cumulative impacts would be both adverse and beneficial. Adverse impacts would be primarily due to land management activities in the region. Park programs would adversely affect some individuals or habitat in the short term, but would not likely adversely affect threatened and endangered species in the long term because long-term effects would be beneficial. Alternative 2 could contribute some adverse effects on threatened or endangered species but could also contribute beneficial long-term effects to the overall cumulative impacts.

Conclusion. Greater emphasis on research, partnering, and visitor education under this alternative would enhance the opportunities for positive effects on threatened and endangered species and their habitat within the park. New development could result in small, localized reductions in habitat. The survey, avoidance, mitigation, and consultation actions that the Park Service would take would help ensure that this alternative would avoid or minimize adverse effects on threatened and endangered species. Alternative 2 could result in some adverse effects on threatened or endangered

species but would not result in impairment to these species. Alternative 2 could contribute some adverse effects on threatened or endangered species but could also contribute beneficial long-term effects to the overall cumulative impacts.

Crater Lake

Impacts to Crater Lake, as in alternative 1, would be minimized by proactive management actions to prevent contamination to the lake. Development within the caldera and lake drainage would be minimal, preventing the addition of sediments, minerals or contaminants that could reduce water quality. Park operations such as snowplowing would continue to be managed to minimize addition of contaminants to the lake ecosystem. Current restrictions on access and boating would continue.

The Crater Lake Long-Term Limnological Program would continue its interdisciplinary monitoring and research program. The program would continue to inform management of the lake's status, variability, and trends. And contributes to the scientific understanding of Crater Lake and other large-lake and ocean ecosystems. This alternative expands the research and monitoring programs of the park through expanded partnerships and the establishment of the new science and learning center. Expanded research efforts would include

- modeling ecosystem components and interactions among biological, physical, and chemical processes, including food web interactions and the impacts of introduced fish
- optical studies of the lake to include the effects of abiotic and biotic particles lake clarity
- paleo-limnological studies

- studies of benthic and nearshore communities

Expanded research and monitoring would result in long-term beneficial impacts to the water quality of Crater Lake.

Cumulative Impacts. Cumulative actions would contribute both adverse and beneficial impacts to water quality.

As called for in the Visitor Services Plan, only essential services would be provided at the rim. Included in this plan is the proposal to relocate the cafeteria parking behind the cafeteria. This would decrease the snow blown into the caldera during snowplowing and thereby decrease possible hydro carbons and vehicle related contaminants.

Improvements in boating technology by conversion of research and tourboats to 4-stroke motor or direct fuel injection would also prevent contaminants that could reduce water quality. Personal watercraft would continue to not be allowed on the lake, and access to the lake would continue to be provided by a single access. Water quality could benefit from these increased protection measures, although the extent of potential beneficial effects is unknown, but would likely be localized and minor.

Conclusion. The no-action alternative would have a negligible, long-term, beneficial effect on water quality within Crater Lake. In accordance with the criteria for determining impairment, there would be no major adverse impacts on water quality, and therefore no impairment of water quality.

Water Resources

The construction or rehabilitation of facilities would have the potential to impact water quality through ground disturbance, which would result in increased surface runoff and erosion. However, due to the limited extent of proposed developments and implementation of mitigation measures, such as silt fences, erosion control blankets, mulch, and revegetation to control impacts, increased sedimentation and turbidity would be temporary and negligible.

Relocation of some park administration functions outside the park would likely have little effect on water use in the park because the existing building would be used for other functions. Adaptive use of existing buildings is expected to have a negligible effect on water use within the park. New overnight use by a small number of visiting researchers, scientists, and artists would be accommodated in existing facilities. This is expected to result in a negligible, if any, increase in overall water demand. Incorporation of water saving features into facilities would be expected to offset most of the increased use.

Under this alternative, snowmobile use would be restricted to existing use levels. Similar to alternative 1 (no-action alternative), because snowmobiles raise concerns about long-term impacts from high pollution emissions, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study. Management actions to mitigate nonpoint source pollution would be implemented if necessary. Water quality could benefit from increased protection measures, although the extent of potential beneficial

effects would likely be localized and minor.

Cumulative Impacts. Cumulative impacts on water resources from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). The park's fire management program might adversely impact water quality (e.g., sedimentation, erosion) due to the effects of fires, particularly high intensity fires. Park construction and rehabilitation proposals would also contribute to adverse impacts from increased surface runoff and erosion. Best management practices such as erosion and sediment controls would be employed to minimize these impacts. Impacts would be localized, short-term, and minor. Minor beneficial cumulative actions would include ongoing trails rehabilitation and relocation within the park that would reduce localized erosion and runoff.

The replacement of the waterline from Munson Springs to Garfield would likely reduce water loss by the system. Implementation of actions within the *Visitor Services Plan* would also reduce water use within the park. Reductions in water use would have a minor beneficial effect on water quantity in Annie Creek.

The impacts of other actions described above in conjunction with the impacts of alternative 2 would result in localized, minor, adverse, and beneficial impacts on water quality and minor beneficial effects on water quantity in Annie Creek. Alternative 2 would contribute a negligible adverse impact on water quality and negligible decrease in water quantity in Annie Creek to the overall cumulative impact.

Conclusion. Alternative 2 would have a negligible adverse effect on water quality due to construction activities and a negligible effect on Annie Creek water quantity. Water quality could benefit from increased protection measures, although the extent of potential beneficial would likely be localized and minor. Water resources would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 2 would result in short- and long-term negligible to localized, minor adverse and beneficial impacts on water quality and quantity. Alternative 2 would contribute a negligible, adverse impact on water quality and negligible, decrease in water quantity in Annie Creek to the overall cumulative impact.

Air Quality

Seasonal closure of a portion of the Rim Drive and closure of the Grayback Trail to motorized use would benefit air quality because of reduced vehicular emissions in these areas. Beneficial effects would be localized and negligible because of the relatively low levels of motorized use that would be eliminated.

There would be some short-term, localized impacts on air quality resulting from particulates or machinery fumes generated during construction, removal, or rehabilitation of facilities under some alternatives. Mitigation measures such as watering and revegetation of disturbed areas, requiring machinery to meet emission standards, would be employed. Effects would be short term and negligible, lasting only during the construction period.

Under this alternative, snowmobile use would be restricted to existing use levels. Similar to alternative 1 (no-action

alternative), because snowmobiles raise concerns about long-term impacts from high pollution emissions, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study. Management practices to mitigate nonpoint source pollution would be implemented as necessary. Air quality could benefit from increased protection measures, although the extent of potential beneficial would likely be localized and negligible.

Cumulative Impacts. Cumulative impacts on air quality from actions in the park and surrounding lands would be similar to those described for the no-action alternative. The park's air quality is very good with negligible effects from regional pollution sources outside of the park. Forest fires on surrounding lands could contribute particulates for limited periods of time. Degradation of air quality from the park's fire management program could result in moderate short-term impacts, but the program would be in conformance with the Clean Air Act, Oregon State Smoke Management Plan, and the Oregon Visibility Protection Plan. Park construction and rehabilitation proposals would cause localized increases in dust and emissions from construction vehicles and equipment, resulting in localized short-term effects on air quality. The cumulative actions in conjunction with the no-action alternative would result in short-term, negligible to moderate, adverse impacts on air quality. Alternative 2 would contribute a negligible, short-term adverse and negligible, long-term, beneficial increment to the cumulative effect.

Conclusion. Long-term, beneficial impacts to air quality within the park would be minor. Short-term construction

related impacts would be negligible. Air quality would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 2 would result in short-term moderate adverse impacts on air quality. Alternative 2 would contribute a negligible, short-term, adverse, and negligible, long-term, beneficial increment to the cumulative effect.

VISITOR USE

Diversity of Recreational Opportunity

Under alternative 2 there would be a focused range of visitor experiences emphasizing research, learning, and more in-depth experience of park resources. Visitors would have opportunities to participate in guided field trips, seminars, and workshops. This focused learning environment would enable park interpreters and partnering researchers to convey a broader range of information and involve park visitors in hands-on learning experiences about both natural and cultural park resources. In frontcountry areas at Munson Valley, Rim Village, and along Rim Drive, there would be expanded opportunities to experience the rustic designed architecture of park buildings and roads in their cultural settings.

Existing recreational opportunities would remain, including scenic driving, front country and back country hiking, picnicking, and nature viewing. Winter activities, including snow-camping, cross-country skiing, and snowshoeing would continue as would snowmobile access along the north entrance road to North Junction. Use of snow coach access would be encouraged on the North Entrance road. Greater diversity of visitor use along Rim Drive would be provided by

seasonal closures of sections of East Rim Drive during the autumn shoulder season, allowing visitors an opportunity to experience the primary resource of the park in ways other than driving, as new (nonmotorized) uses would be encouraged in areas that have space to accommodate them. Nonmotorized recreational opportunities would be available along Grayback Drive.

Because there would be an addition in recreational opportunities (seasonal non-motorized use along Rim Drive) and an expansion of existing educational / interpretive programs (in-depth, focused educational field trips and seminars), the change in the diversity of visitor experience would be highly noticeable, exceptionally beneficial, and would affect relatively large numbers of visitors, resulting in a major beneficial impact on the diversity of visitor opportunity.

Visitor Access and Circulation

Under alternative 2 the road system would continue to be accessible during peak visitor use times in the summer months. Traffic congestion, especially along Rim Drive during the summer season, would be managed by improving existing pullouts, parking areas, and overlooks. If warranted by future crowding, shuttles and other alternative transportation systems would be used to alleviate congestion along Rim Drive between Cleetwood Cove and Rim Village. A feasibility analysis would determine whether the shuttle would be a concession, Park Service operated, or a service contract. There would be some change to motor vehicle accessibility to portions of east Rim Drive during the shoulder autumn season when portions of East Rim Drive would be closed to motorized traffic on an experimental basis resulting in reduced motorized access.

Grayback Drive would be closed to motorized traffic throughout the year. Private vehicle access to the rim in the winter would continue. Snowmobile access and permits for snow coach tours would continue on the North Entrance Road to North Junction. Because there would be no noticeable change in the way visitors experience the park in the winter, there would be negligible impacts to visitor accessibility to park resources during the winter season. Overall, changes in motorized accessibility in the park would be detectable, localized in area, and of short duration affecting a relatively small number of visitors resulting in minor, long-term, adverse impacts to motorized accessibility.

New trails would be developed in localized frontcountry areas along the park's road system. There would be new hiking and biking opportunities along East Rim Drive during the autumn. Improvements to existing front country hiking trails and development of new front country trails would result in greater trail accessibility. Visitor surveys indicate that short trails are extremely important to a majority of visitors. Expansion of frontcountry trails, the addition of seasonal nonmotorized hiking and biking opportunities along East Rim Drive, and the addition of year-round hiking and/or skiing, snowshoeing, and biking opportunities along Grayback Drive would be readily apparent. Ninety-three percent of visitors responding to the 2001 Visitor Survey indicated that short, frontcountry trails were either very important or extremely important. Because front country trail access would be expanded and new front country non-motorized trail opportunities would be added an exceptionally beneficial impact on trail accessibility would normally be expected, however because visitation to the park during the fall shoulder season is

considerably reduced from peak use these additions and expansions of nonmotorized trail opportunities would affect a relatively small number of visitors resulting in minor to moderate, long-term, beneficial impacts on trail accessibility.

Education and Orientation

Under alternative 2 existing passive interpretive opportunities would continue and interpretive programs and educational services would increase in number and in depth of information. Opportunities to participate in educational programs would increase with the development of a science and learning center at Munson Valley. Partnerships with universities, museums, other agencies, and researchers would expand the breadth and depth of knowledge of park resources and enrich interpretive programs. Visitors would have the opportunity to participate in a wide variety of educational programs such as focused guided field trips, workshops, and seminars. Interpretation of park resources would be provided by researchers guiding special indepth tours, participatory field trips, and seminars. Park interpreters would provide research-based programs. Guided hikes and interpretation on concession-operated boat tours would focus on participatory, learning experiences for visitors. New and expanding sources of information about park resources would be available to park visitors and would be conveyed in a broader context as technology advanced and new educational venues developed. Because the variety and range of interpretive programs would increase and expand, the change to visitor opportunities to participate in educational and interpretive programs would be highly noticeable. These changes in the interpretive program would affect relatively large numbers of visitors, resulting in a major, long-term,

beneficial impact on visitors' opportunities to participate in interpretive programs.

Visitor Facilities and Services

Opportunities for visitors to access and use park facilities and services would increase. New and expanded uses of park facilities would open some park buildings and structures for visitor use and enjoyment. Visitors would gain new opportunities to experience east Rim Drive and its associated pullouts and overlooks without vehicular traffic during the fall. Grayback Drive would provide non-motorized opportunities year-round. Participation in workshops and seminars conducted in park buildings and other structures would expand and change visitor use of park facilities. These changes would be highly noticeable, a relatively large numbers of visitors would be affected, and the changes would be exceptionally beneficial. Therefore alternative 2 would have a major, beneficial, long-term impact on the visitor's experience of park facilities and services.

Soundscapes and Scenic Quality

Development of frontcountry trails would occur in localized areas along the park's transportation corridor resulting in detectable, localized, but small changes to the natural sound environment in these areas. This would result in negligible long-term, adverse impacts to soundscapes at park trailheads. Closing portions of East Rim Drive to vehicular traffic in the autumn shoulder season would enhance the natural soundscape along this portion of the lake caldera. This change would be detectable, although the change would affect a relatively small number of visitors and would be localized in area resulting in minor beneficial long-term

impacts to soundscapes along east Rim Drive.

With the seasonal closure of East Rim Drive in the fall, visitor opportunities to sightsee in the park would experience a change during that season. Scenic views of the lake without the intrusion of vehicular traffic would be possible. During peak use periods in the summer opportunities for visitors to sightsee in the park, including motorized sightseeing along Rim Drive, would remain unchanged. There would be a noticeable change in visitor experience in viewing the lake in the autumn. This change would be highly noticeable, but would affect a relatively small number of visitors and be localized in area, resulting in a minor, beneficial impact on visitor opportunities to sightsee and enjoy the park's scenic views.

Cumulative Impacts. Past and ongoing projects, including development of front-country trails, reconfiguration of Rim Village, and adaptive reuse of historic structures in Munson Valley and Rim Village, have had long-term, major, beneficial impacts on the visitor experience. Reconfiguration of Rim Village would change the way visitors access views of the lake at Rim Village. A walk along the promenade would be possible without having to compete with vehicular traffic. A year-round visitor contact station at the rim would enable winter views of the lake for people of all abilities. Overall these projects have the potential to increase the diversity, of visitor experience, enhance the range of interpretative programs, expand access to park facilities, and to improve the quality of visitor experience values such as sounds of nature and scenic views. The impacts of

the above other actions, when combined with the impacts of the no-action alternative would result in a major, long-term, beneficial impact. Alternative 2 would contribute a minor to major, beneficial increment to cumulative impacts to the visitor experience, because alternative 2 would add new and expanding existing visitor opportunities. Alternative 2 would also contribute minor, long-term adverse increment to cumulative impacts due to the seasonal closure of East Rim Drive.

Conclusion. Alternative 2 would have a major beneficial impact on the diversity of visitor experience. Under this alternative visitors would experience minor, long-term, adverse impacts on vehicular access with the seasonal closure of East Rim Drive but would gain minor to moderate, long-term, beneficial impacts on frontcountry trails accessibility. There would be major beneficial impacts to visitor enjoyment of educational and interpretive programs and access to park facilities and services. Opportunities for visitors to enjoy scenic views would be expanded along the caldera rim resulting in minor beneficial impacts to scenic viewing opportunities. The cumulative actions in conjunction with the no-action alternative would result in an overall major, long-term, beneficial impact. Alternative 2 would contribute a minor to major beneficial increment to cumulative impacts to the visitor experience, because this alternative would add new and expanding existing visitor opportunities. Alternative 2 would also contribute a minor, long-term, adverse increment to cumulative impacts due to the seasonal closure of East Rim Drive.

OPERATIONS

Park Operations

Under alternative 2 existing buildings and facilities would be adaptively used for new functions and uses. Researchers and scientists would stay in the park year-round increasing all season use of park buildings. Use of park facilities is expected to be constant but short term with frequent turnover, necessitating increased maintenance responsibilities in preparing and maintaining park buildings for and in use. Maintenance of year-round residences at Steel Circle and summer season residences at Sleepy Hollow in Munson Valley would continue. Park maintenance staff would continue to support park operations from the central maintenance facility located at Munson Valley. Munson Valley Road to Rim Village would continue to be cleared of snow during the winter months and Rim Drive would continue to be plowed to allow summer season access as early in the spring as weather dictates. Because changes in the ability of the park to provide desired services and facilities would be small but perceptible, minor, long-term, adverse impacts to park operations would be expected under alternative 2.

To accommodate new and expanded visitor use, some park functions that are not, of necessity, park resource-based, would be relocated outside the park in surrounding communities. Fewer employees would reside in the park and more staff functions would be accomplished outside the park boundary. This action would disperse the staff and associated inconveniences in communication and coordination among employees would be expected to occur. This would be offset by increased telecommunication

efficiency and reliability. Locating staff in surrounding communities would also contribute to increased efficiencies in developing partnerships and would contribute a moderate beneficial impact on park operations. Different options for accommodating operations outside the park would be studied before implementing any actions. Actions that propose purchasing additional property outside the boundary would require additional authorization. Staff functions would shift to a greater emphasis on research, education, and interpretation. There would also be an increased need for maintenance operations to maintain year-round use of park facilities and to manage frequent turnover of park residential spaces. Because changes in park operations would be readily apparent and would have an appreciable effect on the ability of the park to provide new services and facilities, there would be moderate, beneficial impacts on park operations.

Cumulative Impacts. Past and ongoing projects including reconfiguration of Rim Village, adaptive reuse of historic structures in Munson Valley and Rim Village, upgrading infrastructure at Cleetwood Cove, and highway road improvement projects on Highway 62, have had long-term moderate beneficial impacts on park operations. Overall these projects have the potential to have an appreciable effect on park operations and improve the ability of the park to provide desired services and facilities. Impacts of the above other actions in conjunction with the no-action alternative would result in moderate, long-term, beneficial cumulative impacts. The no action alternative would contribute a moderate, beneficial, and minor adverse increment to cumulative impacts to park operations.

Conclusion. Alternative 2 would result in moderate, beneficial impacts on park operations. Cumulative actions in conjunction with the no-action alternative would result in a moderate, long-term, beneficial cumulative impact. Alternative 2 would contribute a moderate, beneficial and minor, adverse increment to cumulative impacts to park operations.

Concession Operations

Under alternative 2 impacts on concession activities would be similar to alternative 1. Relative to the no-action alternative, there would be no measurable or perceptible change to concession operations under alternative 2, resulting in no new impacts on concession operations.

Cumulative Impacts. Past actions, including restoration of the Crater Lake Lodge, and ongoing actions, such as reconfiguration of park facilities at the rim and at Mazama Village, have had a beneficial impact on concessioner activity. Consolidation of concession activity at Mazama and the closeness of Mazama Village to Oregon State Highway 62 facilitate concession operations and inventory staging. These actions would result in moderate, long-term, beneficial impacts. Alternative 2 would not contribute to cumulative impacts on concession operations.

Conclusion. Alternative 2 would have negligible, long-term adverse impacts and would not contribute to cumulative impacts on concession operations.

SOCIOECONOMIC ENVIRONMENT

The emphasis of this alternative is to manage the park and its resources to provide greater opportunities for visitors

to experience diverse recreational, educational, and research opportunities. Some additional staff persons (5.5 FTE) would be hired. Changes to the park's infrastructure are called for to support this shift in park emphasis. The park's base budget would be increased by \$700,380. Development projects (such as building new trails and backcountry camping sites, improving roadways, pullouts, parking areas, etc.) require the expenditure of additional funds for development in the amount of \$4,743,000 – which is \$943,000 more than the no -action alternative. These monies spent over the life of the plan for various projects would provide some impacts (e.g., increase in income, creation of jobs, etc.) to individual firms and workers which would be moderate to major, short term, and beneficial. Impacts on the economic indicators within the affected area described in the “Affected Environment” chapter would be negligible because of the relative size of the regional economy (approximately \$5.0 billion in earnings and about 187,000 jobs in 2001) and the phasing of the projects over the next 15 to 20 years.

The pattern of increasing visitation is expected to continue. Concession services may be expanded to cover additional tours or research partnerships. Providing additional facilities and programs would encourage more visitor use at the parks. The amount of additional use is indeterminate at this time. However, this increased use could result in some additional spending within the gateway communities or region, which would benefit some retail establishments, restaurants, or motels in the travel corridors.

Moving some administrative or operational functions to areas outside the park as the need for space increased would

result in the purchase or long-term lease of land and building(s) and/or the construction of new buildings in gateway areas. New facility construction would result in a short-term, positive impact on the regional economy, mostly affecting the construction sector of the economy. The purchase of privately owned land on a willing-buyer/willing-seller basis would benefit both the private landowner and the Park Service. Land or real estate acquisition by the federal government would result in some long-term loss of local real-estate tax revenue. However, the amount of property tax revenue lost to the three counties would be minor compared to the tax revenues collected by Douglas County (tax revenues \$ 58.2 million in 2002/03), Jackson County (tax revenues \$148.1 million in 2002), and Klamath County (tax revenues of about \$37 million, 2002). Acquisition of other federally owned land for these purposes would not result in any change in real estate taxes.

Improving facilities within the parks would further contribute positive economic benefits – in the form of direct spending – to the growing regional economy. More visitors might result in additional tourism-related spending within the region and gateway towns, increasing business opportunities, income, and employment. The need for housing for additional park staff combined with the increasing desirability of living in the gateway communities might add to the demand for local housing and other locally provided goods. Hiring additional staff would result in a small increase in the local population that would contribute to the overall growth in the gateway communities. As described above, in conjunction with other past, present, and reasonably foreseeable actions, the preferred alternative would have minor to moderate,

long-term, beneficial impacts on the socioeconomic climate of the local gateway communities, but these benefits would be negligible at the three-county regional level.

Cumulative Impacts. Additional changes or shocks (either positive or negative) to the local and regional socioeconomic environment are not expected. No other actions that could have cumulative effects when combined with the impacts of alternative 2 have been identified during this planning process. In conjunction with other past, present, and reasonably foreseeable actions, no additional cumulative impacts are expected.

Conclusion. An increase in park staffing levels by 5.5 full-time FTE's, along with a budget increase to \$4,727,380 (current + leasing + staffing) would have a moderate impact on the local gateway communities' economies and a negligible impact on the regional economy. Additional employees would likely purchase some goods and services from within the gateway communities.

Approximately \$4,743,000 would be spent over the life of the plan on various projects, an increase of only \$943,000 compared to the no-action alternative. These expenditures could result in moderate to major, short-term, beneficial impacts on individual firms and employees (increased business and profits, increased employment opportunities, increased income, etc.). Overall impacts on the regional economy (effects on the economic indicators of income, unemployment rate, poverty rate, etc.), however, would be negligible because of the size and the phasing of the projects over the next 15 to 20 years. These projects might encourage some increased visitation to the parks, with beneficial

effects on the region and adjacent communities in terms of increased visitor expenditures for locally provided goods and services.

Moving some administrative functions and park employee housing outside the parks as space requirements dictate would result in the purchase or long-term lease of land and the construction of buildings in local gateway areas, with short-term, beneficial impacts on the local economy, mostly affecting the construction sector and a few landowners. The purchase of privately owned land (on a willing-buyer/willing-seller basis) by the federal government would result in some long-term loss of local real-estate tax revenue. However, the amount of property tax revenue lost to the three counties would be minor compared to the tax revenues collected by the three counties. Acquisition of other federally owned land for these purposes would not result in any change in real estate taxes.

UNAVOIDABLE ADVERSE EFFECTS

There would be no unavoidable adverse impacts of major intensity that would result from implementing alternative 2. Moderate adverse effects on park operations would occur due to increased maintenance and management operations. The negligible and minor impacts are described in the foregoing analysis.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The vast majority of the park would be protected in a natural state and would maintain its long-term productivity. Disturbance of soils, vegetation, and wildlife habitat from visitor use and constructing facilities would reduce the long-term productivity of the environment in localized areas. Greater emphasis on research, partnering, and visitor education would indirectly contribute to improved resource conditions and the long-term productivity of the environment.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction materials and energy used would be irretrievably lost. There would also be an irretrievable and irreversible commitment of resources in terms of funds expended on both labor and construction materials. Because it takes so long for soils to form, the loss of soils due to development and visitor use in localized areas would be an irreversible commitment of resources.

IMPACTS OF IMPLEMENTING ALTERNATIVE 3

CULTURAL RESOURCES

Archeological Resources

Implementation of alternative 3 on archeological resources would generally be the same as those listed under alternative 1, although the additional construction of trails to introduce visitors to a diverse range of ecosystems and terrain, could have some additional impacts on archeological sites. If known archeological resources could not be avoided, the range of potential adverse effects to archeological resources would be negligible to moderate depending upon the extent to which the resources were affected.

Cumulative Effects. Implementation of this alternative would generally have the same cumulative effects on archeological resources as those listed under alternative 1.

Conclusion. Implementation of this alternative would generally have the same impacts on archeological resources as those listed under alternative 1, although the additional construction of trails could have some additional impacts on archeological sites. If known archeological resources could not be avoided, the range of potential adverse effects to archeological resources would be negligible to moderate depending upon the extent to which the resources were affected.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3)

identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with archeological resources.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on archeological resources would be no adverse effect.

Historic Structures/Buildings

Implementation of this alternative would have the same impacts on historic structures/buildings as those listed under alternative 1.

Cumulative Effects. Implementation of this alternative would have the same cumulative effects on historic structures/buildings as those listed under alternative 1.

Conclusion. Implementation of alternative 3 would have the same impacts on historic structures/buildings as those listed under alternative 1.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with historic structures/buildings.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on historic structures/buildings would be no adverse effect.

Cultural Landscapes

Implementation of this alternative would generally have the same impacts on cultural landscapes as those listed under alternative 1, although provision for dispersed and expanded recreational opportunities and development of new trails to introduce visitors to a diverse range of ecosystems could result in additional impacts on the park's cultural landscapes. If known resources could not be avoided, the range of potential adverse impacts to cultural landscapes would be negligible to moderate depending upon the extent to which the resources were affected.

Cumulative Effects. Implementation of this alternative would generally have the same cumulative effects on cultural landscapes as those listed under alternative 1, although provision for decentralized recreational opportunities and development of new trails could result in additional cumulative effects on the park's cultural landscapes.

Conclusion. Implementation of this alternative would generally have the same impacts on cultural landscapes as those listed under alternative 1, although provision for decentralized recreational opportunities and development of new trails to introduce visitors to a diverse range of ecosystems could result in additional impacts on the park's cultural landscapes. If known resources could not be avoided, the range of potential adverse impacts to cultural landscapes would be negligible to moderate depending upon

the extent to which the resources were affected.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with cultural landscapes.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on cultural landscapes would be no adverse effect.

Ethnographic Resources

Implementation of alternative 3 would generally have the same impacts on ethnographic resources as those listed under alternative 1, although emphasis on visitor enjoyment of the diverse and unique natural environment of the national park could have some barely perceptible or measurable, and hence negligible, impacts on such resources. Provision for a wider range of visitor experiences could result in some intrusion on sacred sites or landscapes and important traditional use activity areas and thus have minor adverse impacts on ethnographic resources, because the impacts would be noticeable but would neither appreciably alter resource conditions nor alter the relationship between the resource and the affiliated group's body of practices and beliefs.

Cumulative Effects. The cumulative effects to ethnographic resources resulting

from implementation of this alternative would be similar to those described for alternative 1, with the addition of minor adverse impacts associated with provisions for wider ranges of visitor experience. However, the minor adverse impacts associated with such provisions would represent a very small incremental increase in any overall adverse cumulative effect.

Conclusion. Implementation of this alternative generally have the same impacts on ethnographic resources as those listed under alternative 1, although emphasis on a wider range of visitor experiences to enjoy the diverse and unique natural environment of the national park could have some minor adverse impacts on such resources.

Section 106 Summary. No Traditional Cultural Properties are affected by actions under this alternative. Thus, Section 106 determinations are unnecessary.

Museum Collections

Implementation of this alternative would have beneficial minor to moderate long-term impacts on the park's museum collections because adequate staffing and space would be provided for their curation and storage and they would be stored in an on-site facility that met professional and National Park Service museum standards. Although adequate storage and workspace would be provided to improve curation and protection of the collections and staffing would be upgraded to reduce the cataloging backlog, park-related collection materials not currently owned or managed by the National Park Service would generally not be acquired. Access to the collections, both for NPS and non-NPS researchers, would be limited by

availability of museum staff to assist in use of the collections.

Cumulative Effects. Since the national park was established the combination of limited staffing and lack of storage and workspace meeting professional and National Park Service museum standards have hindered endeavors to improve care of and access to the museum collections and address the ever-increasing cataloging backlog. Thus, the park's museum collections have been subjected to minor to moderate long-term adverse impacts. Actions under this alternative, such as provision of adequate space to curate and store the park's museum collections in an on-site facility that met professional and National Park Service museum standards and adequate staffing to reduce the cataloging backlog, would contribute beneficial minor to moderate long-term effects to any overall cumulative impacts on the park's museum collections.

Conclusion. Implementation of alternative 3 would have beneficial minor to moderate long-term impacts on the curation and protection of the park's museum collections because adequate space would be provided for their curation and storage in an on-site facility that met professional and National Park Service museum standards.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be

no impairment of resources or values associated with museum collections.

NATURAL RESOURCES

Biotic Communities

Construction and use of new facilities (i.e., picnic areas, short trails) in frontcountry zones along the Rim Drive and other park roads would result in site-specific loss of soils, vegetation, and wildlife habitat. There would also be increased human disturbance to wildlife. Individuals, populations, and species vary in their sensitivity to disturbance and visitor use might disturb or displace some individual animals, particularly those species more sensitive to human disturbance. Certain wildlife may also become habituated to human presence or attracted to the increased food source visitors provide. Specific locations for new facilities have not been identified; however, siting them primarily in or adjacent to previously developed or disturbed sites within the park and avoiding sensitive resources such as wetlands or whitebark pine stands, would minimize additional loss of vegetation, soils, and habitat and disruption to wildlife. Long-term adverse impacts would be localized and minor. Mitigation measures such as topsoil salvage, erosion control, and revegetation would minimize construction impacts. Increased monitoring and restoration programs would be implemented to ensure that impacts from additional frontcountry development and more dispersed visitor use would be minimized and sensitive resources such as whitebark pine stands protected.

Increased contact with visitors could indirectly benefit native species, communities, and processes. There would be

greater opportunity to enhance the public's appreciation, understanding, and stewardship for these resources, which may reduce the potential for visitor related impacts. This broader base of public support and advocacy would also aid in accomplishing the park's resource protection and preservation programs and initiatives. Beneficial effects would likely be localized and minor.

Winter recreational activities occur when wildlife are stressed by cold weather and food shortages. Disturbance or harassment of wildlife during this sensitive time can have negative effects on individual animals, and in some cases populations, particularly when populations are low. Winter recreation such as snowmobiling and skiing can create added energetic stress in winter when most wildlife species are already stressed (NPS 1999d). The effects of winter recreational activities in the park are unknown, although, disturbance would likely be limited because visitor use levels are expected to remain relatively low and would continue to occur within very limited areas within the park. However, some increase in snowmachine use could occur due to grooming of the North Entrance Road. The Park Service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of park resources. Management actions, such as restrictions on off-trail use, specific area closures, increased patrols, visitor education, or limits on use or party sizes, would be taken as necessary to address impacts. Consequently, long-term impacts from continuing or increasing winter activities would be offset by increased protection measures that would benefit wildlife, although the extent of potential beneficial effects would likely be localized and minor.

Cumulative Impacts. Cumulative impacts on biotic communities from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). Overall cumulative impacts would be long-term, and both major adverse and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs affecting lands both within and outside of the park. Alternative 3's contribution to both adverse and beneficial cumulative impacts would be localized and minor.

Conclusion. Long-term adverse impacts from construction and use of new facilities would be localized and minor. Increased contact and education of visitors and possible implementation of protection measures to mitigate winter use impacts could have minor benefits to resources. Biotic communities would not be impaired by the actions proposed under this alternative.

Cumulative impacts would be long-term, and both major adverse and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs affecting lands both within and outside of the park. Alternative 3's contribution to both adverse and beneficial cumulative impacts would be localized and minor.

Threatened, Endangered, and Sensitive Species

Similar to impacts discussed under biotic communities, increased monitoring and restoration programs and increased

contact with visitors would enhance the opportunities for positive effects on threatened and endangered species. Some inconsequential changes to habitat or loss of individuals might occur from new development or use as described below. New frontcountry facilities would be relatively small in scale, but would be constructed in more locations under this alternative. They would primarily be placed within currently developed or previously impacted areas or road corridors, where human use is already occurring, thus minimizing the potential for adverse effects. Site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in any proposed project area. If any were located, or if an action occurred within suitable habitat, the National Park Service would consult with the U.S. Fish and Wildlife Service and Oregon Department of Natural resources to determine mitigation measures to avoid or minimize adverse impacts on the species.

As discussed under the biotic communities impact topic, the park service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of threatened and endangered species. Because of a number of factors such as limited occurrence, small populations, low densities, and/or low birth rates, these species are more vulnerable to impacts than general wildlife populations. Some species (lynx, wolverine, fisher) could benefit from increased protection measures, although the extent of potential beneficial effects is unknown. Greater beneficial effects would occur if for example, den sites were located and measures were taken to protect them from disturbance.

Similar to alternative 2, development proposed under alternative 3 may affect, but would not be likely to adversely affect special status species for the following reasons:

Canada lynx, California Wolverine, and Pacific Fisher. Although the park has conducted extensive surveys for Canada lynx and wolverine in the park, none have been detected. All these species require large expanses of land relatively free from human use. Because of the extent of suitable habitat within the park, new development and associated visitor use would likely occur within or near suitable habitat, which would incrementally contribute to habitat loss and fragmentation. New frontcountry development and trails would result in more dispersed use. This increased human noise and activity could disturb and displace these species. However, development and trails would be located in nonwilderness areas, primarily in or adjacent to existing developed areas and road corridors. Because of the existing development and use in these areas, adjacent habitat would not be readily used and would probably be avoided by these species. New development and use would affect only a very small portion of suitable habitat within the park.

Bald Eagle. There would have little if any adverse impact on the primary food sources (fish and carrion) of the bald eagle. No new development or use would occur near the existing nest site along the Crater Lake shoreline. Tour boats would continue to be restricted from areas on the lake that are near the nest site. The primary area for potential nest sites for this species would likely be within the caldera. Potential new development along the rim, such as trails and picnic areas, could affect potential nest site habitat. However, new

development would affect very little of the overall amount of suitable habitat along the rim or within the caldera. Prior to new development, surveys would be completed to identify suitable habitat and locate nest sites. New development would be sited and designed to avoid impacts to nesting eagles.

Northern Spotted Owl. Current management practices that would continue under alternative 2 include protecting identified nest sites from human activities. Although new development and associated use could be located within patches of old growth stands identified as suitable habitat, no development would occur near known nest sites or within associated protective buffer zones. Most development would be located in or adjacent to existing developed areas and roadways, thus minimizing the likelihood of disturbance.

Northern Goshawk. Development of frontcountry facilities along roadways (e.g., picnic and parking areas, trails) could result in the loss of goshawk habitat, primarily where facilities were located in forested habitats. These developments would impact a relatively small area and would potentially affect only a small fraction of any nesting pair's much larger territory or the extent of suitable habitat. Surveys to locate nest sites would be completed prior to facility construction and those sites avoided.

Peregrine Falcon. Peregrines are known to be sensitive to disturbances such as human presence above their nest site. No new development would be located in or above the area of the one known nest site within the caldera. Tour boats would also continue to be restricted from areas on the lake that are near the nest site. New development such as trails or picnic areas

along the rim could result in visitor use above some caldera cliff faces that could provide potential nest sites. However, new development would affect very little of the overall amount of suitable habitat along the rim or within the caldera. Prior to new development, surveys would be completed to identify suitable habitat and locate nest sites. New development would be sited and designed to avoid impacts to nesting falcons.

Bull Trout. Some frontcountry development could occur within the Sun Creek drainage basin along Grayback Trail and Rim Drive. Runoff from areas disturbed by construction could lead to increased sedimentation that could affect bull trout habitat in Sun Creek. Design and location of facilities would take into consideration such parameters as soil types, slopes, and vegetative cover in order to minimize disturbance and potential runoff. A vegetative buffer would be maintained between facilities and creek headwaters. Best management practices such as erosion and sediment controls and revegetation would be implemented to eliminate or reduce both short- and long-term impacts. Use of the Grayback Trail would not change and the park would continue to take actions to stabilize and minimize areas of erosion along this trail.

Pumice Grapefern, Shasta Arnica, and Crater Lake Rockcress. The location of these plants would continue to be protected and the populations monitored. Because of the greater potential for new development and use along the rim under this alternative, loss of habitat or individual plants could occur. These plants exist in distinct locations and locations for any new development or trails would be surveyed for the presence of these species and measures to avoid or minimize adverse impacts would be implemented.

Cumulative Impacts. Cumulative impacts on threatened and endangered species from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). Overall cumulative impacts would be both adverse and beneficial. Adverse impacts would be primarily due to land management activities in the region. Park programs would adversely affect some individuals or habitat in the short-term, but would not likely adversely affect threatened and endangered species in the long-term because long-term effects would be beneficial. Alternative 3 could contribute some adverse effects on threatened or endangered species but could also contribute beneficial long-term effects to the overall cumulative impacts.

Conclusion. New development and more dispersed use could result in small, localized reductions in habitat and disturbance to individuals. The survey, avoidance, mitigation, and consultation actions that the Park Service would take would help ensure that this alternative would avoid or minimize adverse effects on threatened and endangered species. Alternative 3 could result in some adverse effects on threatened or endangered species but would not result in impairment to these species. Alternative 3 could contribute some adverse effects on threatened or endangered species but could also contribute beneficial long-term effects to the overall cumulative impacts.

Crater Lake

Alternative 3 seeks to allow a greater range of visitor opportunities to the extent that resources continue to be protected. Impacts on Crater Lake would generally be the same as those listed under alternative 1 (no-action alternative).

Minimizing development within the caldera and lake drainage would prevent addition of sediments, minerals, or contaminants that could reduce water quality. Current restrictions on access and boating would continue to minimize contaminants that could reduce water quality.

The long-term research and monitoring program would continue. Continued monitoring would result in long-term beneficial impacts on water quality.

Cumulative Impacts. Implementation of this alternative would generally have the same cumulative effects on Crater Lake as those listed under alternative 1.

Conclusion. Implementation of this alternative would generally have the same impacts on Crater Lake as those listed under alternative 1. This alternative would have a negligible, long-term, beneficial effect on water quality within Crater Lake. In accordance with the criteria for determining impairment, there would be no major adverse impacts on water quality, and therefore no impairment of water quality.

Water Resources

The construction or rehabilitation of facilities and more dispersed visitor use would have the potential to impact water quality through ground disturbance, which would result in increased surface runoff and erosion. However, due to the limited extent of proposed developments and implementation of mitigation measures such as silt fences, erosion control measures, designated trails, and revegetation to control impacts, increased sedimentation and turbidity would be temporary and negligible.

Under this alternative, grooming the North Entrance Road to accommodate snow coaches could increase use of both snow coaches and snowmobiles, although, use volumes would not be expected to increase appreciably. Similar to alternative 1 (no-action alternative), because snowmobiles raise concerns about long-term impacts from high pollution emissions, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study. Management actions to mitigate nonpoint source pollution would be implemented if necessary. Additional impacts from some increased use would be mitigated by increased protection measures. Water quality could benefit from increased protection measures, although the extent of potential beneficial effects would likely be localized and minor.

Cumulative Impacts. Cumulative impacts on water resources from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). The park's fire management program may adversely impact water quality (e.g. sedimentation, erosion) due to the effects of fires, particularly high intensity fires. Park construction and rehabilitation proposals would also contribute to adverse impacts from increased surface runoff and erosion. Best management practices such as erosion and sediment controls would be employed to minimize these impacts. Impacts would be localized, short-term and minor. Minor beneficial cumulative actions would include ongoing trails rehabilitation and relocation within the park that would reduce localized erosion and runoff.

The replacement of the waterline from Munson Springs to Garfield would likely reduce water loss by the system. Implementation of actions within the visitor services plan would also reduce water use within the park. Reductions in water use would have a minor beneficial effect on water quantity in Annie Creek .

The impacts of other actions described above in conjunction with the impacts of alternative 3 would result in localized, minor adverse and beneficial impacts on water quality and minor to moderate beneficial effects on water quantity in Annie Creek. Alternative 3 would contribute a negligible adverse impact on water quality and negligible decrease in water quantity in Annie Creek to the overall cumulative impact.

Conclusion. Alternative 3 would have a negligible adverse effect on water quality due to construction activities and a negligible effect on Annie Creek water quantity. Water quality could benefit from increased protection measures, although the extent of potential beneficial would likely be localized and minor. Water resources would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 3 would result in short- and long-term negligible to minor adverse and beneficial impacts on water quality and quantity. Alternative 3 would contribute a negligible adverse impact on water quality and negligible decrease in water quantity in Annie Creek to the overall cumulative impact.

Air Quality

Implementation of a shuttle system would result in an incremental reduction in traffic and thus emissions along the Rim Drive and the roadway between the rim

and Mazama. This would likely result in localized, negligible beneficial effects on air quality.

There would be some short-term, localized impacts on air quality resulting from particulates or machinery fumes generated during construction, removal, or rehabilitation of facilities under some alternatives. Mitigation measures such as watering and revegetation of disturbed areas, requiring machinery to meet emission standards, would be employed. Effects would be short-term and negligible, lasting only during the construction period.

Under this alternative, grooming the North Entrance Road to accommodate snowcoaches could increase use of both snowcoaches and snowmobiles, although, use volumes would not be expected to increase appreciably. Similar to alternative 1 (no-action alternative), because snowmobiles raise concerns about long-term impacts from high pollution emissions, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study. Management actions to mitigate nonpoint source pollution would be implemented if necessary. Additional impacts from some increased use would be mitigated by increased protection measures. Air quality could benefit from increased protection measures, although the extent of potential beneficial would likely be localized and negligible.

Cumulative Impacts. Cumulative impacts on air quality from actions in the park and surrounding lands would be similar to those described for the no-action alternative. The park's air quality is good with negligible effects from regional

pollution sources outside the park. Forest fires on surrounding lands could contribute particulates for limited periods of time. Degradation of air quality from the park's fire management program could result in moderate short-term impacts, but the program would be in conformance with the Clean Air Act, Oregon State Smoke Management Plan, and the Oregon Visibility Protection Plan. Park construction and rehabilitation proposals would cause localized increases in dust and emissions from construction vehicles and equipment, resulting in localized, short-term effects on air quality. The cumulative actions in conjunction with the no-action alternative would result in short-term, moderate, adverse impacts on air quality. Alternative 3 would contribute a negligible short-term, adverse, and negligible, long-term, beneficial increment to the cumulative effect.

Conclusion. Long-term beneficial impacts to air quality within the park under this alternative would be negligible. Short-term construction related impacts would be negligible. Air quality would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 3 would result in short-term moderate adverse impacts on air quality. Alternative 3 would contribute a negligible, short-term, adverse, and negligible, long-term, beneficial increment to the cumulative effect.

VISITOR USE

Diversity of Recreational Opportunity

Under alternative 3 visitors would experience the entire range of visitor experiences through recreational opportunities and educational programs. Scenic driving, front and back country

hiking, camping, and picnicking, nature viewing, and boat tours would be available to a greater diversity of user groups. Visitor use would be dispersed in an expanded front country and park visitors would find increased opportunities for high-quality recreation activities and experiences. Additional hiking and picnicking opportunities would be developed in frontcountry areas along the park's road system and new hiking and biking opportunities would be available along east rim drive between Cleetwood Cove and Kerr Notch. More park facilities would be open to use enabling visitors to experience the park's cultural resources in their rustic setting. Additional backcountry trails and camping opportunities would be explored. Winter access to Rim Village and winter activities including snow camping, cross-country skiing, and snowshoeing would continue as would snowmobile access along the North Entrance Road to North Junction. Use of snow coach access would be encouraged on the North Entrance Road. Motorized recreational opportunities would be available along Grayback Drive. Because the change in the diversity of visitor experience would be highly noticeable, exceptionally beneficial, and would affect relatively large numbers of visitors, alternative 3 would have a major, beneficial impact on the diversity of visitor opportunity.

Visitor Access and Circulation

Under alternative 3 motorized accessibility would change with the closure of one lane of Rim Drive between Cleetwood Cove and Kerr Notch to vehicular traffic. Rim Drive would accommodate one-way traffic between these points. Road access to Rim Village during the winter would be maintained. Traffic congestion during the summer season, particularly along Rim

Drive, would be managed by improving existing pullouts, parking areas, overlooks and by the addition of a transportation shuttles. A feasibility analysis would determine whether the shuttle would be a concession, Park Service operated, or a service contract. These rider-optional shuttles would operate between Rim Village and Cleetwood Cove and between Mazama Village and Rim Village. At peak visitor periods, interpretive and educational information and orientation to the park would be provided for shuttle riders. Other roads in the park, including Grayback Drive, would remain accessible for motorized travel. Loss of two-way motorized access to East Rim Drive would be readily apparent, but would inconvenience a relatively small number of visitors desiring to travel in both directions along East Rim Drive between Cleetwood Cove and Kerr Notch, resulting in negligible to minor, long-term, adverse impacts to the motorized visitor experience of the park.

Relative to the no-action alternative there would be no change in winter access to the park. Visitors would continue to have private vehicle access to Rim Village in the winter, and snowmobile access would continue on the North Entrance Road. Snowcoach use would also be encouraged on the North Entrance Road. No change in winter access would result in no to negligible impacts to winter vehicular access to the park.

Access to trailheads and opportunities for day hikes on front country trails along the park's road system would be expanded. New trails would be developed in localized front country areas along the park's road system. These trails would be located to introduce visitors to a diverse range of ecosystems and terrain and to accommodate ability and experience

levels. In addition, one-lane of Rim Drive between Cleetwood Cove and Kerr Notch would be closed to private vehicles to offer new opportunities for nonmotorized activities. Closure of sections of East Rim Drive would improve front country caldera rim hiking opportunities. There would be an associated and detectable change in visitor safety resulting from multiple use of East Rim Drive between Cleetwood Cove and Kerr Notch where the roadway would be shared by vehicles, hikers, and bicyclists. Overall, improvements to existing frontcountry hiking trails and development of new frontcountry trails would result in greater trail accessibility, and visitor surveys indicate that short trails are important to most visitors.

Because frontcountry trail access would be expanded, there would be detectable changes in visitor hiking and biking experiences. These changes would affect a relatively large number of visitors but would be localized in areas, resulting in minor, beneficial impacts to visitor experience of trails accessibility. Overall changes in visitor access and circulation would be readily apparent and would affect a relatively large number of visitors, resulting in a moderate, beneficial impact on visitor access and circulation.

Education and Orientation

Relative to the no-action alternative, alternative 3 would result in changes in the availability and focus of interpretive and educational information and education programs. Education and interpretation would focus on minimizing impacts, leaving no trace, and acquisition of skills for outdoor recreation. Educational programs would be in suites to provide appropriate levels of education and interpretation for a variety of groups.

Some orientation and education efforts could occur offsite in local hotels and/or on tours to prepare visitors for and foster stewardship to groups on their way to and within the park. Interpretive programs would stress the natural and cultural resources of the park in a regional recreational setting. Many interpretive opportunities at the park would be self-directed or self-serve and contact with park interpretive staff would necessitate visitors stopping at Visitor Information Building or at Rim Village. Changes in interpretive programs would be detectable and would affect a relatively large number of visitors resulting in moderate, long-term, adverse impacts on visitor opportunities to participate in interpretive programs.

Visitor Facilities and Services

Opportunities for visitors to access and use park facilities and services would increase. New and expanded uses of park facilities would open some park buildings and structures for visitor use and enjoyment. Visitors would gain opportunities to enjoy a hiking or biking experience on east Rim Drive. Grayback Drive would continue to provide motorized opportunities year-round. These changes in visitor experience of park facilities would be highly noticeable and would affect a relatively large numbers of visitors, resulting in a major beneficial impact on visitor experience of park facilities and structures.

Soundscapes and Scenic Quality

Development of frontcountry trails would occur along the park's transportation, corridor resulting in detectable changes to the natural sound environment in these areas which would result in minor, long-

term, adverse impacts to soundscapes at park trailheads.

Relative to the no-action alternative, there would be no change in views of the lake. Scenic views from the caldera rim would continue to be shared with vehicular traffic. There would be small but detectable changes in visitor ability to enjoy scenic views of the park's natural and cultural resources. Increases in front-country areas along the park's transportation corridors would open more front-country opportunities for visitors to enjoy scenic views. This change would affect a relatively small number of visitors and be localized in nature, resulting in minor, long-term beneficial impacts to opportunities to enjoy scenic views in the park.

Cumulative Impacts. Past and ongoing projects, including development of front-country trails, reconfiguration of Rim Village, and adaptive use of historic structures in Munson Valley and Rim Village have long-term, major, beneficial impacts on the visitor experience. Past actions, such as the completion of the Cleetwood Trail and the development of the Castle Crest and Godfrey Glen Trails, have increased visitor access to front country trails. Reconfiguration of Rim Village would change the way visitors access views of the lake at Rim Village. A walk along the promenade would be possible without having to compete with vehicular traffic. Opportunities to participate in interpretive programs would expand with the use of historic structures at Munson Valley, and a year-round visitor contact station at the rim that would enable winter views of the lake for people of all abilities. Overall these projects have the potential to increase the diversity of visitor experience, enhance the range of interpretative programs, expand access to park facilities, and improve the quality of

visitor experience values such as sounds of nature and scenic views. The impacts of the above other actions, when combined with the impacts of the no-action alternative would result in an overall major, long-term beneficial impact. Alternative 3 would contribute a moderate to major beneficial increment to cumulative impacts to visitor experience, because Alternative 3 would increase and expand existing visitor opportunities. Alternative 3 would also contribute minor to moderate, long-term adverse increment to cumulative impacts due to a reduction in the range of interpretive programs and impacts on soundscapes at some park trailheads.

Conclusion. Alternative 3 would have a major beneficial impact on the diversity of the visitor experience. Under alternative 3 visitors would experience minor, long-term, adverse impacts on vehicular access with the closure of East Rim Drive to two-way traffic, but would gain minor, long-term, beneficial impacts with frontcountry trails accessibility. Because interpretative programs would primarily focus on “leave no trace” ethics and there would be less emphasis on educational programs, there would be a reduction in the range of interpretive programs, resulting in moderate, long-term, adverse impacts to visitor enjoyment of interpretive programs. Access to park facilities and services would increase, resulting in a major beneficial impact to visitor’s enjoyment of park facilities. There would be minor long term adverse impacts to visitors’ perceptions of soundscapes. Opportunities for visitors to enjoy scenic views would be expanded resulting in minor beneficial impacts to scenic viewing opportunities.

Cumulative actions in conjunction with alternative 3 would have an overall major

long-term beneficial impact. Alternative 3 would contribute a moderate beneficial increment to cumulative impacts to visitor experience, because alternative 3 would increase and expanding existing visitor opportunities. Alternative 3 would also contribute minor to a moderate, long-term, adverse increment to cumulative impacts due to a reduction in the range of interpretive programs and impacts on soundscapes at some park trailheads.

OPERATIONS

Park Operations

Under Alternative 3 existing buildings and facilities would remain and some may be adaptively used for new functions and uses. Development of new frontcountry trails, closure of a portion of Rim Drive to two-way traffic, and adaptive use of historic structures for visitor use would increase the level of maintenance required to support these new visitor activities. Year-round residences at Steel Circle and summer season residences at Sleepy Hollow at Munson Valley would continue to be maintained. Park maintenance staff would continue to maintain park roads, utilities, and structures. The Munson Valley Road to Rim Village would continue to be cleared of snow during the winter months, and Rim Drive would continue to be plowed to allow summer access as early in the spring as weather dictates.

Most park functions would remain in the park. Staff functions would shift to a greater emphasis on resource protection and interpretation. There would also be an increased need for maintenance operations to maintain expanded front country trails and visitor services. Changes in park operations would be perceptible but would not be expected to have an overall

detrimental effect on the ability of the park to provide desired services and facilities, resulting in minor, adverse impacts to park operations.

Cumulative Impacts. Past facility development, particularly at the rim, has affected park operations. Ongoing actions, including scaling back development at Rim Village and improving parking and circulation, have impacted park operations. Overall these projects have the potential to have a moderate long-term beneficial effect on park operations and improvement in the ability of the park to provide desired services and facilities. Impacts of the above other actions in conjunction with the alternative 3 would result in moderate long-term beneficial cumulative impacts. Alternative 3 would contribute a minor adverse increment to cumulative impacts to park operations.

Conclusion. Alternative 3 would result in minor, adverse impacts to park operations. Cumulative actions in conjunction with alternative 3 would result in moderate long-term beneficial cumulative impacts. Alternative 3 would contribute a minor, adverse increment to cumulative impacts to park operations.

Concession Operations

Relative to the no-action alternative, there would be a change to concessioner activities under alternative 3. There would be a moderate, long-term, beneficial impact on concession operations. Increased partnering with commercial operators would provide for additional opportunities.

Cumulative Impacts. Past actions, including restoration of the Crater Lake Lodge, and ongoing actions, such as reconfiguration of park facilities at the rim

and at Mazama Village have had an impact on concessioner activity. Consolidation of concession activity at Mazama and the closeness of Mazama Village to Oregon State Highway 62 would facilitate concession operations and inventory staging, resulting in readily apparent changes in concession operations that would have a long-term, moderate, beneficial impact on concessioner operations. Impacts of the above other actions in conjunction with alternative 3 would result in an overall moderate, long-term beneficial cumulative impact. Alternative 3 would contribute a moderate, adverse increment to cumulative impacts on concession operations.

Conclusion. Alternative 3 would result in a moderate, long-term adverse impact on concession operations. Cumulative actions in conjunction with alternative 3 would result in an overall moderate, long-term, beneficial cumulative impact. Alternative 3 would contribute a moderate adverse increment to cumulative impacts on concession operations.

SOCIOECONOMIC ENVIRONMENT

This alternative emphasizes that the full range of recreational opportunities and educational experiences be offered to a most diverse public. The widest possible range of visitor groups is sought out to acquaint, educate, and foster an appreciation of the natural environment in a more diverse park clientele. Most current facilities continue to be used and maintained. Historic structures and fabric are preserved without adaptive reuse. Trails are developed to provide access to a broad range of the park's ecosystems and environments. Partnerships with other public and private entities are fostered to provide a wide range of educational and

interpretative services to the public. Some interpretative activities and opportunities occur outside the park. Staffing levels increase for ranger and interpretative activities adding 5.5 full-time FTE's. A transit system is evaluated and possibly developed to provide access for the public to some areas of the park. A base operating budget of \$5,454,900 is needed to fund this alternative.

Achieving these changes in park operations requires the expenditure of additional funds in the amount of \$3,934,000 – which is \$134,000 less than the no-action alternative. These funds are spent over the life of the plan for various projects provide some impacts (e.g., increase in income, creation of jobs, etc.) to individual firms and workers which would be moderate to major, short term, and beneficial. Impacts on the economic indicators within the affected area would be negligible because of the relative size of the regional economy (approximately \$5.0 billion in earnings and about 187,000 jobs in 2001) and the phasing of the projects over the next 15 to 20 years.

Commercial businesses/concessions, such as tours, would continue within the park and such businesses would be encouraged to provide interpretative information and services to park visitors. Any expansion of these businesses would provide additional employment opportunities.

The pattern of increasing visitation is expected to continue. Providing additional programs, services, and outreach would encourage more visitor use at the parks. The amount of additional use is indeterminate at this time. Also, attracting more visitors and offering visitor programs outside the park may result in additional tourism-related spending within the region and gateway towns, increasing

business opportunities, income, and employment which would benefit some retail establishments, restaurants, or motels in the travel corridors.

The need for additional staff may increase the need for housing. Combined with this, the increasing desirability of living in the gateway communities adds to the demand for local housing and other locally provided goods. Hiring additional staff results in a small increase in the local population that contributes to the overall growth in the gateway communities. As described above, in conjunction with other past, present and reasonably foreseeable actions, alternative 3 would have minor to moderate long-term beneficial impacts on the socioeconomic climate of the local gateway communities but these changes in benefits are negligible at the three-county regional level.

Cumulative Impacts. Additional changes or shocks (either positive or negative) to the local and regional socioeconomic environment are not expected. No other actions that could have cumulative effects when combined with the impacts of alternative 3 have been identified during this planning process, which has included public participation and input. In conjunction with other past, present, and reasonably foreseeable actions, no additional cumulative impacts are expected.

Conclusion. An increase in park staffing levels by 5.5 full-time employees would have a moderate impact on the local gateway communities' economies and a negligible impact on the regional economy. Additional employees would likely purchase some goods and services from within the gateway communities.

Approximately \$3,934,000 (in addition to ongoing actions and projects) would be spent over the life of the plan on various projects, and an increase of only \$134,000 compared to the no-action alternative. These expenditures could result in moderate to major, short-term, beneficial impacts on individual firms and employees (increased business and profits, increased employment opportunities, increased income, etc.). Overall impacts on the regional economy (effects on the economic indicators of income, unemployment rate, poverty rate, etc.), however, would be negligible because of the size and the implementation (timing) of the projects over the next 15 to 20 years. The actions of this alternative may encourage some increased visitation to the parks, with beneficial effects on the region and adjacent communities in terms of increased visitor expenditures for locally provided goods and services.

UNAVOIDABLE ADVERSE EFFECTS

There would be no unavoidable adverse impacts of major intensity that would result from implementing alternative 3. A reduction in the range of interpretive programs would result in moderate long term adverse impacts to visitor enjoyment of interpretive programs. An increase in concessioner staffing to maintain and operate the shuttle system would result in

moderate long-term adverse impacts on concession operations.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The vast majority of the park would be protected in a natural state and would maintain its long-term productivity. Disturbance of soils, vegetation, and wildlife habitat from visitor use and constructing facilities would reduce the long-term productivity of the environment in localized areas. Increased contact with visitors could indirectly contribute to improved resource conditions and the long-term productivity of the environment.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction materials and energy used would be irretrievably lost. There would also be an irretrievable and irreversible commitment of resources in terms of funds expended on both labor and construction materials. Because it takes so long for soils to form, the loss of soils due to development and visitor use in localized areas would be an irreversible commitment of resources.

IMPACTS OF IMPLEMENTING ALTERNATIVE 4

CULTURAL RESOURCES

Archeological Resources

Implementation of this alternative would generally have the same impacts on archeological resources as those listed under alternative 1. Although the resource preservation emphasis of this alternative could be expected to have some negligible to minor, long-term, beneficial impacts on archeological sites, removal of non-essential buildings could have some negligible to minor, long-term and permanent, adverse impacts on such resources.

Cumulative Effects. The cumulative effects to archeological resources would be similar to those described for alternative 1, with the addition of minor beneficial impacts resulting from the resource preservation emphasis of this alternative and some negligible to minor, long-term and permanent, adverse impacts on such resources resulting from removal of nonessential buildings. The minor beneficial impacts, as well as the negligible to minor, long-term and permanent adverse impacts associated with implementation of this alternative would, however, be a small component of any overall cumulative effect.

Conclusion. Implementation of this alternative would generally have the same impacts on archeological resources as those listed under alternative 1, although resource preservation emphasis could be expected to have some negligible to minor long-term beneficial impacts on archeological sites.

There would be no adverse impacts on resources or values whose conservation is

(1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with archeological resources.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on archeological resources would be no adverse effect.

Historic Structures/Buildings

Implementation of this alternative would have impacts on historic structures/buildings that are similar to those listed under alternative 1. Alternative 4 would have minor to moderate, long-term, beneficial impacts on historic structures/buildings because they would be subjected to less wear and tear as a result of reduced adaptive use, modifications, and winter use and appropriate preservation treatments would be determined for all historic structures in accordance with the Secretary of the Interior's *Standards* in consultation with the Oregon state historic preservation officer and the historic preservation community.

Cumulative Effects. In the past, documented values of some historic structures/buildings in the park have been subjected to cumulative adverse, minor to moderate, long-term, and permanent impacts. Actions under this alternative would have impacts on historic structures/buildings that are similar to those listed under alternative 1 (including, among

other things, application of appropriate preservation treatments for all historic structures, would contribute beneficial, minor to moderate, long-term effects to any overall cumulative impact on historic structures/buildings.

Conclusion. Implementation of alternative 4 would have minor to moderate, long-term, beneficial impacts on historic structures/buildings.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with historic structures/buildings.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on historic structures/buildings would be no adverse effect.

Cultural Landscapes

Implementation of this alternative would have minor to moderate, long-term, beneficial impacts on cultural landscapes in the park because the Munson Valley, Rim Village, and Rim Drive cultural landscapes would be managed as cultural heritage zones to maximize preservation of their significant documented values and features. Although this alternative would have a minor to moderate, long-term, adverse effect on Rim Drive, because a portion of the road would be closed to vehicular traffic and thus alter historic use

of the road, rehabilitation of most pull-offs, parking areas, and overlooks along the roadway to their original designed appearance would have minor to moderate, long-term, beneficial impacts on the Rim Drive cultural landscape. Removal of nonhistoric structures and facilities throughout the park would generally have minor to moderate, long-term, beneficial impacts on cultural landscapes in the park.

Cumulative Effects. In the past lack of concern for the preservation of cultural landscapes in the park has resulted in minor to moderate long-term adverse impacts on such resources because decisions about site development and resource management have compromised some of the character-defining patterns and features as well as the documented values of cultural landscapes. Actions under alternative 4, such as management of the Munson Valley, Rim Village, and Rim Drive cultural landscapes as cultural heritage zones, and removal of nonhistoric structures and features, would contribute beneficial minor to moderate long-term effects to any overall cumulative effect on cultural landscapes.

Conclusion. Implementation of this alternative would have minor to moderate, long-term, beneficial impacts on cultural landscapes in the park because the Munson Valley, Rim Village, and Rim Drive cultural landscapes would be managed as cultural heritage zones to preserve their documented values, and nonhistoric structures and facilities would be removed throughout the park.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural

integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with cultural landscapes.

Section 106 Summary. For purposes of Section 106, the determination of effect of actions under this alternative on cultural landscapes would be no adverse effect.

Ethnographic Resources

Implementation of this alternative would generally have the same impacts on ethnographic resources as those listed under alternative 1. However, emphasis on natural resource preservation and restoration and reduction of human presence on the natural landscape could be expected to have negligible to minor, beneficial, long-term impacts on such resources. Emphasis on natural resource preservation/restoration and reduction of human presence on the natural landscape could be expected to reduce intrusion on sacred sites or landscapes and important traditional use activity areas, thus resulting in some negligible to minor, beneficial, long-term improvement in ethnographic resource conditions and access to and/or accommodation of various groups' traditional practices or beliefs relating to such sites.

Cumulative Effects. National Park Service development and administrative/maintenance operations, as well as increasing visitor use of the national park since its establishment, have had and are continuing to have cumulative adverse, negligible to minor effects on ethnographic resources. As sacred sites in south-central Oregon have been lost over time, those remaining in the park have become

more significant to the Klamath Tribes and other affiliated Native American groups. Actions under this alternative such as natural resource preservation and restoration and reduction of human presence on the natural landscape would contribute negligible to minor long-term beneficial effects to any overall cumulative effect on ethnographic resources.

Conclusion. Implementation of this alternative would generally have the same impacts on ethnographic resources as those listed under alternative 1. However, emphasis on natural resource preservation/restoration and reduction of human presence on the natural landscape could be expected have negligible to minor beneficial long-term impacts on such resources.

There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with ethnographic resources.

Section 106 Summary. No Traditional Cultural Properties are affected by actions under this alternative. Thus Section 106 determinations are unnecessary.

Museum Collections

Implementation of this alternative would have beneficial minor to moderate long-term impacts on the park's museum collections because the increased volume of the collections that would result from

as acquisition of pertinent park-related collection materials not currently owned or managed by the National Park Service, would be stored in an offsite facility that met professional and National Park Service museum standards. Thus, provision for adequate storage and workspace would be provided to improve curation, protection, and access to the collections, and staffing would be increased to reduce the cataloging backlog.

Cumulative Effects. Since the national park was established the combination of limited staffing and lack of storage and workspace meeting professional and National Park Service museum standards have hindered endeavors to improve care of and access to the museum collections and address the ever-increasing cataloging backlog, thus having minor to moderate long-term adverse effects on such resources. Actions under this alternative such as expansion of the collections and their storage in an offsite facility that meets professional and National Park Service museum standards and provision for adequate storage, workspace, and staffing to improve curation, protection, and access to the collections would contribute to beneficial, minor to moderate, long-term effects to any overall cumulative effect on the park's museum collections.

Conclusion. Implementation of alternative 4 would have beneficial, minor to moderate, long-term impacts on the park's museum collections. There would be no adverse impacts on resources or values whose conservation is (1) necessary to fulfill specific purposes identified in the national park's establishing legislation, (2) key to the cultural integrity or opportunities for enjoyment of the national park, or (3) identified as a goal in this *General Management Plan* or other

relevant National Park Service planning documents. Consequently, there would be no impairment of resources or values associated with the park's museum collections.

NATURAL RESOURCES

Biotic Communities

The following actions would potentially have localized minor to more widespread moderate long-term beneficial effects on biotic communities. The intensity of the effects would likely be greater over time as more knowledge of the resources is accumulated, partnerships expand, and resource management and restoration actions are implemented that further the preservation and restoration of native species, communities, and processes.

Removing facilities and restoring areas to more natural conditions and routing trails away from sensitive areas such as wetlands would reduce impacts to biotic communities.

Expanding resource management programs, data collection, resource staff, and partnering would indirectly contribute to improved resource conditions by enhancing the Park Service's knowledge and capabilities for restoring and maintaining native species, communities, and processes.

Emphasizing visitor activities that have low environmental impact and focusing interpretive programs on resource stewardship would also indirectly contribute to improved resource conditions by reducing the potential for visitor related impacts.

Closing roads (i.e., portion of Rim Drive, Grayback Road) could reduce road kills,

disturbance to wildlife, and off-road driving and associated impacts to roadside resources (e.g., soils, vegetation).

Eliminating snowmobiling along the North Entrance Road and winter plowing to the rim would seasonally reduce use and disturbance to wildlife in these areas and could enhance wildlife migration patterns. The plowed road corridor would be less of an impediment to wildlife movement (e.g., elk, deer, bear).

Although snowmobiling would no longer be allowed, other winter recreational activities can create added energetic stress in winter when most wildlife species are already stressed. The Park Service would initiate a long-term data gathering and monitoring program to evaluate winter use and associated impacts to ensure long-term protection of park resources. Management actions, such as restrictions on off-trail use, specific area closures, increased patrols, visitor education, or limits on use or party sizes, would be taken as necessary to address impacts.

Adaptive use or removal of existing buildings is not expected to result in new resource impacts. These buildings are located in existing, previously disturbed developed areas. Park functions relocated from the park to nearby communities would be housed in existing structures if possible. However, if new buildings were necessary, construction activities would have short-term effects on soils and vegetation. Depending on whether or not facilities were built on previously disturbed sites, the long-term, adverse effects with mitigation would be negligible to minor.

Cumulative Impacts. Cumulative impacts on biotic communities from land uses and activities in the park and surrounding

lands would be similar to those described for the no-action alternative. Overall cumulative impacts would be both long term, minor to major, adverse, and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs affecting lands both within and outside the park. Alternative 4's contribution to these adverse impacts would be negligible to minor. However, actions under alternative 4, particularly reduced development and enhanced resource management programs, would promote the further protection, maintenance, and restoration of native biological communities. Therefore, alternative 4 would also contribute a minor to moderate beneficial effect to the overall cumulative impacts.

Conclusion. The greater emphasis on reduction in development and expanded resource management programs and restoration in the park along with increased visitor education under this alternative would contribute to improved resource conditions within the park, potentially having localized minor to more widespread moderate, long-term, beneficial effects on biotic communities. Biotic communities would not be impaired by the actions proposed under this alternative.

Cumulative impacts would be long-term, and both major adverse and beneficial. Adverse impacts would be primarily because of the widespread logging and fire suppression on lands surrounding the park and beneficial impacts would be from restoration and protection programs, affecting lands both within and outside the park. Alternative 4's contribution to adverse impacts would be minor and its

contribution to beneficial effects minor to moderate.

Threatened, Endangered, and Sensitive Species

Alternative 4 emphasizes preservation of native species and restoration of disturbed areas. A number of actions would reduce the extent of impacts from development and human presence in the park. There would be fewer buildings and facilities in the park. Grayback Trail could be removed and a large section of Rim Drive would be closed to motorized use. Eliminating snowmobiling along the North Entrance Road and winter plowing to the rim would seasonally reduce use and disturbance to wildlife in these areas and could enhance wildlife migration patterns and habitat for winter carnivores (e.g., wolverine, fisher, lynx). A long-term data gathering and monitoring program would evaluate winter use and associated impacts to ensure long-term protection of threatened and endangered species. Overall, alternative 4 would have a beneficial effect on threatened and endangered species and their habitat.

Cumulative Impacts. Cumulative impacts on special status species and their habitat from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). Adverse impacts would occur primarily because of the alteration and fragmentation of forests surrounding the park due to the persisting impacts of logging and fire suppression. Restoration and protection programs affecting lands both within and outside of the park may have adverse short-term effects, but would not be likely to adversely affect special status species over the long-term. Alternative 4 would contribute beneficial

long-term effects to the overall cumulative impacts.

Conclusion. Greater emphasis on resource evaluations, surveys, monitoring, and facility removal and restoration would enhance the opportunities for positive effects on threatened and endangered species and their habitat within the park. Thus, alternative 4 would not be likely to adversely affect and would not result in impairment to these species. Alternative 4 would contribute beneficial long-term effects to the overall cumulative impacts.

Crater Lake

Alternative 4 emphasizes the preservation of natural resources. In addition to the current preservation actions – minimizing development with the caldera and lake drainage, and restricting access and boating as in alternative 1 – the park would seek to restore the natural systems of Crater Lake. Winter plowing to the rim would stop, except for spring opening. Vehicular access to the rim would be via snow coach. Minimizing snow plowing to the rim would begin to restore natural deposition processes and would minimize potential hydrocarbons and other vehicle caused pollutants.

Snowmobile access along North Junction Road would be stopped. Snowmobiles raise concerns about long-term impacts from high pollution emissions. Emissions from 2-stroke engine exhaust include monoxide, hydrocarbons, nitrous oxides, and particulate matter (NPS 1999e). These concerns include the possibility that accumulations of pollutants in the snow pack and resultant snow pack runoff may be having adverse impacts on water quality and associated aquatic systems, although impacts from snow pack runoff that is contaminated with snowmobile pollutants

have not been found. Impacts on water quality are likely short term and localized along travel routes because of the low volume of use and because snowmobiles are restricted to the north entrance road, which does not follow near any streams. Although snowmobile use is not expected to appreciably increase, the Park Service would initiate a long-term data gathering and monitoring program to evaluate use and associated impacts as part of an overall winter recreational use study.

Management actions to mitigate no point source pollution would be implemented if necessary. Water quality could benefit from increased protection measures, although the extent of potential beneficial effects is unknown, but would likely be localized and minor.

The long-term program would expand to monitor a diverse array of chemical, physical, and biological properties beyond those in alternative 1. Most of the sample and data collection would continue to occur in the summer months when the lake is easily accessible. Occasional winter studies are also conducted. The program would continue to add devices capable of year-round sample and data collection to gain a better understanding of processes occurring during the winter months. Emphasis would be on ensuring that all research is as non-manipulative as possible. Sample and data processing, along with data analysis and trend monitoring, would occur on a regular basis. Results of the monitoring studies are documented on an annual basis with special emphasis on long-term trend analysis. Increased monitoring would result in long-term beneficial impacts on water quality.

Cumulative Impacts . Cumulative actions would contribute both adverse and beneficial impacts to water quality. Implementation of this alternative would generally have the same cumulative effects on Crater Lake as those listed under alternative 1.

Conclusion. Implementation of this alternative would generally have the same impacts on Crater Lake as those listed under alternative 1. This alternative would have a negligible, long-term, beneficial effect on water quality within Crater Lake. In accordance with the criteria for determining impairment, there would be no major adverse impacts on water quality, and therefore no impairment of water quality.

Water Resources

The removal or adaptive use of facilities would have the potential to impact water quality through ground disturbance, which would result in increased surface runoff and erosion. However, due to the limited extent of potential ground disturbance and implementation of mitigation measures such as silt fences, erosion control blankets, mulch, and revegetation to control impacts, increased sedimentation and turbidity would be temporary and negligible.

Reduction in the extent of facilities and use in the park would reduce water use in the park. This would likely have a minor beneficial effect on water quantity in Annie Creek because although overall development would be reduced, the major developed areas in the park would remain. Closure of the Grayback Trail and a section of the Rim Drive to traffic and elimination of winter access to the rim via private vehicles, including snowmobiles, could benefit water quality because

vehicular emissions or deposition of petroleum products would be eliminated, at least seasonally, in these areas. Beneficial effects would be localized and minor.

Cumulative Impacts. Cumulative impacts on water resources from land uses and activities in the park and surrounding lands would be similar to those described for alternative 1 (no-action alternative). The park's fire management program may adversely impact water quality (e.g., sedimentation, erosion) due to the effects of fires, particularly high intensity fires. Park construction and rehabilitation proposals would also contribute to adverse impacts from increased surface runoff and erosion. Best management practices such as erosion and sediment controls would be employed to minimize these impacts. Impacts would be localized, short-term, and minor. Minor beneficial cumulative actions would include ongoing trails rehabilitation and relocation within the park that would reduce localized erosion and runoff.

The replacement of the waterline from Munson Springs to Garfield would likely reduce water loss by the system. Implementation of actions within the visitor services plan would also reduce water use within the park. Reductions in water use would have a minor, beneficial effect on water quantity in Annie Creek.

The impacts of other actions described above in conjunction with the impacts of alternative 4 would result in localized, minor, adverse, and beneficial impacts on water quality and minor to moderate beneficial effects on water quantity in Annie Creek. Alternative 4 would contribute a localized, negligible, adverse, and minor, beneficial impact on water quality, and a minor increase in water

quantity in Annie Creek to the overall cumulative impact.

Conclusion. Alternative 4 would have a negligible adverse effect on water quality due to construction activities and a minor beneficial effect on Annie Creek water quantity. Water quality could benefit from reduced vehicle use in some areas of the park, although the extent of potential beneficial would likely be localized and minor. Water resources would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 4 would result in short- and long-term, negligible to minor, adverse, and beneficial impacts on water quality and quantity. Alternative 4 would contribute a localized, negligible, adverse, and minor, beneficial impact on water quality, and a minor increase in water quantity in Annie Creek to the overall cumulative impact.

Air Quality

Possible closure and restoration of the Grayback Trail would benefit air quality because of vehicular emissions would be eliminated in this area. Closure of a section of the Rim Drive to traffic and elimination of winter access to the rim via private vehicles, including snowmobiles, would have similar seasonal effects. Beneficial effects would be localized and negligible because air stagnation that would allow concentration of pollutants is rare and/or relatively low levels of use that would be eliminated.

There would be some short-term, localized impacts on air quality resulting from particulates or machinery fumes generated during removal or rehabilitation of facilities. The elevation and geography make the park susceptible to winds that tend to disperse particulates and other

pollutants. Mitigation measures, such as watering and revegetation of disturbed areas, requiring machinery to meet emission standards, would be employed. Effects would be short-term and negligible, lasting only during the construction period.

Cumulative Impacts. Cumulative impacts on air quality from actions in the park and surrounding lands would be similar to those described for the no-action alternative. The park's air quality is good with negligible effects from regional pollution sources outside the park. Forest fires on surrounding lands could contribute particulates for limited periods of time. Degradation of air quality from the park's fire management program could result in moderate short-term impacts, but the program would be in conformance with the Clean Air Act, Oregon State Smoke Management Plan, and the Oregon Visibility Protection Plan. Park construction and rehabilitation proposals would cause localized increases in dust and emissions from construction vehicles and equipment, resulting in localized, short-term effects on air quality. The cumulative actions in conjunction with the no-action alternative would result in short-term, moderate, adverse impacts on air quality. Alternative 4 would contribute a negligible, short-term, adverse and negligible, long-term, beneficial increment to the cumulative effect.

Conclusion. Long-term beneficial impacts to air quality within the park under this alternative would be negligible. Short-term construction related impacts would be negligible. Air quality would not be impaired by the actions proposed under this alternative. The cumulative actions in conjunction with alternative 4 would result in short-term, moderate, adverse impacts on air quality. Alternative 4 would

contribute a negligible, short-term, adverse, and negligible, long-term, beneficial increment to the cumulative effect.

VISITOR USE

Diversity of Recreational Opportunity

Relative to the no action alternative, Alternative 4 would reduce the range of visitor experience. Visitor experience would stress low environmental impact on and harmony with the park's resources. During the summer, many existing opportunities for scenic driving and back country hiking and camping would continue. Nature viewing and boat tours would also continue to be available. New opportunities for hiking and solitude along the caldera rim would be added with the closure of a portion of Rim Drive between Cleetwood Cove and Kerr Notch to vehicular traffic. Visitors would be able to experience the caldera rim and views of the lake without the intrusion of vehicular traffic. There would be a reduction in front country areas and a corresponding decrease in the number of short interpretive hiking trails. Backcountry hiking and camping opportunities would increase.

Winter access to the park beyond Mazama Village would be by snow coach only, which would offer a new visitor experience. There would be no winter private vehicle access to Rim Village, which would eliminate the traditional visitor experience of driving to the rim in the winter. Snowmobile access along the north entrance road to North Junction would not be allowed, resulting in a loss of this winter visitor experience. There would be no motorized access and no maintained trail on Grayback Drive, which would be allowed to return to natural

conditions. Visitors would gain a new winter snowcoach experience and the new experience of hiking without vehicular traffic on a portion of Rim Drive. These new experiences would be offset by a loss of the Rim Drive automobile experience which is very important to most visitors. Overall, the change in the diversity of visitor experience would be readily apparent and would affect a relatively large number of visitors, resulting in moderate, adverse impacts on the diversity of visitor opportunity.

Visitor Access and Circulation

Relative to the no action alternative, under alternative 4 motor vehicle accessibility to the park would be reduced. During peak use most of the park's road system would be accessible and visitors would be able to drive to many locations in the park. A portion of Rim Drive between Cleetwood Cove and Kerr Notch would be closed to motorized travel. The Grayback Drive would also be closed to motorized travel and the centerpiece of the automobile tour experience in the park would be lost. During the winter months the park would not be accessible via private vehicle beyond Mazama Village. To alleviate traffic congestion, especially along Rim Drive during the summer season, use of a mandatory alternative transportation system would be explored. A feasibility analysis would determine whether the shuttle would be concession, Park Service operated, or a service contract.

Changes in motorized accessibility would be detectable and localized in area; however modification to traffic flow on Rim Drive would affect a large number of visitors, resulting in moderate, long-term, adverse impacts to motorized accessibility. Closure of a portion of Rim Drive may have moderate long-term, adverse,

impacts on Rim Drive as the centerpiece of the Volcanic Legacy Scenic Byway and All American Road.

Access to trailheads and opportunities for day hikes on frontcountry trails along the park's road system would be reduced and many front country short trail hiking experiences would be lost. The entire trail system would be reviewed and new backcountry trails might be provided (e.g. low elevation nature trails). Some trails might be eliminated and the area rehabilitated. Rim Drive between Cleetwood Cove and Kerr Notch would be closed to private vehicles, and would thus offer new opportunities for non-motorized activities. Loss of frontcountry trails is important because visitor surveys indicate that short trails are extremely important to a majority of visitors. A reduction of frontcountry trail access would affect a relatively large number of visitors. Overall, changes in the way visitors access the park would be readily apparent and would affect a moderate number of visitors resulting in moderate, long-term, adverse impacts to park accessibility.

Education and Orientation

Under alternative 4 interpretive and educational programs would focus on stewardship and resource protection of the park's natural and cultural resources. Interpretive programs would offer in-depth information on park resources. Many orientation and education efforts would occur offsite to prepare visitors for and foster stewardship. Many interpretive opportunities at the park would be self-directed or self-serve, and contact with park interpretive staff would necessitate visitors stopping at Visitor Information Building or at Rim Village. Changes in interpretive programs would be detectable and would affect a relatively large number

of visitors resulting in moderate, long-term, adverse impacts on visitor opportunities to participate in interpretive programs.

Visitor Facilities and Services

Opportunities for visitors to access and use park facilities and services would decrease. Most existing visitor use facilities would remain, however during the winter months facilities beyond Mazama Village would not be available. This decrease would be partially offset by a slight increase in visitor use of facilities at Mazama Village associated with snowcoach operations. Portions of park roads would be closed to private vehicles. Changes in visitor experience of park facilities would be readily apparent and would affect a relatively large number of visitors, resulting in a moderate, adverse impact on visitor experience of park facilities and structures.

Soundscapes and Scenic Quality

Opportunities to visit the backcountry to experience natural sounds and tranquility would increase. Frontcountry areas would be reduced and noise levels associated with trailheads and front country areas would also be reduced. During the long winter season, visitors would arrive at the caldera rim via snowcoach and would have the opportunity to experience what they perceive as a pristine winter landscape and untrammeled lake views at the caldera rim. The number of frontcountry developments would be reduced resulting in a readily apparent change in the way visitors view and perceive the park's natural resources. Therefore alternative 4 would result in moderate, beneficial impacts to scenic vistas.

Cumulative Impacts. Past and ongoing projects including development of front country trails, reconfiguration of Rim Village, and adaptive reuse of historic structures in Munson Valley and Rim Village have long-term major beneficial impacts on visitor experience. Past actions, such as the relocation of the Cleetwood Trail and the development of the Castle Crest and Godfrey Trails, have increased visitor access to front country trails. Reconfiguration of Rim Village would change the way visitors view the lake at Rim Village. Overall these projects have the potential to increase the diversity, of visitor experience, enhance the range of interpretative programs, expand access to park facilities, and to improve the quality of visitor experience values such as sounds of nature and scenic views. Cumulative actions in conjunction with alternative 4 would have an overall major long-term beneficial impact. Alternative 4 would contribute a moderate, adverse increment to cumulative impacts to visitor experience. Alternative 4 would also contribute a moderate beneficial increment to cumulative impacts to scenic vistas.

Conclusion. Alternative 4 would have a moderate, long-term adverse impact on the diversity of visitor opportunities, visitor accessibility, and on the ability of visitors to participate in educational and interpretive programs. There would be moderate, long term adverse impacts on visitor enjoyment of park facilities and services. There would also be a moderate, beneficial impact to winter scenic vistas at the rim. Cumulative actions in conjunction with alternative 4 would have an overall major, long-term, beneficial impact. Alternative 4 would contribute a moderate adverse increment to cumulative impacts to visitor experience.

OPERATIONS

Park Operations

Under alternative 4 the trend in the built environment would be a reduction in facilities. Buildings that are not historic and not essential to park functions would be removed and the area rehabilitated. Removal of some buildings and closing most buildings during the winter months would reduce maintenance and utilities requirements. The park maintenance staff would continue to support park operations from the central maintenance facility located at Munson Valley. Maintenance staff would continue to maintain park roads, utilities, and structures. The Munson Valley Road to Rim Village would not be plowed during the winter months. Spring snow removal from Rim Drive would increase in difficulty and complexity, because maintenance crews would first have to clear the park roads from Mazama Village up Munson Valley before tackling the heavy snows on Rim Drive. This would increase the time for spring snow-clearing with the consequent increase in maintenance responsibility.

Many park functions would be located outside of the park. Park functions that are by necessity park-based, such as maintenance and law enforcement would be retained in the park. Different options for accommodating operations outside the park boundary would be studied before implementing any actions. Actions that propose purchasing property outside the boundary would require additional authorization. The composition of the staff would increase in the areas of resource preservation, protection, restoration, and education activities. There would be a decreased need for maintenance operations during the winter

months. The Munson Valley Road would need some level of grooming to enable operation of the winter snowcoach. Decreased winter maintenance needs would be partially offset by a concentrated need in the early spring to open park roads to vehicular traffic. Changes in park operations would be readily apparent and would have appreciable effects on park and concession abilities to provide necessary services and facilities, resulting in a moderate, beneficial impact on park operations.

Cumulative Impacts. Past facility development, particularly at the rim, has affected park operations. Ongoing actions including scaling back development at Rim Village and improving parking and circulation have had a moderate, beneficial, cumulative impact on park operations. Alternative 4 in conjunction with past and ongoing activities would have a moderate to major, beneficial cumulative effect. This alternative would contribute a moderate beneficial increment to beneficial cumulative impact to park operations.

Conclusion. Alternative 4 would result in moderate, beneficial impacts to park operations. Alternative 4, in conjunction with past and ongoing activities, would have a moderate to major beneficial cumulative effect. This alternative would contribute a moderate increment to beneficial cumulative impact to park operations.

Concession Operations

During peak use in the summer concession activities would remain the same. Winter access to the rim would be via snowcoach rather than private vehicle. The change is not predicted to have an impact on the small number of visitors to the rim in the

winter; however, the change in access could have a moderate, long-term, adverse impact on operations at the rim due to changes in access for supplies and employees.

Cumulative Impacts. Past actions, including restoration of the Crater Lake Lodge, and ongoing actions, such as reconfiguration of park facilities at the rim and at Mazama Village, have had a moderate, beneficial impact on concessioner activity. These actions, in conjunction with alternative 4, would have both moderate adverse and beneficial cumulative impacts on concession operations. Alternative 4 would contribute a moderate, adverse impact to the cumulative effect.

Conclusion. Alternative 4 would result in a moderate, long-term adverse impact on concessioner activities and would contribute moderate, beneficial cumulative impacts on concession operations.

SOCIOECONOMIC ENVIRONMENT

Natural resource preservation and restoration are driving elements of alternative 4. Low-impact visitor activities are emphasized. The built environment is reduced. Nonhistoric buildings that are not essential to park operations would be removed and the land restored. Vehicle access to some parts of the park would be curtailed. Some trails and some roads may be removed and rehabilitated. Part of the Rim Road becomes accessible to pedestrians only. Winter access would be limited to Route 62 and snowcoach from Mazama parking lot. This alternative calls for most park operations and visitor contact facilities to be relocated outside the park.

These and other actions would require an increased budget and an increased number of staff positions in the areas of resource preservation, restoration, protection, and education. Staffing would increase by 1 additional FTE to achieve preservation and restoration goals. A base operating budget of \$4,419,760 is needed to fund this alternative.

In addition, approximately \$3.9 million would be spent over the life of the plan on various projects and services, an increase of \$140,000 compared to the no -action alternative. These expenditures could result in moderate to major, short-term, beneficial impacts on individual firms and employees (increased business and profits, increased employment opportunities, increased income, etc.). Overall impacts on the regional economy (effects on the economic indicators of income, unemployment rate, poverty rate, etc.), however, would be negligible because of the size and the phasing of the projects over the next 15 to 20 years.

Moving some administrative, operations, and visitor contact functions to areas outside the park would result in the purchase and/or long-term lease of land and building(s) and/or the construction of new buildings in gateway areas. The need for additional staff may increase the need for housing; this, combined with the increasing desirability of living in the gateway communities adds to the demand for local housing and other locally provided goods. Hiring additional staff results in a small increase in the local population that contributes to the overall growth in the gateway communities. New facility construction would result in a short-term, positive impact on the regional economy, mostly affecting the construction sector of the economy. The purchase of land (on a willing-

buyer/willing-seller basis) by the federal government would result in some long-term loss of local real-estate tax revenue. However, the amount of property tax revenue lost to the three counties would be minor compared to the tax revenues collected by Douglas County (tax revenues \$ 58.2 million in 2002/03), Jackson County (tax revenues \$148.1 million in 2002), and Klamath County (tax revenues of about \$37 million, 2002). Acquisition of other federally owned land for these purposes would not result in any change in real estate taxes.

Visitor use of the park would be reduced. Removal of facilities and services from the park and the shift to less use of motorized vehicles and reduced accessibility for motorized vehicles would tend to reduce the number of visitors to the park. Road closures and restoration, reduced winter snow plowing, and closing the north junction road to snowmobiling would also reduce access and use of some parts of the park. Concession businesses may be reduced or eliminated as incompatible with the new direction for this park.

The need for additional staff may increase the need for housing; this, combined with the increasing desirability of living in the gateway communities adds to the demand for local housing and other locally provided goods. Hiring additional staff results in a small increase in the local population that contributes to the overall growth in the gateway communities.

Cumulative Impacts. Additional changes or shocks (either positive or negative) to the local and regional socioeconomic environment within which the park exists are not expected. No other actions that could have cumulative effects when combined with the impacts of alternative 4 have been identified during this planning

process, which has included public participation and input. In conjunction with other past, present, and reasonably foreseeable actions, no additional cumulative impacts are expected.

Conclusion. An increase in park staffing levels by 1 full-time employee would have a moderate impact on the local gateway communities' economies and a negligible impact on the regional economy. Additional employees would likely purchase some goods and services from within the gateway communities.

Approximately \$3.9 million (in addition to ongoing actions and projects) would be spent over the life of the plan on various projects, an increase of \$140,000 compared to the no-action alternative. These expenditures could result in moderate to major, short-term, beneficial impacts for individual firms and employees (increased business and profits, increased employment opportunities, increased income, etc.). Overall impacts on the regional economy (effects on the economic indicators of income, unemployment rate, poverty rate, etc.), however, would be negligible because of the size and the phasing of the projects over the next 15 to 20 years.

Moving park functions and visitor contact facilities outside the park may increase the numbers of visitors that stop in gateway towns. This may result in additional tourism related spending for locally provided goods and services within the region and gateway towns perhaps increasing business opportunities, income, and employment. On the other hand, reduced access to the park may reduce the numbers of visitors that come to the park, perhaps negatively affecting the gateway communities and the regional tourism related businesses.

Moving administrative functions and park employee housing outside the parks would result in the purchase or long-term lease of land and the construction of buildings in local gateway areas, with short-term, beneficial impacts on the local economy, mostly affecting the construction sector and a few landowners.

The need for additional staff may increase the need for housing; this, combined with the increasing desirability of living in the gateway communities adds to the demand for local housing and other locally provided goods. Hiring additional staff results in a small increase in the local population that contributes to the overall growth in the gateway communities.

UNAVOIDABLE ADVERSE EFFECTS

Concession activities would also change in the winter to accommodate snowcoach access to the park, requiring a year-round maintenance responsibility. These changes would result in a moderate adverse impact on concession operations. The negligible

and minor impacts are described in the foregoing analysis.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The vast majority of the park would be protected in a natural state and would maintain its long-term productivity. The short-term disturbance of soils, vegetation, and wildlife habitat from removing facilities and rehabilitating disturbed areas would be offset by the increased long-term protection of soils and restoration of vegetation and wildlife habitat.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction and restoration materials and energy used would be irretrievably lost. There would also be an irretrievable and irreversible commitment of resources in terms of funds expended on both labor and materials.

CONSULTATION AND COORDINATION



SUMMARY OF PUBLIC INVOLVEMENT

Consultation and coordination among the government agencies, organizations, and the public were an important part of the planning process for the *Draft General Management Plan / Environmental Impact Statement* for Crater Lake National Park. The public had two primary avenues by which it participated during the development of the plan: participation in public meetings and response to newsletters.

PUBLIC MEETINGS AND NEWSLETTERS

Public meetings and newsletters were used to keep the public informed and involved in the planning process for Crater Lake National Park. A mailing list was compiled that consisted of members of government agencies, nongovernmental groups, businesses, legislators, local governments, and interested citizens.

The notice of intent to prepare an environmental impact statement was published in the *Federal Register* on May 25, 2001. A newsletter issued January 2001 described the planning effort. Public meetings were held during April 2001 in Klamath Falls, Medford, Roseburg, and Salem and were attended by 96 people. A total of 72 written comments were received in response to that newsletter. A second newsletter issued in July 2001 summarized the comments received in the meetings and in response to newsletter 1. These comments were used to complete the park purpose and significance statements that serve as the foundation for the rest of the planning. Comments on various issues facing the park were referred to during development of the general management plan.

A third newsletter distributed in the spring of 2002 described the draft alternative concepts and management zoning for managing the park. A total of 95 comments were received in response to that alternatives' newsletter. In general opinions were fairly divided in support of individual alternatives and how to address the issues. A number of letters favored continued snowmobile use while other people favored elimination of snowmobiles in the park. Opinions were divided on managing traffic on Rim Drive

- maintaining current two-way traffic, converting part of the road to one-way traffic, or closure of the road to traffic.

Most respondents favored use of shuttles. A number of people who opposed partnering with private industry were concerned with large-scale commercialization within the park.

CONSULTATION WITH THE STATE HISTORIC PRESERVATION OFFICE AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

Agencies that have direct or indirect jurisdiction over historic properties are required by section 106 of the National historic Preservation Act of 1966, as amended (16 USC 470, et seq.) to take into account the effect of any undertaking on properties eligible for the National Register of Historic Places. To meet the requirements of 36 CFR 800, the National Park Service sent letters to the Oregon historic preservation office and the Advisory Council on Historic Preservation on November 17, 2000, inviting their participation in the planning process. Both offices were sent all the newsletters with a request for comments.

CONSULTATION WITH NATIVE AMERICANS

Letters were sent in November 2000 to the Cow Creek Band of the Umpqua Indian Tribe and the Klamath Tribes to invite their participation in the planning process. The tribes were informed on the scope of the planning project and the preliminary alternatives by newsletter. The first official government-to-government consultation with the Klamath Tribes in relation to park projects took place in November 2001 and can be credited largely to a meeting with members of the tribal council in August. Both meetings set some parameters for consulting with tribal staff while a cooperative agreement on conducting on-going consultation is being negotiated. The tribes would also have an opportunity to review and comment on this draft plan.

CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

A list of federally threatened, endangered, and proposed species that may be present, or in the vicinity of Crater Lake National Park dated June 28, 2002, was received from the U.S. Fish and Wildlife Service (USFWS) and is included in appendix B. A meeting between the Park Service and the USFWS Klamath Falls Field Office to discuss consultation responsibilities for the general management plan and other park projects was held in May 2003. Additional discussions with the USFWS concerning affects on federally listed species also occurred as part of the preparation of the draft plan and environmental impact statement.

The National Park Service has determined the preferred alternative may affect, but would not be likely to adversely the Lost River sucker, shortnose sucker, or Canada lynx and may have some adverse affect on

the following federally threatened species: bald eagle, northern spotted owl, and bull trout. The National Park Service will initiate formal consultation with the USFWS regarding the effects on bald eagle, northern spotted owl, Canada lynx, and bull trout. The USFWS will receive a copy of the public draft of this plan for their review and to serve as a biological assessment for consultation. Comments from USFWS will be addressed and the results of the consultation included in the final environmental impact statement.

AGENCIES AND ORGANIZATIONS TO WHOM THIS DOCUMENT WAS SENT

Federal Agencies

Advisory Council on Historic Preservation
Forest Service

Winema National Forest
Rogue River National Forest
Umpqua National Forest
USFS Toketee Ranger Station
Chiloquin Ranger District

Department of the Interior
Fish and Wildlife Service
National Park Service
Office of Public Affairs
Oregon Caves National Monument
Water Rights Branch
EPA, Region 10

American Indian Tribes

The Klamath Tribe
Klamath Tribe Attorney
Klamath Tribe Planning Department
Cow Creek Band of the Umpqua Tribe

U.S. Senators and Representatives

Senator Ron Wyden
Senator Gorden Smith
Congressman David Wu, 1st District
Congressman Greg Walden, 2nd District

Congressman Earl Blumenauer, 3rd
District
Congressman Peter DeFazio, 4th District
Congressman Darlene Hooley, 5th
District

State Government

Oregon Department of Fish and Wildlife
Oregon Department of Transportation
Oregon Historical Preservation Office
Oregon Natural Resources Council
Jason Atkinson, Oregon Senate
Lenn Hannon, Oregon Senate
Steve Harper, Oregon House of
Representatives
Tim Knopp, Oregon House of
Representatives
Oregon State Parks

Local Governments

City of Chiloquin
City of Klamath Falls
Planning Director
City of Medford
Planning Director
City of Roseburg
Deschutes County Library
Douglas County Library
Eugene Library
Jackson County Commissioners
Jackson County Planning Director
Josephine County Library
Klamath County Commissioners
Klamath County Planning Director
Klamath County Library
Klamath County Museum
Multnomah County Library
Prospect Schools
Roseburg Area Chamber of Commerce
Salem Library

Organizations / Businesses

Alla Mage Ski Club
Audubon Magazine

Backcountry Horsemen
Bay Area Economics
Blue Ribbon Coalition
Broken Arrowhead Ranch
CC Riders Snowmobile Club
Century West
Chiloquin Ridge Riders
Coalition of Equestrians Club
College of Oceanography
Crater Lake Lodge, Inc.
Dain Bosworth, Inc.
David Evans and Associates
Delaware North Companies
Denali National Park Concessions Office
Diamond Lake Homeowners
District Ranger, Klamath Ranger District
Ecology of Environment, Inc.
Edelweiss Ski Club
Estramade Ranch
Fletcher Farr Ayotte
Friends of Crater Lake National Park
GM, Paradise Inn, National Park Inn
Goold's Sprague River Ranch, Inc.
Grants Pass Nordic Ski Club
Grants Pass Resource Area
Institute for Policy Research,
Northwestern U.
J & E Ranch
Jack Owens Ranches
KAGO
KDRV, Channel 12
Klamath Basin Snowdrifters
Klamath Bow Hunters
Klamath Co Economic Development Assn.
Klamath County Economic Development.
Association
Klamath Motor Sports
Knipe and Knipe, Inc.
KOIN - TV
KOMO TV
KOTI TV
KPIC, Channel 4
KS Wild
KTVL, Channel 10
Lake Quinault Lodge
Landau Associates, Inc.
League of Women Voters

CONSULTATION AND COORDINATION

LMJ Cattle Company
Mail Tribune
Medford District Office
Medford Mail Tribune
Medford Visitors Convention Bureau
Meyer and Glitzenstein
Mt. Hood Snowmobile Club
Murase Associates
National Parks Conservation Association
Nature Conservancy
News Review
Nordic Club
Northwester Tours
Oregon Historical Society
Oregon Hunter's Association
Oregon Nordic Club
Oregon Parks Foundation, Inc.
Oregon Snowmobile Association
Oregon State University, College of
Forestry

Oregon Tourism Commission
OSSA
Ottaway News Service
Robert Peccia & Associates
Rogue Snowmobile Club
Rogue Snowmobiling
S.W. Jeffries and Company
Sierra Club
Siskiyou Audubon Society
Siskiyou Reg. Ed. Proj.

Individuals

There are more than 700 individuals to whom copies of this EIS were sent. A complete listing of these names is available from the Superintendent, Crater Lake National Park, Hwy. 62, Crater Lake, OR 97604.

APPENDIXES, BIBLIOGRAPHY, PREPARERS



APPENDIX A: LEGISLATION

6. Crater Lake National Park

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Act of May 22, 1902, reserving a certain tract of land from public lands in Oregon as a public park.....	111
Act of Legislature of Oregon, approved January 25, 1915, ceding exclusive jurisdiction to the United States over Crater Lake National Park.....	112
Act of August 21, 1916, accepting cession by Oregon of exclusive jurisdiction over lands embraced within the Crater Lake National Park.....	113
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Act of May 14, 1932, adding certain land to Crater Lake National Park.....	117
Act of May 14, 1932, authorizing the acquisition of additional land in Medford, Oreg., for use in administration of the Crater Lake National Park..	117

An Act Reserving from the public lands in the State of Oregon, as a public park for the benefit of the people of the United States, and for the protection and preservation of the game, fish, timber, and all other natural objects therein, a tract of land herein described, and so forth, approved May 22, 1902 (32 Stat. 202)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land bounded north by the parallel forty-three degrees four minutes north latitude, south by forty-two degrees forty-eight minutes north latitude, east by the meridian one hundred and twenty-two degrees west longitude, and west by the meridian one hundred and twenty-two degrees sixteen minutes west longitude, having an area of two hundred and forty-nine square miles, in the State of Oregon, and including Crater Lake, is hereby reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart forever as a public park or pleasure ground for the benefit of the people of the United States, to be known as "Crater Lake National Park." (U.S.C., title 16, sec. 121.)

SEC. 2. That the reservation established by this act shall be under the control and custody of the Secretary of the Interior, whose duty it shall be to establish rules and regulations and cause adequate measures to be taken for the preservation of the natural objects within said park, and also for the protection of the timber from wanton depredation, the preservation of all kinds of game and fish, the punishment of trespassers, the removal of unlawful occupants and intruders, and the prevention and extinguishment of forest fires. (U.S.C., title 16, sec. 122.)

Public lands.
Crater Lake Na-
tional Park,
Oreg., estab-
lished.
Boundaries.

Regulations, etc.,
by Secretary of
Interior.

Settlement in, etc., prohibited. SEC. 3. That it shall be unlawful for any person to establish any settlement or residence within said reserve, or to engage in any lumbering, or other enterprise or business occupation therein, or to enter therein for any speculative purpose whatever, and any person violating the provisions of this act, or the rules and regulations established thereunder, shall be punished by a fine of not more than five hundred dollars, or by imprisonment for not more than one year, and shall further be liable for all destruction of timber or other property of the United States in consequence of any such unlawful act: *Provided*, That said reservation shall be open, under such regulations as the Secretary of the Interior may prescribe, to all scientists, excursionists, and pleasure seekers and to the location of mining claims and the working of the same: *And provided further*, That restaurant and hotel keepers, upon application to the Secretary of the Interior, may be permitted by him to establish places of entertainment within the Crater Lake National Park for the accommodation of visitors, at places and under regulations fixed by the Secretary of the Interior, and not otherwise. (U.S.C., title 16, sec. 123.)

Penalties.

Provisos.

Admission of visitors, etc.

Hotels, etc., permitted. (Amended by 39 Stat. 535, as amended. See pp. 9-12.)

Act of Legislature of Oregon, approved January 25, 1915, ceding to the United States exclusive jurisdiction over Crater Lake National Park in the State of Oregon. (Oregon Laws, 1920, vol. II, p. 3487.)

Be it enacted by the people of the State of Oregon, That exclusive jurisdiction shall be, and the same is hereby, ceded to the United States over and within all the territory which is now, or may hereafter be, included in that tract of land in the State of Oregon set aside by an act of Congress, approved May 22, 1902, entitled "An Act reserving from the public lands in the State of Oregon, as a public park for the benefit of the people of the United States, and for the protection and preservation of the game, fish, timber, and all other natural objects therein, a tract of land herein described, and so forth," for the purposes of a national park, known and designated as Crater Lake National Park; saving, however, to the said State the right to serve civil or criminal process within the limits of the aforesaid park in any suits or prosecutions for, or on account of, rights acquired, obligations incurred, or crimes committed in said State but outside of said park; and saving further to the said State the right to tax persons and corporations, their franchises and property on lands included in said park: *Provided, however*, That jurisdiction shall not vest until the United States, through the proper officers, notifies the Governor of said State that they assume police and military jurisdiction over said park.

SEC. 2. All acts and parts of acts in conflict with this act are hereby repealed.

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SEC. 3. Inasmuch as at this time there exists confusion concerning the jurisdiction of the Federal and State courts over the property and within the territory in this Act described, the passage of this Act is declared to be immediately necessary for the immediate protection of the peace, health, and safety of the State, and an emergency is hereby declared to exist, and this Act shall go into immediate force and effect from and after its passage and approval by the Governor.

An Act To accept the cession by the State of Oregon of exclusive jurisdiction over the lands embraced within the Crater Lake National Park, and for other purposes, approved August 21, 1916 (39 Stat. 521)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of the act of the Legislature of the State of Oregon, approved January twenty-fifth, nineteen hundred and fifteen, ceding to the United States exclusive jurisdiction over the territory embraced within the Crater Lake National Park, are hereby accepted and sole and exclusive jurisdiction is hereby assumed by the United States over such territory, saving, however, to the said State the right to serve civil or criminal process within the limits of the aforesaid park in suits or prosecution for or on account of rights acquired, obligations incurred, or crimes committed in said State but outside of said park, and saving further to the said State the right to tax persons and corporations, their franchises and property, on the lands included in said park. All the laws applicable to places under the sole and exclusive jurisdiction of the United States shall have force and effect in said park. All fugitives from justice taking refuge in said park shall be subject to the same laws as refugees from justice found in the State of Oregon. (U.S.C., title 16, sec. 124.)

Crater Lake National Park, Ore.
Sole jurisdiction over, ceded by Oregon to United States.
State process, etc.

SEC. 2. That said park shall constitute a part of the United States judicial district for Oregon, and the district court of the United States in and for Oregon shall have jurisdiction of all offenses committed within said boundaries. (U.S.C., title 16, sec. 125.)

Jurisdiction of Oregon judicial district.

SEC. 3. That if any offense shall be committed in the Crater Lake National Park, which offense is not prohibited or the punishment for which is not specifically provided for by any law of the United States, the offender shall be subject to the same punishment as the laws of the State of Oregon in force at the time of the commission of the offense may provide for a like offense in said State; and no subsequent repeal of any such law of the State of Oregon shall affect any prosecution for said offense committed within said park. (U.S.C., title 16, sec. 126.)

Punishment under Oregon laws.

SEC. 4. That all hunting or the killing, wounding, or capturing at any time of any wild bird or animal, except

Hunting, fishing, etc., prohibited.

Regulations, etc.	dangerous animals when it is necessary to prevent them from destroying human lives or inflicting injury, is prohibited within the limits of said park; nor shall any fish be taken out of the waters of the park in any other way than by hook and line, and then only at such seasons and in such times and manner as may be directed by the Secretary of the Interior. That the Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of all timber, mineral deposits other than those legally located prior to the passage of this Act, natural curiosities, or wonderful objects within said park, and for the protection of the animals and birds in the park from capture or destruction, and to prevent their being frightened or driven from the park; and he shall make rules and regulations governing the taking of fish from the streams or lakes in the park. Possession within said park of the dead bodies, or any part thereof, of any wild bird or animal shall be prima facie evidence that the person or persons having the same are guilty of violating this Act. Any person or persons, or stage or express company, or railway company, who knows or has reason to believe that they were taken or killed contrary to the provisions of this Act and who receives for transportation any of said animals, birds, or fish so killed, caught, or taken, or who shall violate any of the other provisions of this Act or any rule or regulation that may be promulgated by the Secretary of the Interior with reference to the management and care of the park or for the protection of the property therein, for the preservation from injury or spoliation of timber, mineral deposits other than those legally located prior to the passage of this Act, natural curiosities, or wonderful objects within said park, or for the protection of the animals, birds, or fish in the park, or who shall within said park commit any damage, injury, or spoliation to or upon any building, fence, hedge, gate, guidepost, tree, wood, underwood, timber, garden, crops, vegetables, plants, land, spring, mineral deposits other than those legally located prior to the passage of this Act, natural curiosities, or other matter or thing growing or being thereon or situate therein, shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not more than \$500 or imprisonment not exceeding six months, or both, and be adjudged to pay all costs of the proceedings. (U.S.C., title 16, sec. 127.)
Evidence of violations.	
Punishment for violations.	
Forfeiture of guns, traps, etc.	SEC. 5. That all guns, traps, teams, horses, or means of transportation of every nature or description used by any person or persons within said park limits when engaged in killing, trapping, ensnaring, or capturing such wild beasts, birds, or animals shall be forfeited to the United States and may be seized by the officers in said park and

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held pending the prosecution of any person or persons arrested under charge of violating the provisions of this Act, and upon conviction under this Act of such person or persons using said guns, traps, teams, horses, or other means of transportation, such forfeiture shall be adjudicated as a penalty in addition to the other punishment provided in this Act. Such forfeited property shall be disposed of and accounted for by and under the authority of the Secretary of the Interior. (U.S.C., title 16, sec. 128.)

SEC. 6. That the United States District Court for Oregon shall appoint a commissioner who shall reside in the park and who shall have jurisdiction to hear and act upon all complaints made of any violations of law or of the rules and regulations made by the Secretary of the Interior for the government of the park and for the protection of the animals, birds, and fish, and objects of interest therein, and for other purposes authorized by this Act. Commissioner. Appointment, authority, etc.

Such commissioner shall have power, upon sworn information, to issue process in the name of the United States for the arrest of any person charged with the commission of any misdemeanor, or charged with a violation of the rules and regulations, or with a violation of any of the provisions of this Act prescribed for the government of said park and for the protection of the animals, birds, and fish in said park, and to try the person so charged, and if found guilty, to impose punishment and to adjudge the forfeiture prescribed. Judicial power in violations of rules, etc.

In all cases of conviction an appeal shall lie from the judgment of said commissioner to the United States District Court for Oregon, and the United States court in said district shall prescribe the rules of procedure and practice for said commissioner in the trial of cases and for appeal to said United States District Court. (U.S.C., title 16, sec. 129.) Appeals.

SEC. 7. That any such commissioner shall also have power to issue process as hereinbefore provided for the arrest of any person charged with the commission within said boundaries of any criminal offense not covered by the provisions of section four of this Act to hear the evidence introduced, and if he is of opinion that probable cause is shown for holding the person so charged for trial shall cause such person to be safely conveyed to a secure place of confinement within the jurisdiction of the United States District Court for Oregon, and certify a transcript of the record of his proceedings and the testimony in the case to said court, which court shall have jurisdiction of the case: *Provided*, That the said commissioner shall grant bail in all cases bailable under the laws of the United States or of said State. (U.S.C., title 16, sec. 130.) Procedure in criminal cases. Provide. Bail.

SEC. 8. That all process issued by the commissioner shall be directed to the marshal of the United States for Service of process.

the district of Oregon, but nothing herein contained shall be so construed as to prevent the arrest by any officer or employee of the Government or any person employed by the United States in the policing of said reservation within said boundaries without process of any person taken in the act of violating the law or this Act or the regulations prescribed by said Secretary as aforesaid. (U.S.C., title 16, sec. 131.)

Salary. SEC. 9. That the commissioner provided for in this Act shall be paid an annual salary of \$1,500, payable quarterly: *Provided*, That the said commissioner shall reside within the exterior boundaries of said Crater Lake National Park, at a place to be designated by the court making such appointment: *Provided further*, That all fees, costs, and expenses collected by the commissioner shall be disposed of as provided in section eleven of this Act. (U.S.C., title 16, sec. 132.)

United States fees, etc. SEC. 10. That all fees, costs, and expenses arising in cases under this Act and properly chargeable to the United States shall be certified, approved, and paid as are like fees, costs, and expenses in the courts of the United States. (U.S.C., title 16, sec. 133.)

Deposit of fines and costs. SEC. 11. That all fines and costs imposed and collected shall be deposited by said commissioner of the United States, or the marshal of the United States collecting the same, with the clerk of the United States District Court for Oregon. (U.S.C., title 16, sec. 134.)

Acceptance of cession. SEC. 12. That the Secretary of the Interior shall notify, in writing, the governor of the State of Oregon of the passage and approval of this Act.

Excerpt from "An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1918, and for other purposes," approved June 12, 1917 (40 Stat. 152)

Crater Lake National Park. Acceptance of donated lands, etc. (Repealed by 46 Stat. 1028, but subject matter covered by U.S.C., title 16, sec. 6, 41 Stat. 917. See p. 13.) The Secretary of the Interior is authorized to accept patented lands or rights of way over patented lands in the Crater Lake National Park that may be donated for park purposes. (U.S.C., title 16, sec. 135.)

Crater Lake National Park, Oreg. **Acceptance from city of Medford of lots, as sites for buildings in.** An Act Accepting certain tracts of land in the city of Medford, Jackson County, Oregon, approved June 7, 1924 (43 Stat. 606)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Secretary of the Interior be, and he is hereby, authorized to accept certain tracts of land in the city of Medford, Jackson County, Oregon, described as lots numbered 15 and 16, block 9, amended plat to Queen Ann Addition to the city of Medford; and lot 3, block 2, central subdivision to the city of Medford, which have been tendered to the United States of America in fee simple by the city of Medford, Oregon, as sites for buildings to be used in connection with the administration of Crater Lake National Park, Oregon.

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An Act To add certain land to the Crater Lake National Park in the State of Oregon, and for other purposes, approved May 14, 1932 (47 Stat. 155)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all of that certain tract described as follows: Beginning on the south boundary line of Crater Lake National Park at four mile post numbered 112; thence west along the south boundary line of said park four and twenty-six one-hundredths chains which is the northwest corner of this tract; thence south one hundred and fourteen and forty-two one-hundredths chains; thence south forty degrees fifty-nine minutes east, eighty-four and thirty-nine one-hundredths chains; thence east fifteen and thirteen one-hundredths chains to highway stake numbered 130; thence north eighty-nine degrees thirty minutes east, eighteen and six one-hundredths chains; thence north twenty and eighty-three one-hundredths chains; thence north nineteen degrees and forty minutes west, one hundred and twenty-six and four one-hundredths chains; thence north twenty-seven degrees fifty-two minutes west forty-three and fifty one-hundredths chains to the south boundary of Crater Lake National Park; thence west twenty-four chains following the south boundary of said park to the place of beginning, in the State of Oregon be, and the same is hereby, excluded from the Crater National Forest and made a part of the Crater Lake National Park subject to all laws and regulations applicable to and governing said park. (U.S.C., 6th supp., title 16, sec. 121a.)

Crater Lake National Park, Oreg.

Land added to, Description.

Transferred from Crater National Forest.

An Act To authorize the acquisition of additional land in the city of Medford, Oregon, for use in connection with the administration of the Crater Lake National Park, approved May 14, 1932 (47 Stat. 156)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and he is hereby, authorized to acquire on behalf of the United States for use in connection with the present administrative headquarters of the Crater Lake National Park, that certain tract of land in the city of Medford, Jackson County, Oregon, adjoining the present headquarters site and described as lot 4, block 2, central subdivision to said city of Medford, Oregon, which tract of land has been offered to the United States for the purpose aforesaid by the city of Medford, Oregon, free and clear of all encumbrances for the consideration of \$300.

Crater Lake National Park, Oreg.
Purchase of certain tract from Medford, Oreg., as addition to, authorized.

SEC. 2. That not to exceed the sum of \$300 from the unexpended balance of appropriations heretofore made for the acquisition of privately owned lands and/or standing timber within the national parks and national monuments be, and the same is hereby, made available for the acquisition of land herein authorized.

Price.
Fund available.
Vol. 46, p. 1154.

PUBLIC LAW 96-553—DEC. 19, 1980

94 STAT. 3255

Public Law 96-553
96th Congress

An Act

To revise the boundary of Crater Lake National Park in the State of Oregon, and for other purposes.

Dec. 19, 1980
[S. 2318]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) the first section of the Act entitled, "An Act reserving from the public lands in the State of Oregon, as a public park for the benefit of the people of the United States, and for the protection and preservation of the game, fish, timber, and all other natural objects therein, a tract of land herein described, and so forth", approved May 22, 1902 (32 Stat. 202), is amended to read as follows:

Crater Lake
National Park,
Oreg., boundary
revision.

16 USC 121.

"That in order to preserve for the benefit, education, and inspiration of the people of the United States certain unique and ancient volcanic features, including Crater Lake, together with significant forest and fish and wildlife resources, there is hereby established the Crater Lake National Park in the State of Oregon. The boundary of the park shall encompass the lands, waters, and interests therein within the area generally depicted on the map entitled, 'Crater Lake National Park, Oregon', numbered 106-80,001, and dated February 1980, which shall be on file and available for public inspection in the office of the National Park Service, Department of the Interior. Lands, waters, and interests therein within the boundary of the park which were within the boundary of any national forest are excluded from such national forest and the boundary of such national forest is revised accordingly."

(b) The Act entitled "An Act to add certain land to the Crater Lake National Park in the State of Oregon, and for other purposes", approved May 14, 1932 (47 Stat. 155), is repealed.

Repeal.
16 USC 121a.

SEC. 2. To make possible more effective protection of the Alpine Lakes Wilderness and more comprehensive and effective management of the management unit within the Alpine Lakes Area, established by the Alpine Lakes Area Management Act of 1976, the Secretary of Agriculture is authorized to acquire any or all of the following described lands in the State of Washington: in township 23 north, range 9 east, Willamette meridian, the southeast quarter of

16 USC 1132
note.

APPENDIX B: U.S. FISH AND WILDLIFE SERVICE LETTER ON THREATENED, ENDANGERED, AND PROPOSED SPECIES WITH ATTACHED LIST



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Klamath Falls Fish and Wildlife Office
6610 Washburn Way
Klamath Falls, OR 97603
(541) 885-8481 FAX (541) 885-7837

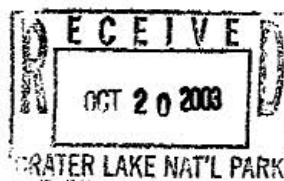


October 16, 2003

Memorandum

In reply refer to 1-10-04-SP-007

To: Park Superintendent, Crater Lake National Park
Crater Lake, Oregon



From: Field Supervisor, Klamath Falls Fish and Wildlife Office
Klamath Falls, Oregon *John E. Edinger*

Subject: Species List Update

We are updating your list of Federally threatened, endangered and proposed species that may be present on, or in the vicinity of Crater Lake National Park. The previous list was valid for 90 days or until we sent a letter with any changes that occurred. An updated list is attachment with a current compilation date (Attachment A). The list should not be considered evidence as to the presence or absence of species at proposed project locations.

Please distribute this letter and enclosure to the appropriate personnel in your office.

Thank you for your efforts to conserve, protect and recover listed and candidate species. If you have questions regarding this letter, please contact Leonard LeCaptain at (541) 885-8481.

Attachment A

Act	Int	Int
		<i>CL</i>
		Superintendent
		Superintendent's Sec.
		Mount. Asst.
		Crater Administration
		Computer Prog.
		Budget
		Purchasing
		Personnel
		Chief of Maintenance
		K & T Foreman
		R & L Foreman
		Chief Ranger
		Staff Ranger
		Antio Springs O.R.
		Fire Mgmt. Officer
		Red Cone O.R.
		Chief Natural Resource Biol.
		Chief Interpretation
		Park Interpreter
		Historian
		ORCA
		DSC
		Files

Attachment A

SPECIES LIST

The federal agency or designated representative shall use the following list(s), along with relevant biological studies, literature reviews, views of species experts, and site inspections, to determine if the project may affect (negatively or positively) listed or proposed species or proposed or designated critical habitat. If the subject project may affect a listed species and the proposed action is funded, permitted, or implemented by a Federal agency, the Federal agency must prepare a biological assessment if the project is a construction project which may require an environmental impact statement¹⁷. If a biological assessment is not required, the Federal agency still has the responsibility to review its proposed activities and determine whether the listed species may be affected. If, based on an analysis it is determined that the project will have "no effect" on listed or proposed species, then no additional correspondence with the Service is necessary under the Act's requirements. If the action agency requires a letter indicating Service review of the "no effect" determination, then please provide a summary of the project, relevant maps and species information, a copy of the species list provided by the Klamath Falls Fish and Wildlife Office (KFFWO), and justification for the effects determination to the KFFWO.

The species list(s) also includes Federal candidate species of concern that may be present within each county. While not protected under the Endangered Species Act (Act), the Service encourages Federal agencies and private land owners to utilize their authorities to conserve and protect candidate species, so activities which they authorize do not contribute to the need to list these species as either threatened or endangered under the Act. We also encourage Federal agencies and private land owners to provide the Service with information on status surveys, monitoring and other studies related to candidate species, and to address these species during consultation. During the assessment or review process, the Federal agency may engage in planning efforts, but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act. If a listed species may be affected, the Federal agency should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. The conference

process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

The action agency and applicant should be aware that section 9 of the Act prohibits the "take" of any listed species. The definition of "take" includes to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. "Harm" in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Anyone who engages in a take would be subject to prosecution under section 9 of the Act. Such taking may occur only under the authority of the Service's pursuant to section 7 (if a Federal agency is involved with this project) or through a section 10(a)(1)(B) permit, as mandated in the Act.

^{1/} "Construction Project" means any major Federal action which significantly affects the quality of the human environment designed primarily to result in the building or erection of man-made structures such as dams, buildings, roads, pipelines, channels and the like. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approval which may result in construction.

LISTED, PROPOSED AND CANDIDATE SPECIES
THAT MAY OCCUR ON CRATER LAKE NATIONAL PARK

LISTED SPECIES

Mammals

Canada lynx	<i>Lynx canadensis</i>	T
-------------	------------------------	---

Birds

Bald	<i>Haliaeetus leucocephalus</i>	T
Northern spotted owl	<i>Strix occidentalis caurina</i>	T, CH

Fish

Shortnose sucker	<i>Chasmistes brevirostris</i>	E, PCH
Lost River sucker	<i>Deltistes luxatus</i>	E, PCH
Bull trout (Klamath River population segment)	<i>Salvelinus confluentus</i>	T, PCH

Plants

None

PROPOSED SPECIES

None

CANDIDATE SPECIES

Birds

Yellow-billed cuckoo (Western continental US)	<i>Coccyzus americanus</i>	C
---	----------------------------	---

Amphibians and Reptiles

Oregon Spotted frog	<i>Rana pretiosa</i>	C
---------------------	----------------------	---

(E) - Endangered (T) - Threatened (CH) - Critical Habitat
(C) - Candidate (PE) - Proposed as endangered (PT) - Proposed as threatened
(PCH) - Proposed critical habitat

(List compiled October 2003)

APPENDIX C: PROJECTED COSTS OF ALTERNATIVES

Ongoing and Planned Actions and Projects		
Visitor Services Plan		
Mazama Village	Adapt historic 1928 building for visitor contact	\$ 4,432,000
	Rehabilitate Rim Cultural Landscape	500,000
	Remove Rim Village Dorm	350,000
	<i>Construct New Restaurant and Expand Parking Lot*</i>	<i>1,140,000</i>
	<i>Construction Concession Maintenance Facility*</i>	<i>364,000</i>
Cleetwood Cove	Develop group campsites	60,900
	Improve bulkhead	500,000
	Construct seasonal shade structure	200,000
	Improve Cleetwood Trail	360,000
<i>Subtotal *(Private Dollars)</i>		<i>\$ 1,504,000</i>
Subtotal (Federal Dollars)		6,402,900
TOTAL		\$ 7,906,900
Alternative One: No Action		
Area	Description	Net Cost
Muson valley	Rehabilitate Superintendent's /Chief Ranger's Residences	\$1,800,000
Buildings	Adapting Existing buildings	2,000,000
TOTAL		\$ 3,800,000

Alternative Two: Preferred Emphasis on Increased Visitor Opportunities		
Area	Description	Net Cost
Munson Valley	Rehabilitate Superintendent's /Chief Ranger's Residences	\$ 1,800,000
East Rim Drive	New trails	265,000
Frontcountry Sites	New trails	265,000
	Picnic Sites	25,000
	Waysides	200,000
Buildings	Adapting Existing buildings	2,000,000
Parking Improvements		100,000
Office Relocation (out of park)		88,000
	TOTAL	\$ 4,743,000
Alternative Three: Emphasis on Enjoyment of Natural Environment		
Area	Description	Net Cost
Munson Valley	Rehabilitate Superintendent's/Chief Ranger's Residences	\$1,800,000
Frontcountry Sites	New trails	265,000
	Picnic Sites	25,000
	Waysides	200,000
Shuttle Bus	Rim	750,000
	Mazama to Rim	750,000
	Shuttle stop/improvements	100,000
Office Relocation (out of park)		44,000
	TOTAL	\$ 3,934,000

Alternative Four: Emphasis on Preservation and Restoration of Natural Resources		
Area	Description	Net Cost
Rim Village	Rehabilitate Superintendent's/Chief Ranger's Residences	\$ 1,800,000
Frontcountry Sites	New trails	265,000
Buildings	Nonhistoric buildings removed, site restored	1,200,000
Winter Snowcoach	Mazama to Rim	500,000
Office Relocation (out of park)		176,000
	TOTAL	\$3,941,000

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Project/Location: Crater Lake National Park - General Management Plan											
7/10/00											
Subject: Functional Component											
Description:											
Project Life Cycle = 25 Years											
Discount Rate = 7.00%											
Present Time = Current Date											
Alternative 1				Alternative 2		Alternative 3		Alternative 4			
INITIAL COSTS		Quantity	UM	Unit Price	Est.	PW	Est.	PW	Est.	PW	PW
Construction Costs											
A.	Rehab Superintendent Hou:			\$0.00	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000
B.	Building Space			\$0.00	2,000,000	2,000,000	2,000,000	2,000,000	1,200,000	1,200,000	1,200,000
C.	Trails/Picnic/Campsites			\$0.00	0	0	755,000	755,000	490,000	490,000	265,000
D.											
E.	Parking Improvement					0	100,000	100,000	0	0	0
F.	Shuttle Bus					0		0	1,600,000		500,000
G.	Snow Coach					0		0		500,000	500,000
H.	Office Relocation					0	88,000	88,000	44,000	44,000	176,000
I.											
J.											
Total Initial Cost											
Initial Cost PW Savings (Compared to Alt. 1)											
Description		Year	PW Factor								
REF	Shuttle bus replacement	5	0.7130			0					178,246
	Shuttle bus replacement	10	0.5083			0					127,087
A.	Shuttle bus replacement	15	0.3624			0					90,611
B.	Shuttle bus replacement	20	0.2584			0					64,604
B.		0	1.0000			0					0
B.		0	1.0000			0					0
C.		0	1.0000			0					0
D.		0	1.0000			0					0
E.						0					460,548
Total Replacement/Salvage Costs											
Description		Escl. %	PWA								
ANN	Leasing	0.000%	11.654			0					300,196
	Staffing	0.000%	11.654			0					1,456,698
A.	Bus Operation/Maintenance	0.000%	11.654			0					2,820,167
B.		0.000%	11.654			0					0
C.		0.000%	11.654			0					0
D.		0.000%	11.654			0					0
E.						0					4,577,061
F.											
Total Annual Costs (Present Worth)											
						3,800,000					

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.