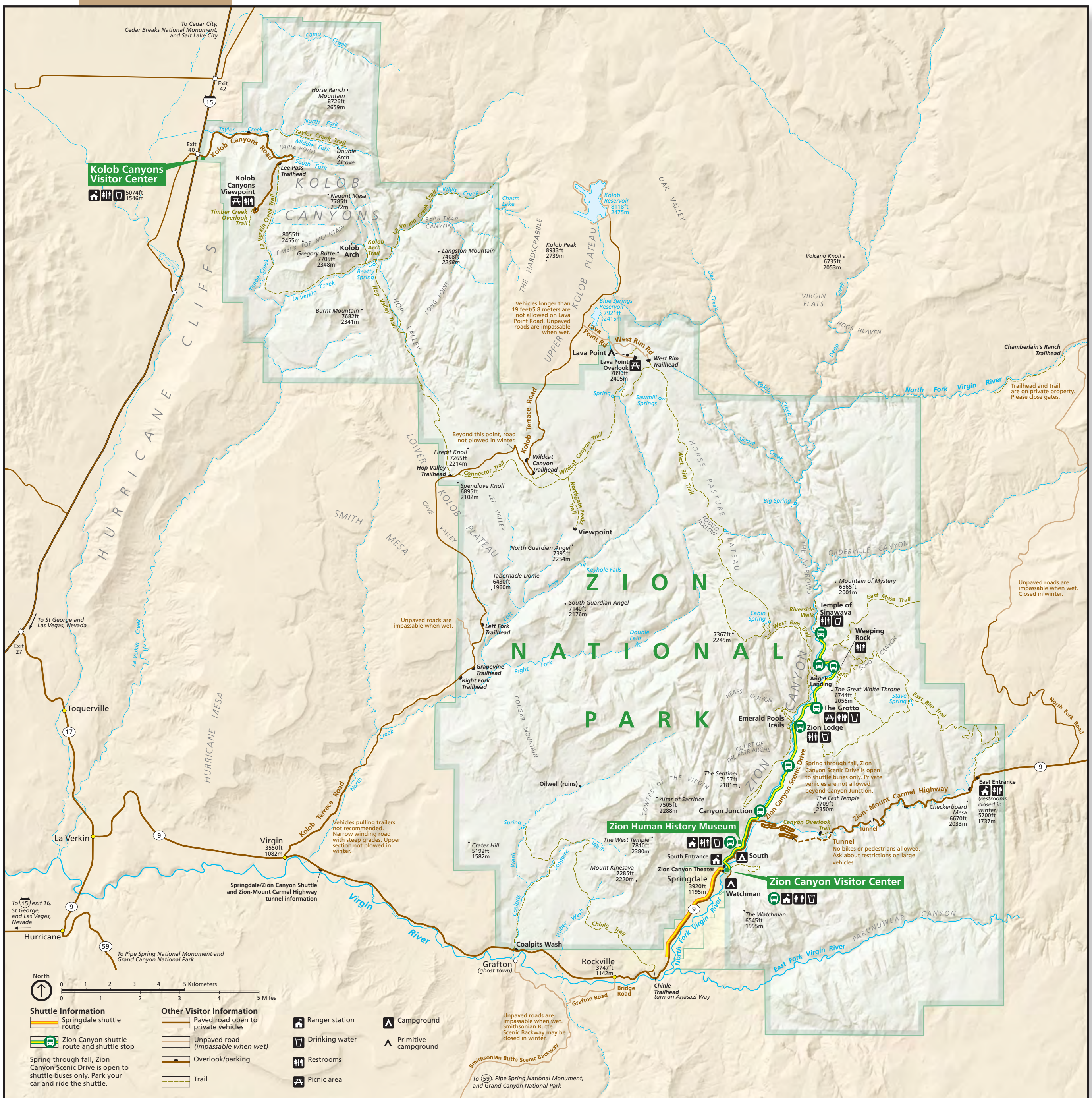
NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR

Foundation Document

Zion National Park

Utah

October 2013



To Cedar City, Cedar Breaks National Monument, and Salt Lake City
Kolob Canyons Visitor Center
5074ft 1546m
Kolob Canyons Road
Kolob Canyons Viewpoint
Timber Creek Overlook Trail
Lee Pass Trailhead
Taylor Creek Trail
Double Arch Alcove
Horse Ranch Mountain 8726ft 2659m
Nagunt Mesa 7785ft 2372m
K O L O B
C A N Y O N S
Kolob Arch
Kolob Arch Trail
Gregory Butte 7705ft 2348m
8055ft 2455m
La Verkin Creek Trail
Beatty Spring
Hop Valley Trail
Langston Mountain 7408ft 2258m
Burnt Mountain 7682ft 2341m
Kolob Reservoir 8118ft 2475m
Kolob Peak 8933ft 2739m
Blue Springs Reservoir 7921ft 2415m
Vehicles longer than 19 feet/5.8 meters are not allowed on Lava Point Road. Unpaved roads are impassable when wet.
Lava Point Rd
West Rim Rd
Lava Point
Lava Point Overlook 7890ft 2405m
West Rim Trailhead
Volcano Knoll 6735ft 2053m
VIRGIN FLATS
Chamberlain's Ranch Trailhead
Trailhead and trail are on private property. Please close gates.
North Fork Virgin River
Kolob Terrace Road
Beyond this point, road not plowed in winter.
Firepit Knoll 7265ft 2214m
Hop Valley Trailhead
Wildcat Canyon Trailhead
Wildcat Canyon Trail
Connector Trail
Northgate Peaks Trail
Spendlove Knoll 6895ft 2102m
Viewpoint
H U R R I C A N E   C L I F F S
SMITH MESA
North Guardian Angel 7395ft 2254m
Tabernacle Dome 6430ft 1960m
South Guardian Angel 7140ft 2176m
Z I O N
N A T I O N A L
P A R K
Unpaved roads are impassable when wet.
Left Fork Trailhead
Grapevine Trailhead
Right Fork Trailhead
Mountain of Mystery 6565ft 2001m
East Mesa Trail
Temple of Sinawava
Weeping Rock
Angels Landing
The Great White Throne 6744ft 2056m
The Grotto
Emerald Pools Trails
Zion Lodge
7367ft 2245m
Unpaved roads are impassable when wet. Closed in winter.
To St George and Las Vegas, Nevada
Exit 27
Toquerville
HURRICANE MESA
Oilwell (ruins)
The Sentinel 7157ft 2181m
Altar of Sacrifice 7505ft 2288m
Spring through fall, Zion Canyon Scenic Drive is open to shuttle buses only. Private vehicles are not allowed beyond Canyon Junction.
The East Temple 7709ft 2350m
Zion–Mount Carmel Highway
Checkerboard Mesa 6670ft 2033m
East Entrance (restrooms closed in winter) 5700ft 1737m
Canyon Junction
Canyon Overlook Trail
Tunnel
Tunnel
No bikes or pedestrians allowed. Ask about restrictions on large vehicles.
Zion Human History Museum
La Verkin
Virgin 3550ft 1082m
Kolob Terrace Road
Vehicles pulling trailers not recommended. Narrow winding road with steep grades. Upper section not plowed in winter.
Crater Hill 5192ft 1582m
The West Temple 7810ft 2380m
South Entrance
South
Mount Kinesava 7285ft 2220m
Zion Canyon Theater
Springdale 3920ft 1195m
Watchman
Zion Canyon Visitor Center
The Watchman 6545ft 1995m
Springdale/Zion Canyon Shuttle and Zion-Mount Carmel Highway tunnel information
To 15 exit 16, St George, and Las Vegas, Nevada
Hurricane
To Pipe Spring National Monument and Grand Canyon National Park
Coalpits Wash
Grafton (ghost town)
Rockville 3747ft 1142m
Bridge Road
Grafton Road
Chinle Trailhead turn on Anasazi Way
East Fork Virgin River
PARUNUWEAP CANYON
Virgin River
Unpaved roads are impassable when wet. Smithsonian Butte Scenic Backway may be closed in winter.
Smithsonian Butte Scenic Backway
To 59, Pipe Spring National Monument, and Grand Canyon National Park
North
0 1 2 3 4 5 Kilometers
0 1 2 3 4 5 Miles
Shuttle Information
Springdale shuttle route
Zion Canyon shuttle route and shuttle stop
Spring through fall, Zion Canyon Scenic Drive is open to shuttle buses only. Park your car and ride the shuttle.
Other Visitor Information
Paved road open to private vehicles
Unpaved road (impassable when wet)
Overlook/parking
Trail
Ranger station
Drinking water
Restrooms
Picnic area
Campground
Primitive campground

Contents

Mission of the National Park Service

The National Park Service (NPS) preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The National Park Service collaborates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.

The NPS core values are a framework in which the National Park Service accomplishes its mission. They express the manner in which, both individually and collectively, the National Park Service pursues its mission. The NPS core values are:

- **Shared stewardship**: We share a commitment to resource stewardship with the global preservation community.
- **Excellence:** We strive continually to learn and improve so that we may achieve the highest ideals of public service.
- **Integrity:** We deal honestly and fairly with the public and one another.
- **Tradition:** We are proud of it; we learn from it; we are not bound by it.
- **Respect:** We embrace each other's differences so that we may enrich the well-being of everyone.

The National Park Service is a bureau within the Department of the Interior. While numerous national park system units were created prior to 1916, it was not until August 25, 1916, that President Woodrow Wilson signed the National Park Service Organic Act formally establishing the National Park Service.

The national park system continues to grow and comprises 401 park units covering more than 84 million acres in every state, the District of Columbia, American Samoa, Guam, Puerto Rico, and the Virgin Islands. These units include, but are not limited to, national parks, monuments, battlefields, military parks, historical parks, historic sites, lakeshores, seashores, recreation areas, scenic rivers and trails, and the White House. The variety and diversity of park units throughout the nation require a strong commitment to resource stewardship and management in order to ensure both the protection and enjoyment of these resources for future generations.

The arrowhead was authorized as the official National Park Service emblem by the Secretary of the Interior on July 20, 1951. The sequoia tree and bison represent vegetation and wildlife, the mountains and water represent scenic and recreational values, and the arrowhead represents historical and archeological values.

Introduction

Every unit of the national park system is to have a foundation document that provides basic guidance for planning and management decisions—a foundation for planning and management. The core components of a foundation document include the park's purpose, significance, fundamental resources and values, interpretive themes, and special mandates and administrative commitments. The foundation document also includes an assessment of planning and data needs that identifies planning issues, planning products to be developed, and the associated studies and data required for park planning. Along with the core components, the assessment provides a focus for park planning activities and establishes a baseline from which planning documents are developed.

A primary benefit of developing a foundation document is the opportunity to integrate and coordinate all kinds and levels of planning from a single, shared understanding of what is most important about the park. The process of developing a foundation document begins with gathering and integrating information about the park. Next, this information is refined and focused to determine what the most important attributes of the park are. The process of preparing a foundation document aids park managers, staff, and the public in identifying and clearly stating in one document the essential information that is necessary for park management to consider when determining future planning efforts, outlining key planning issues, and protecting resources and values that are integral to park purpose and identity.

While not included in this document, a park atlas is also part of a foundation project. The atlas is a series of maps compiled from available geographic information system (GIS) data on natural and cultural resources, visitor use patterns, facilities, and other topics. It serves as a GIS-based support tool for planning and park operations. The atlas is published as a (hard copy) paper product and as geospatial data for use in a web mapping environment. The park atlas for Zion National Park can be accessed online at: http://insideparkatlas.nps.gov/.

Part 1: Core Components

The core components of a foundation document include a brief description of the park, park purpose, significance statements, fundamental and other important resources and values, and interpretive themes. These components are core because they typically do not change over time. Core components are expected to be used in future planning and management efforts.

Brief Description of the Park

Located in Washington, Iron, and Kane counties in southwestern Utah, Zion National Park encompasses some of the most scenic canyon country in the United States. The park is characterized by high plateaus, a maze of narrow, deep, sandstone canyons, and striking rock towers and mesas. The North Fork of the Virgin River has carved a spectacular gorge through Zion Canyon, where sandstone walls rise 2,000 to 3,000 feet above the canyon floor. The southern part of the park is a lower desert area, with colorful mesas bordered by rocky canyons and washes. The northern sections of the park are higher plateaus covered by forests.

Zion is one of the earliest additions to the national park system. On July 31, 1909, President William H. Taft issued a proclamation setting aside 15,200 acres as the Mukuntuweap National Monument. In 1918 another presidential proclamation enlarged the monument to 76,800 acres and changed its name to Zion National Monument. Congress established the area as a national park in 1919. A second Zion National Monument (now called the Kolob Canyons) was established by presidential proclamation in 1937. Congress added the Kolob Canyons to Zion National Park in 1956. The park currently encompasses 148,733 acres.

On March 30, 2009, the Omnibus Public Land Management Act (Public Law 111-11) designated the vast majority of Zion National Park as wilderness. A total of 124,462 acres of Zion is designated wilderness (84% of the park), and 9,047 acres (6% of the park) are recommended for wilderness designation. This means that 90% of the park is managed as wilderness, as per NPS policy. The legislation also designated 144 miles of wild and scenic rivers in Zion National Park, the first wild and scenic rivers designated in Utah.

Zion's spectacular scenery attracts visitors from all over the world. Visitation to the park was about 3 million people in 2012. Visitors to Zion enjoy deep cool canyons, high wooded plateaus, and vast warm deserts. Zion offers a variety of recreational opportunities and activities including driving scenic roads, hiking, backpacking, canyoneering, photography, and wildlife viewing, to name a few.

Zion is a leader in protecting natural resources and embracing sustainable practices that reduce the effects of park operations on climate change. In order to accomplish this, Zion has implemented sustainable policies and practices. Examples included eliminating the need to purchase bottled water in plastic containers by providing and publicizing water bottle filling stations; creating a recycling program for staff, visitors, and concessioners; installing solar panels that provide electricity to many of the park buildings; and using energy efficient vehicles. These actions will help Zion meet the challenge of the National Park Service to leave park resources unimpaired for the enjoyment of future generations.

Park Purpose

The purpose statement identifies the specific reason(s) for establishment of a particular park. The purpose statement for Zion National Park was drafted through a careful analysis of its enabling legislation and the legislative history that influenced its development. The park was established by presidential proclamation and then by congressional legislation in 1919 (see appendix A for the presidential proclamations, enabling legislation, and other applicable legislative acts). The purpose statement lays the foundation for understanding what is most important about the park.

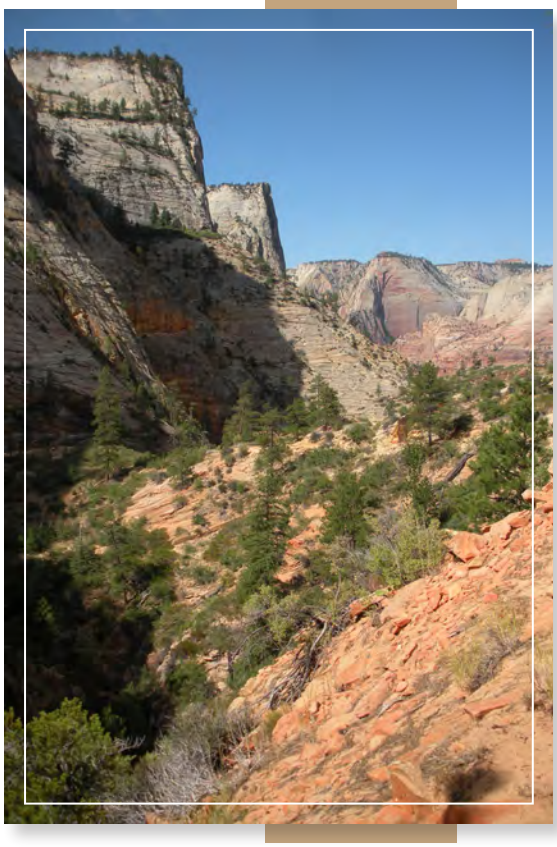
The purpose of Zion National Park is to preserve the dramatic geology including Zion Canyon and a labyrinth of deep and brilliantly colored Navajo sandstone canyons formed by extraordinary processes of erosion at the margin of the Colorado Plateau; to safeguard the park's wilderness character and its wild and scenic river values; to protect evidence of human history; and to provide for scientific research and the enjoyment and enlightenment of the public.

Park Significance

Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. These statements are linked to the purpose of Zion National Park, and are supported by data, research, and consensus. Statements of significance describe the distinctive nature of the park and why an area is important within a global, national, regional, and systemwide context. They focus on the most important resources and values that will assist in park planning and management.

The following significance statements have been identified for Zion National Park. (Please note that the order of the statements do not reflect the level of significance.)

- Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park.
- Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that exist only in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research.
- The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization.
- Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo sandstone aquifers and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park.
- In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research.
- Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.



Fundamental Resources and Values

Fundamental resources and values (FRVs) are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements.

Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

The following fundamental resources and values have been identified for Zion National Park:

- **Geologic Showcase.** Zion's spectacular sedimentary layers form the center of the Grand Staircase, the great regional sequence of cliffs and slopes linking the ancient rocks of Grand Canyon, through the Mesozoic layers of Zion, to the high plateaus of Bryce Canyon and Cedar Breaks. Zion contains the finest exposure of Navajo sandstone, in places exceeding 2,000 feet in thickness, a remnant of the largest sand dune system known to have existed on the planet. In addition to the dramatic high cliffs, the park displays a landscape modified by recent volcanism and an exceptionally rapid rate of erosion. These natural processes have produced large landslides, inverted valleys, deep slot canyons, hanging valleys, and have exposed significant paleontological resources.
- **Water Shapes the Landscape.** The park's many free-flowing rivers carry powerful flash floods and tremendous sediment loads, which act together as the primary agents of erosion. These rivers continue to carve into the edge of the Colorado Plateau, shaping Zion's dramatic scenery. By virtue of rivers cutting through the water-bearing Navajo sandstone, numerous canyon springs, fed by groundwater, create hanging gardens and seeping alcoves that form moist oases in a desert environment and sustain perennial river flows.

- **Convergence of Ecoregions.** The convergence of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions combined with the vertical relief and high concentration of canyons has provided a diversity of habitats for the array of life forms found in Zion National Park, including rare, endangered, and endemic species.

- **Natural Resource Quality and Function.** The quality of air, water, vegetation, and wildlife resources in Zion National Park are generally preserved, in some cases by allowing natural processes and natural disturbance regimes (such as fires, floods, and rockfalls) to exist, thereby promoting an environment predominated by natural processes. Wildland fire, in particular, provides the natural disturbance regime that maintains many of the park's ecosystems and is critical to maintaining wilderness character and associated natural resource values.

- **Wilderness Character.** Eighty-four percent of Zion is designated wilderness, managed with restraint and humility to protect the natural character of the landscape. The vast majority of this wilderness is entirely undeveloped with no trails, campsites, or structures. Even in a park with millions of visitors each year one can explore and experience the sights and sounds of solitude.

- **Wild and Scenic Rivers.** Zion's wild and scenic rivers provide for a wide range of river values and are composed of more than 140 miles of free-flowing, largely undeveloped water courses that provide habitat for six native fish species. In recent geologic time, the rivers have sliced though rock layers thousands of feet thick. The carved canyons provide habitat for the threatened Mexican spotted owl and cool canyon microclimates are home to hanging gardens where the endemic Zion snail resides.

- **The Remnants of Humanity's Past.** The cultural resources in Zion National Park encompass a continuum of human experience of both native and nonnative people. The nationally significant Parunuweap Canyon Archeological District contains "type" sites through which the Virgin Branch of the Anasazi were initially recognized as a distinctive regional manifestation of Ancestral Puebloan culture. For contemporary people, including American Indians and European American descendants of pioneers, many of the park's cultural sites, objects, landscapes, and natural resources remain important touchstones that contribute to group identity and heritage.

- **Opportunities for Connection to the Resources.** Zion National Park provides its visitors a wide range of high-quality recreational experiences through exceptional infrastructure and services, educational opportunities, and resources of high integrity. Zion National Park interprets park resource meanings, research, and management initiatives to encourage inspiration, learning, and stewardship.

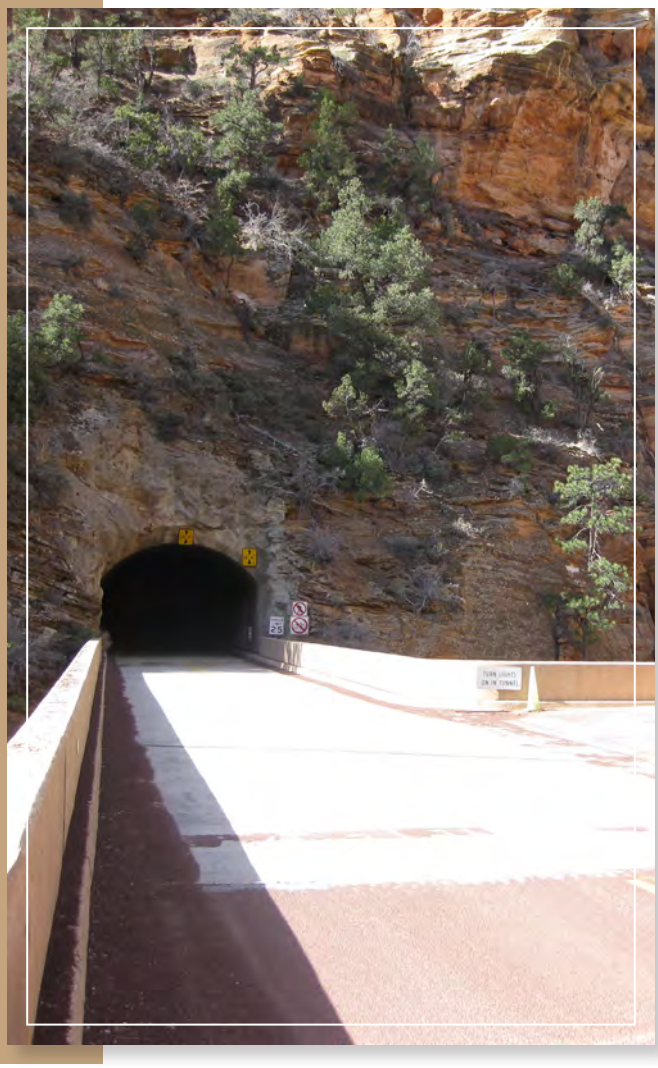
- **Preserving and Studying the Natural and Cultural History of Zion.** Museum and archival collections record Zion's natural and cultural history. Park collections illuminate the stories of American Indians, pioneers, NPS history, and the park's complex natural environment—documenting a long and highly active history of scientific study and scholarly research. The collection also demonstrates the ongoing importance of continued scientific study to develop and implement best management practices.

Other Important Resources and Values

Zion National Park contains other resources and values that are not fundamental to the purpose of the park, and may be unrelated to its significance, but are important to consider in planning processes. These are referred to as "other important resources and values" (OIRV). These resources and values have been selected because they are important in the operation and management of the park, and warrant special consideration in park planning.

The following other important resources and values have been identified for Zion National Park:

- **An Engineered Way of Life.** The Zion Lodge / Birch Creek Historic District represents early economic development and tourism inside the Grand Circle and Southern Utah. Residences and maintenance buildings in the Oak Creek and Pine Creek historic districts are intricate pieces of early NPS history representing naturalistic / NPS-rustic construction. The Zion-Mt. Carmel Highway and tunnel represent the determination, innovation, and engineering feats of the early 20th century. Other roads, trails, ditches, bridges, cabins, and remnants of sawmills and homesteads showcase early pioneering efforts inside Zion National Park and NPS efforts to develop facilities for visitor access and accommodation. Parunuweap Canyon contains prehistoric, intact, and valuable cultural resources that provide a valuable insight to prehistoric ways of life. Zion preserves and studies these diverse cultures and their engineered ways of life in the desert environment.



Interpretive Themes

Interpretive themes are often described as the key stories or concepts that visitors should understand after visiting a park—they define the most important ideas or concepts communicated to visitors about a park unit. Themes are derived from, and should reflect, park purpose, significance, resources, and values. The set of interpretive themes is complete when it provides the structure necessary for park staff to develop opportunities for visitors to explore and relate to all of the park significance statements and fundamental and other important resources and values.

Interpretive themes are an organizational tool that reveal and clarify meaning, concepts, contexts, and values represented by park resources. Sound themes are accurate and reflect current scholarship and science. They encourage exploration of the context in which events or natural processes occurred and the effects of those events and processes. They go beyond a mere description of the event or process to foster multiple opportunities to experience and consider the park and its resources. Themes help to explain why a park story is relevant to people who may otherwise be unaware of connections they have to an event, time, or place associated with the park.

The following interpretive themes have been identified for Zion National Park:

- The geologic features of Zion National Park, including the premier exposure of Navajo sandstone, the brilliantly colored rock layers, and Zion's place in the Grand Staircase, are both scientifically significant and allow us to immerse ourselves within their immense scope of size and time.
- The wild and scenic Virgin River and its tributaries are the lifeblood of Zion National Park, continuing to carve with powerful force as they drop uncontrolled through the landscape, to reveal Zion's geologic history, shape majestic canyons, and provide a unique watery oasis amidst the arid land.
- Located at the convergence of three ecoregions, Zion National Park contains a richness and diversity of flora and fauna that belies the park's extreme topography and arid conditions.
- The undeveloped vast high plateaus and intimate sandstone canyons of Zion National Park and its designated wilderness provide unparalleled opportunities for a limited number of visitors to experience solitude, adventure, inspiration, and introspection in a natural environment, while creating a backdrop for all to appreciate the importance of protecting wild places.
- Zion National Park is the setting for a legacy of generations of people, all of whom lived their lives deeply connected to this landscape.

Part 2: Dynamic Components

The dynamic components of a foundation document include special mandates and administrative commitments and an assessment of planning and data needs. These components are dynamic because they will change over time. New special mandates can be established and new administrative commitments made. As conditions and trends of fundamental and other important resources and values change over time, the analysis of planning and data needs will need to be revisited and revised, along with key issues. Therefore, this part of the foundation document will be updated accordingly.

Special Mandates and Administrative Commitments

Many of the management decisions for a park unit are directed or influenced by special mandates and administrative commitments with other federal agencies, state and local governments, utility companies, partnering organizations, and other entities. Special mandates are requirements specific to a park that must be fulfilled. Mandates can be expressed in enabling legislation, in separate legislation following the establishment of the park, or through a judicial process. They may expand on park purpose or introduce elements unrelated to the purpose of the park. Administrative commitments are, in general, agreements that have been reached through formal, documented processes, often through memoranda of agreement. Examples include easements, rights-of-way, arrangements for emergency service responses, etc. Special mandates and administrative commitments can support, in many cases, a network of partnerships that help fulfill the objectives of the park and facilitate working relationships with other organizations. They are an essential component of managing and planning for Zion National Park.

Special Mandates

National Wilderness Preservation (2009).

In 2009, the Omnibus Public Land Management Act (PL 111-11) designated 124,462 acres of the park (83.7%) as wilderness. This portion of the park is subject to the requirements of the Wilderness Act (PL 88-577). The National Park Service is required to manage the Zion Wilderness "for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness" and to protect the area and its wilderness character (§2(a)). The act mandates what uses can occur and are prohibited, including recreational uses, commercial uses, and developments.

National Wild and Scenic Rivers (2009).

In 2009, the Omnibus Public Land Management Act (PL 111-11, 123 Stat. 1081) designated 144 miles (35,146 acres) of the Virgin River and its tributaries as a wild and scenic river. The Wild and Scenic Rivers Act (PL 90-542) requires the National Park Service to protect and enhance the water quality, free-flowing condition, and outstandingly remarkable values of the Virgin River and its tributaries. The river is to be managed with the goal of nondegradation and the enhancement of the values for which it was established. Section 4.3.4 of NPS *Management Policies 2006* states that no management actions may be taken that could adversely affect the values that qualify a river for inclusion in the national wild and scenic rivers system.

Clean Air Act – Class 1 Area Designation.

Zion National Park is designated as a Class 1 area under the Clean Air Act. In the Clean Air Act Congress set a national goal "to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic or historic value" (42 U.S.C. §7470(2)).The Clean Air Act bestows an "affirmative responsibility" on the federal land managers to protect Class 1 areas from the adverse effects of air pollution. In section 169A, "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution."

The goals of the act aim to protect visibility (i.e., scenery) and other resources sensitive to air pollution in these special areas. Superintendents are charged with taking management actions consistent with this affirmative responsibility by integrating air resource management into NPS operations and planning. Specifically, the federal land manager is to identify and protect resources sensitive to air pollution, called air quality related values, including visibility.

Zion National Park Water Rights Settlement Agreement (1996).

The Department of the Interior entered into the Zion National Park Water Rights Settlement Agreement in 1996 with the State of Utah and water conservancy districts from Washington and Kane counties. This negotiated agreement resolved uncertainties in the water rights held by the United States under the 1909 proclamation designating Zion as a national monument. The 1996 agreement determined that "the United States has a reserved right to all water underlying, originating within or flowing through Zion National Park, including perennial, intermittent and ephemeral, streams, springs, seeps, lakes, ponds, ground water, and other natural sources of water" that was unappropriated when the park was established. It also asserts that these "waters are to remain in a free flowing condition." While very inclusive, this protection is not absolute because, (1) some water rights upstream of the park and in the park near Springdale predate the park, and therefore are senior to NPS rights, (2) the United States agreed to subordinate the park's reserved rights to water rights filed after designation but before the settlement agreement, (3) the park uses water for administrative purposes, and (4) the agreement allows for some additional appropriation of water upstream of the park. These new appropriations are not to exceed a total of 6,000 acre-feet per year with no more than 2,500 of that coming from diversion of surface waters. The magnitude of this last provision is minimized by the fact that the state engineer manages the Virgin River Basin as fully appropriated, so no new water rights are permitted. Another provision of the settlement agreement protecting park waters is the establishment of a "Groundwater Protection Zone" on the north, east, and south boundaries of the park that limits the amount of pumping from any individual well. The park general management plan and legislation for Zion Wilderness and the designation of wild and scenic rivers all recognize the terms of this agreement.

Administrative Commitments

The National Park Service and Zion National Park have entered into several commitments that include obligations from prior existing properties and rights; agreements to facilitate the operation of the park, protect resources, and enhance visitor services; and contracts, authorizations, and permits for commercial visitor services and special park uses in the park. These commitments have a significant influence on park management and the terms and conditions of the authorizations are legally binding. They are summarized in the following list and listed in detail in appendix B.

- Non-NPS water rights that allow for the diversion of water within the park for uses outside and inside the park
- Agreements for sewage service and potable water with the Town of Springdale
- Conservation agreements to protect species of concern
- Cooperating agreement with the Zion Natural History Association
- Service contract for shuttle services
- Concession contracts for lodging, food and beverage, retail, and interpretive guided horseback rides
- Commercial use authorizations for commercial activities including, but not limited to: interpretive services, guided biking and hiking, shuttles, motorcycle tours, painting, and photography
- Special use permits and research permits for limited-term activities

Assessment of Planning and Data Needs

Once the core components of part 1 of the foundation document have been identified, it is important to gather and evaluate existing information about the park's fundamental resources and values, and develop a full assessment of the park's planning and data needs. The assessment of planning and data needs section presents planning issues, the planning projects that will address these issues, and the associated information requirements for planning, such as resource inventories and data collection, including GIS data.

There are three sections in the assessment of planning and data needs:

1. analysis of fundamental and other important resources and values
2. identification of key issues and associated planning and data needs
3. identification of planning and data needs (including spatial mapping activities or GIS maps)

The analysis of fundamental resources and values and identification of key issues leads up to and supports the identification of planning and data collection needs.

Analysis of Fundamental Resources and Values

The fundamental resource and value analysis table includes current condition, potential threats and opportunities, planning and data needs, and selected laws and NPS policies related to management of the identified resource or value.

FRV – Geologic Showcase	
Related Significance Statements	• Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo sandstone and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that exist only in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research. • The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.
Current Conditions and Trends	**Conditions** • Natural processes predominate. • Human modifications, such as roads, trails, and facilities, are minor and local. • There is limited information about the current condition of paleontological resources. • Localized soil erosion and biological soil crust disturbances exist, especially in high use areas of the park. • Visibility (how clearly scenery and geologic features can be seen) is currently of moderate concern. **Trends** • The geologic features of the park continue to actively erode due to natural processes. • Human modifications are occurring only within existing infrastructure footprint and are not expanding in area. • Paleontological fossils continue to be eroded out, exposed to the elements at a relatively high rate, eventually being lost to natural weathering processes. • Rock surfaces continue to be defaced by visitors.

FRV – Geologic Showcase	
Threats and Opportunities	**Threats** • Prominent geologic features are lost due to natural processes of erosion, which may be exacerbated by more frequent flash floods due to climate change. • Geological hazards are a threat to park infrastructure and mitigation efforts (such as stabilization, rock fall barriers, and levees for flood mitigation) have the potential to impact natural geologic processes. • Increases in air pollution may degrade visibility, reducing opportunities to view the spectacular scenery and geologic features, and detract from visitor experience. • A limited amount of looting occurs of paleontological and geologic resources, such as fossils, petrified wood, and rocks. • Visitors deface rock surfaces. • Changing patterns of visitor activity result in continued soil erosion and biological soil crust disturbances. **Opportunities** • Studies to better understand the extent of paleontological resources could be completed. • Park staff should stay current and informed on evolving scientific literature, to improve understanding of geologic resources and history, to allow for better informed decisions, and to better educate both park staff and visitors. • Identify geological hazards prior to planning and design of park infrastructure. • Minimize soil erosion through trail and route location and design, maintenance, and compliance. • Educate visitors about the significance of geologic resources to reduce theft and damage. • Geological hazard specialists should be involved in park planning, design, and compliance and in geotechnical evaluation of building sites.
Data and/or GIS Needs	• Paleontological inventory and monitoring. • Soil mapping. • Documentation, evaluation, and understanding of recent geologic events including floods, rock falls, landslides, and seismic events. • GIS mapping of areas that receive repeated rock surface vandalism in order to focus education and enforcement actions.
Planning Needs	• Develop plans and best management practices for trail design and maintenance.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Paleontological Resources Protection Act • Wild and Scenic Rivers Act (1968) • Clean Water Act • Zion National Park Water Rights Settlement Agreement **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§4.6.1, 4.6.2, 4.6.4 and 4.8.1.1) • NPS *Natural Resource Management Reference Manual 77*

FRV – Water Shapes the Landscape	
Related Significance Statements	• Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo sandstone aquifers and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that only exist in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research. • The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research.
Current Conditions and Trends	**Conditions** • Stream flow and sediment transport are essentially natural with minimal alteration. Exceptions include 21 diversions of water through non-NPS water rights within the park, most of which are on inholdings. The water rights settlement agreement protects park waters but includes recognition of existing diversions of less than 10% of annual stream flows. • Spring flows are essentially natural except where diverted for NPS administrative use. • Groundwater is in natural condition and protected by the water rights settlement agreement. • Stream channels are predominately natural except for bank stabilization in Zion Canyon to protect park infrastructure. Two miles of channelized river is confined by levees and incised. • Water quality is largely natural and meets state standards; however, the North Fork of the Virgin River is currently in noncompliance for *E. coli*. **Trends** • Flow regimes are within the natural range of variability. • Man-made bank stabilization along the Virgin River in Zion Canyon is deteriorating and needs to be repaired or removed.

FRV – Water Shapes the Landscape	
Threats and Opportunities	**Threats** • Climate change could affect natural flow regimes by reducing overall discharge or by increasing the frequency of flash flood events, or both. • Changes in water rights that negatively affect the park should be minimized under the water rights settlement agreement. The park has the obligation to review new rights and changes. • There is a risk of accidental spills along roadways that could degrade water quality. • Inadequate human waste disposal is an issue in the Narrows and other slot canyons due to high levels of visitor use. • *E. coli* contamination continues due to irrigation runoff upstream from the Narrows. • There is a potential for groundwater depletion outside the park boundary that might impact individual springs and base river flows within the park. **Opportunities** • Continued and expanded education of visitors about proper sanitation in the Narrows and other slot canyons should be pursued. • Park staff should cooperate with state, landowners, and managers to rectify *E. coli* contamination. • Remove levees in Zion Canyon to promote natural channel processes and provide flood protection by armoring the roadway. • Promote water conservation as part of the park's broader sustainability initiative. • Complete and implement wild and scenic river planning, including section 7 compliance of the Wild and Scenic Rivers Act.
Data and/or GIS Needs	• Inventory springs and initiate flow monitoring, including GIS data. • Continue to monitor stream flow on the North and East forks, and establish stream gauges on North and La Verkin creeks. • Continue to monitor water quality and expand to other threatened waters. • Continue tracking water right legal notices.
Planning Needs	• Site planning, design, and compliance to remove levees. • Climate change adaptation strategy related to water supply.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • The Acts of 1928 and 1943 regarding Springdale's use of water in the park • Wild and Scenic Rivers Act (1968) • Clean Water Act and Utah water quality regulations • Zion National Park Water Rights Settlement Agreement • Water rights adjudication and law • Executive Order 11514, "Protection and Enhancement of Environmental Quality" • Executive Order 11988, "Floodplain Management" • Executive Order 12088, "Federal Compliance with Pollution Control Standards • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" • National Flood Insurance Program (44 CFR 60) **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§4.6.1, 4.6.2, 4.6.4 and 4.8.1.1) • Director's Order 77-2: *Floodplain Management* • Special Directive 93-4 "Floodplain Management, Revised Guidelines for National Park Service Floodplain Compliance" (1993)

FRV – Convergence of Ecoregions	
Related Significance Statements	• Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that only exist in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research. • Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.
Current Conditions and Trends	**Conditions** • Most of the fauna in the park are currently stable. Human influence may be affecting the stability of some species. • Plant communities are susceptible to visitor impacts, such as trampling and the spread of invasive species, but are very healthy overall. • Peregrine falcon communities are stable and resilient. • Populations of four species of native fish appear to be stable and resilient. • Impacts, such as trampling or removal of plants, are concentrated in high use areas of the frontcountry. • Research natural areas are protected from visitor impacts. • Flora and fauna are susceptible to effects from air pollution, and estimated wet nitrogen deposition levels are currently of moderate concern. **Trends** • Plant diversity in fragile plant communities (e.g., hanging gardens, or areas where people can concentrate along the edge of riparian areas) may be declining due to visitor impacts. More information on this issue is needed. • Reptile and amphibian population trends are uncertain in Zion.

FRV – Convergence of Ecoregions	
Threats and Opportunities	**Threats** • Canyon and climbing activities threaten nesting birds. • Expansion of Springdale could fragment desert tortoise habitat adjacent to the park. • Visitor activity is the biggest threat to some of the sensitive vegetation. High visitation to accessible hanging gardens, trail cutting, and trampling all impact vegetation. • Nonnative plants (including Russian thistle and cheatgrass) are a threat to natural plant communities. Impacts to natural plant communities result in broader impacts to wildlife habitats (e.g., tortoise habitats). • An introduction of nonnative fish species could adversely impact native fish. • The growth of annual nonnative grasses increases the density of fine carrier fuels and changes the fire regime. These changes cause rippling impacts on both plant and animal communities. • Climate change could impact the diversity of high elevation plant (e.g., aspen communities) and animal species (e.g., American pika, elk, bear, and pollinators). • Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of certain vegetation communities. **Opportunities** • Develop a better understanding of the conditions of ecological communities in the research natural areas. • Removal of the revetments along the Virgin River could allow the river to take its natural course and allow certain plant communities to reestablish themselves. Comparative research is needed to understand what types and qualities of natural habitat might exist. • Data from a transportation study could be used to better understand visitor use impacts on fragile plant communities in the frontcountry. • Establish partnerships with universities and the cooperative ecosystem studies unit to support research and public trust research stewardship. • Establish partnership with the Virgin River Resource Management and Recovery Program to aid in the monitoring and protection of native fish.
Data and/or GIS Needs	• Exotic plant survey. • Visitor impacts on plant communities. • Effects of climate change on high elevation plant communities. • Data and modeling on effects of removing revetments along Virgin River on habitat. • Reptile and amphibian population trend study. • Update vegetation maps (e.g., Kolob Terrace Road vegetation changes since Kolob fire). • Visitor use research in frontcountry to better understand impacts on fragile plant communities. • Continued monitoring of native species.
Planning Needs	• Update fire management plan. • Visitor use management plan.

FRV – Convergence of Ecoregions	
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • The Wilderness Act, 1964 • The Wild and Scenic Rivers Act • Endangered Species Act of 1973, as amended • National Invasive Species Act • Lacey Act, as amended • Federal Noxious Weed Act of 1974, as amended • The Clean Water Act • The Clean Air Act (42 USC 7401 et seq.) gives federal land managers the responsibility for protecting air quality and related values, including visibility, plants, animals, soils, water quality, cultural resources, and public health, from adverse air pollution impacts • Zion National Park Water Rights Settlement Agreement • Executive Order 13112, "Invasive Species" • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§1.6, 4.1, 4.1.4, 4.4.1, 4.7.2) provides general direction for managing park units from an ecosystem perspective • NPS *Natural Resource Management Reference Manual 77*

FRV – Natural Resource Quality and Function	
Related Significance Statements	• Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that only exist in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research.

FRV – Natural Resource Quality and Function	
Current Conditions and Trends	**Conditions** • Fire regime conditions vary depending on area of the park. Overall, fire regime conditions are within the historical range of natural variability for about one-third of the park, while about two-thirds of the park is outside the historical range. • Zion National Park is a Class 1 air quality area. • The ozone level from 2005–2009 at Zion National Park was 73.6 parts per billion (ppb); therefore, the condition status warrants moderate concern. Ozone injury had been identified on Rhus trilobata in Zion and Elderberry in Cedar Breaks. • For 2005–2009, estimated wet nitrogen deposition was 1.9 kilograms per hectare per year (kg/ha/yr); therefore, the condition status warrants moderate concern. A risk assessment evaluating ecosystem sensitivity ranked Zion National Park ecosystems as highly sensitive to nutrient enrichment effects relative to all Inventory & Monitoring parks. • For 2005–2009, estimated average visibility in Zion National Park was 3.9 deciviews (dv) above estimated natural conditions; therefore, the condition status warrants moderate concern. • Water quality generally meets state standards and is considered natural. However, the North Fork of the Virgin River is on the 303(d) list of noncompliant waters for *E. coli* contamination. • Cheatgrass expansion rate is currently unknown. • Vegetation conditions and quality are unknown. • Aquatic invertebrate population health is unknown. • Bighorn sheep populations are increasing and they are starting to disperse outside the park. **Trends** • During 2000–2009, ozone levels monitored at Zion National Park remained relatively unchanged. • From 2000–2009, visibility on both the 20% clearest days and 20% haziest days remained unchanged, i.e., they were neither improving nor degrading. • Fire regimes and condition classes in Zion National Park continue to degrade due to effects of nonnative invasive species. • Trends in water quality are generally unchanged; some increase in algal growth and diurnal fluctuation of dissolved oxygen and pH have been observed following wildfires, and there has been administrative progress on the *E. coli* contamination of the North Fork, but no on-the-ground remediation as yet.

FRV – Natural Resource Quality and Function	
Threats and Opportunities	**Threats** • Feral cats are having impacts on birds, reptiles, and small rodents, and are becoming a problem in the Watchman and South campgrounds. • Trespass cattle are consuming and trampling vegetation and spreading invasive plant seeds. • External developments can impact air quality, water quality, and spread exotic species. • Nonnative species alter fire regimes and destroy native ecosystems. • Undetermined and uncontrolled activities that occur on inholdings, such as livestock grazing and home building, can have an impact on the park. • There is potential for disease transmission from domestic sheep and goats to bighorn sheep. • Upstream irrigation practices have a history of contaminating streams flowing into the park. Livestock use on inholdings and in trespass can contaminate Hop Valley Creek. • Outside impacts of lead poisoning on California Condors are possible due to use of lead ammunition during hunting. • Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of certain vegetation communities. Invasive grasses tend to thrive in areas with high nitrogen deposition, displacing native vegetation adapted to low nitrogen conditions. If nitrogen deposition increases significantly, these plant communities could be affected. • Light pollution from adjacent communities threatens the park's dark night skies. • Climate change will probably alter all park resources, including water resources, ecosystems, wildlife, and vegetation. **Opportunities** • Work with outside communities to maintain high air quality and water quality. Work with the Utah Division of Water Quality to resolve ongoing water quality problems and to investigate threat areas. • Reaching out to property owners on topics such as nonnative plant control. • Continue to reach out to adjacent landholders and build positive relationships. • Educate the public, especially hunters, about the impacts of lead ammunition and the subsequent lead poisoning of scavengers.
Data and/or GIS Needs	• Vegetation conditions study to assess the health of plant communities. • Aquatic invertebrates inventory. • Cattle trespass data or literature review. • Effects of vehicle byproducts from roads washing into waterways. • Bighorn sheep disease transmission research, including the identification of domestic sheep and grazing sheep allotments adjacent to the park. • Continued collection of weather data (temperature and precipitation at a minimum) to build a long-term record for several climate zones in the park. • Stream flow monitoring. • Air quality monitoring. • Water quality monitoring.
Planning Needs	• Air quality scenario planning. • Fire management planning is recurring in nature, requiring annual fire management plan review and update, with substantial review every seven years. • Natural resource condition and climate change vulnerability assessments.

FRV – Natural Resource Quality and Function	
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • The Wilderness Act, 1964 • The Wild and Scenic Rivers Act • Zion National Park Water Rights Settlement Agreement • Endangered Species Act of 1973, as amended • National Invasive Species Act • Lacey Act, as amended • Federal Noxious Weed Act of 1974, as amended • The Clean Water Act • The Clean Air Act (42 USC 7401 et seq.) gives federal land managers the responsibility for protecting air quality and related values, including visibility, plants, animals, soils, water quality, cultural resources, and public health, from adverse air pollution impacts • Executive Order 13112, "Invasive Species" • Executive Order 11988, "Floodplain Management" • Executive Order 11990, "Protection of Wetlands" • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§1.6, 4.1, 4.1.4, 4.4.1, 4.7.2) provides general direction for managing park units from an ecosystem perspective • NPS Director's Order 18: *Wildland Fire Management* • NPS *Natural Resource Management Reference Manual 77* • NPS *Wildland Fire Management Reference Manual 18*

FRV – Wilderness Character	
Related Significance Statements	• The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo sandstone aquifers and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that only exist in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research.
Current Conditions and Trends	• Baseline data (2011) on wilderness character was collected. • The overall condition of wilderness character is stable. • Conditions in wilderness areas are good to excellent, including resources and visitor experiences. • Monitoring wilderness character and conditions is completed on a 3–5 year interval. • Visibility (how clearly scenery and geologic features can be seen) is currently of moderate concern. • Flora and fauna are susceptible to effects from air pollution, and estimated wet nitrogen deposition levels are currently of moderate concern.

FRV – Wilderness Character	
Threats and Opportunities	**Threats** • Threats to the natural quality of wilderness include loss of native species, climate change, air pollution, the proliferation of nonnative species (including alteration of fire regimes and natural disturbance cycles), and activities outside the park resulting in reduced water quality in the wilderness. • Threats to the undeveloped quality of wilderness include structures inside of wilderness, short-term use of motorized equipment and mechanical transport in wilderness, and semipermanent equipment placed by wilderness researchers. • Threats to the untrammeled quality of wilderness include nonnative vegetation removal, ignition of fires, wildlife research, wildland fire suppression, and trespass livestock. • Threats to the solitude and primitive and unconfined types of recreation quality of wilderness include lack of understanding of wilderness values, increased visitation in popular areas of wilderness (reducing solitude), climbing bolts, enlargement of campsites due to visitor caused impacts, and the deposition of human waste and trash. Developments outside the wilderness also threaten visitors' ability to obtain solitude inside wilderness. • Threats to the fifth quality of wilderness, cultural resources in wilderness, include intentional or unintentional damage or degradation of resources. • Increases in air pollution may degrade visibility, reducing opportunities to view the spectacular scenery and geologic features, and detract from visitor experience. • Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of certain vegetation communities. **Opportunities** • Educate visitors and students on wilderness values. • Create education and outreach opportunities to communicate with adjacent land owners on Kolob Terrace road about land management practices for wilderness areas. Discuss key topics such as grazing and managing wilderness areas surrounding inholdings. • Create an authorization process for climbing bolts according to Director's Order 41: *Wilderness Stewardship*.
Data and/or GIS Needs	• Data and GIS needs are ongoing based on the park's wilderness monitoring program.
Planning Needs	• See appendix C for wilderness planning needs.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations Yhat Apply to the FRV** • Wilderness Act, 1964 • Clean Air Act, 1970 **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (Chapter 6) • Director's Order 41: *Wilderness Stewardship* • NPS *Reference Manual 41:Wilderness Stewardship* • NPS *Keeping It Wild in the National Parks User Guide*

FRV – Wild and Scenic Rivers	
Related Significance Statements	• Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that only exist in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research. • The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo Sandstone aquifers and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.
Current Conditions and Trends	**Conditions** • Cultural values are in good to excellent condition. • Geologic values are in excellent condition. • Scenic values are in excellent condition. • Recreational values are in good to excellent condition. • Ecological processes values are in good to excellent condition. • Water quality generally meets state standards and is considered natural. However, the North Fork of the Virgin River is on the 303(d) list of noncompliant waters for *E. coli* contamination. • For the most part, the free-flowing condition is intact, but there are some revetments along the North Fork in Zion Canyon and substantial flow control in Kolob Creek from Kolob Reservoir upstream. **Trends** • Condition of the rivers within the wilderness is good to excellent. • Frontcountry areas of the park, especially in Zion Canyon, are receiving increased visitor use and associated resource impacts. • River channelization and revetments prevent free flow in some places. The levees along two miles of the North Fork are deteriorating and park management intends to let them gradually fail, or actively remove them, to be replaced with armoring along the Zion Canyon Scenic Drive. Intermittent armoring along several other portions of the scenic drive will remain and be maintained.

FRV – Wild and Scenic Rivers	
Threats and Opportunities	**Threats** • Climate change has the potential to affect water quality and quantity of designated rivers. • Upstream irrigation practices have a history of contaminating streams flowing into the park. Livestock use on inholdings and in trespass can contaminate Hop Valley Creek. • Regulation of water release at Kolob Reservoir has the potential to affect natural stream flow. • Development on inholdings, including wells, has the potential to affect river-related values, including scenic viewsheds. • Water use has the potential to reduce natural stream flows. **Opportunities** • Educate visitors on wild and scenic river values. • Studies to identify appropriate visitor experiences and visitor capacity for Zion Canyon will help the park to maintain desired social and resource conditions. • The numbers of visitors and resource conditions continue to be managed to maintain desired conditions in wilderness areas that overlap with the wild and scenic river corridor.
Data and/or GIS Needs	• Visitor capacity data for Zion Canyon. • Compile all information on developments within wild and scenic river corridor. • In order to protect and enhance wild and scenic values, complete a visual resource assessment for river segments with outstandingly remarkable scenic values.
Planning Needs	• Develop strategy to work with outside communities to maintain high air quality and water quality. Work with the Utah Division of Water Quality to resolve ongoing water quality problems and to investigate threat areas.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Wild and Scenic Rivers Act (1968) • Clean Water Act • Zion National Park Water Rights Settlement Agreement • Executive Order 11514, "Protection and Enhancement of Environmental Quality" • Executive Order 11988, "Floodplain Management" • Executive Order 12088, "Federal Compliance with Pollution Control Standards **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§4.3.4) • Director's Order 77-2: *Floodplain Management* • Special Directive 93-4 "Floodplain Management, Revised Guidelines for National Park Service Floodplain Compliance" (1993) • National Flood Insurance Program (44 CFR 60) • NPS *Reference Manual 77: Natural Resource Management*

FRV – The Remnants of Humanity's Past	
Related Significance Statements	• In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.
Current Conditions and Trends	**Conditions** • All known archeological sites are documented in the Archeological Site Management Information System and in GIS. • Approximately 19% of Zion has been surveyed for cultural resources. • Approximately 532 cultural resource sites have been documented to date. • Current condition data exists for all sites. • Access to Parunuweap Canyon is limited due to its designation as a research natural area. **Trends** • High profile sites are regularly monitored. Disturbances stem from two sources: natural forces and human caused. Most documented disturbances are from natural forces, although an occasional incidence of graffiti at rock art sites does occur. • Visitor and stakeholder interest in cultural resources is increasing. • A majority of the cultural sites within the park are within wilderness boundaries and are actively managed in conjunction with wilderness character standards and practices.
Threats and Opportunities	**Threats** • Some historic and prehistoric structures are located in areas subject to geological hazards including floods, rockfall, and natural erosion. • Potential changes in erosion and weathering rates and greater frequency and magnitude of extreme weather or flow events are attributable to anthropogenic climate change. • Increased visitation has potential for graffiti, arson, looting, and other acts of vandalism. • Collection of resources by visitors unaware of or disobeying regulations is a concern. • Protocols and systems to support management and protection of cultural resources are inadequate. • Climate change may accelerate weathering of park structures and increase the potential for fires (frequency and magnitude) and floods. **Opportunities** • Generate interest and sense of stewardship in archeology by communicating resource information to the public. • Pursue partners (universities, research experts, etc.) to assist in documenting and managing cultural resources. • Expand on existing site stewardship initiative to increase effectiveness. • Expand research and education opportunities. • Foster youth involvement to increase understanding, communicate relevancy, and promote stewardship.

FRV – The Remnants of Humanity's Past	
Data and/or GIS Needs	• Conduct additional cultural resource inventories to locate, identify, and document otherwise unknown archeological sites. Document impacts of climate change. • Conduct an ethnographic overview and assessment to further define and determine resources and/or places of special concern to current tribal peoples and/or other nonnative cultural groups. • Prepare an archeological overview and assessment to provide a synthesis of existing archaeological data, and define cultural contexts and historical themes that may direct future cultural resource management projects and research. • Prepare administrative history (history of park). • Collect oral histories related to park history and land use history. • Prepare National Register of Historic Places nominations.
Planning Needs	• Cultural resource site management plans (rock art, etc.). • Climate change scenario planning. • A cultural resource management plan or resource stewardship strategy.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • The Antiquities Act of 1906 • Historic Sites, Buildings, and Antiquities Act of 1935 • National Historic Preservation Act of 1966, as amended (16 USC 470) • American Indian Religious Freedom Act of 1978 • Archaeological Resources Protection Act of 1979 • Native American Graves Protection and Repatriation Act of 1990 • Executive Order 11593, "Protection and Enhancement of the Cultural Environment" • Executive Order 13007, "Indian Sacred Sites" • Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources" • 36 CFR 79 "Curation of Archeological Collections" • 36 CFR 800 "Protection of Historic Properties" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (chapter 5) • Director's Order 28: *Cultural Resource Management* (1998) • Director's Order 28A: *Archeology* (2004)

FRV – Opportunities for Connection to the Resources	
Related Significance Statements	• Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors. • The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research.
Current Conditions and Trends	**Conditions** • Roads and trails (including historic) provide access to wild places. • Facilities are maintained at a high standard. • Wide array of visitor services and educational and volunteer opportunities are available. • Access to a diversity of high-quality experiences are generally available. • There is an occasional diminished quality of visitor experience. As a result of crowding, access to recreational activities is limited and infrastructure is inadequate in the frontcountry. • There is a low park staff to visitor ratio, resulting in fewer park staff and visitor encounters. **Trends** • Increased visitation and congestion makes it difficult to maintain and repair infrastructure of roads and trails. • Visitation is now extending beyond the traditional summer season. • There is an increasing desire for adventure sports. • There are increasing requests for wilderness permits (specifically canyoneering). • There are increasing requests for commercial activities and special park uses. • There is an increase in international visitors. • Visitors' cultural and recreational values and interests are shifting. • There is an increasing visitor use of social and electronic media. • There is an expansion of nonpersonal information and interpretive services. • There is an increased interest in recreational over-flights.

FRV – Opportunities for Connection to the Resources	
Threats and Opportunities	**Threats** • A reduction in visitor satisfaction due to overcrowding is possible, specifically in Zion Canyon. Effects of overcrowding include: increased lines, slower service, more air pollution from idling cars, increased noise levels, and increased frequency of encounters with other visitors. • Resource degradation (such as graffiti, trampled vegetation, or expanding footprints at campsites) can impact visitor experiences. • Loss of relevancy of NPS identity and park resources to the public. • Transportation system capacity is exceeded during the peak season. • Over-flights potentially impact visitor experience. • User-group conflicts are potential issues with hikers and horseback riders on the Sand Bench Trail and to a lesser extent on other trails in the park where horse use is allowed. • Visitors who do not understand the importance of solitude as a wilderness quality may feel that their freedom or ability to access Kolob Canyons District is being impacted due to the visitor use permit system or group size limits. • Opportunities for interpretation and educational programs may be reduced if increasing visitation, along with decreases in staffing, requires available personnel to operate contact stations instead of providing programs. • In a geologically active area, geologic hazards including seismic activity, rockfall, landslides, floods, and soil instability can cause injury and damage structures. • With a warmer and drier landscape, climate change could affect visitor services (e.g., reduced water supplies), reduce visitor satisfaction, and increase threats to visitors (e.g., increased wildfires). **Opportunities** • Visitors who understand the importance of solitude as a wilderness quality may believe that their freedom and ability to experience solitude and other wilderness values is improved at the Kolob Canyons District due to the visitor use permit system or group size limits. • Messaging regarding sustainability, safety, and resource appreciation could be developed. • The availability of messaging to non-English speaking visitors could be increased. • Cooperation with park partners in support of visitor services, interpretation, and education outreach would be beneficial. • Emphasis on social media and nonpersonal services would be beneficial. • Targeted outreach opportunities could be employed to sustain and/or develop park relevancy in future visitors. • The opportunity exists to develop, solicit, and award a new concession contract for guided interpretive horseback rides in the park. • Completing a comprehensive interpretive plan, including a special focus section on Kolob Canyons District, would be beneficial. • Awareness of geological hazards can be maintained and incorporated into park planning, design, and operations. • Visitor education on climate change, sharing climate-related changes at Zion National Park. • In a geologically active area replete with geological hazards, opportunities exist to tell compelling stories about geological processes illustrated by relatively recent events.

FRV – Opportunities for Connection to the Resources	
Data and/or GIS Needs	• Visitor use statistics on trends and use levels, data on visitor perception of resource and social condition to inform visitor capacity for the frontcountry and feedback. • Visitor impacts on park resources. • Ridership data on shuttle. • Visitor risk management tracking. • Study on effectiveness of messaging regarding safety, sustainability, and stewardship in park. • Study of park operations and facilities to enhance visitor safety and accessibility. • Study to improve visitor information and wayfinding. • Study to model the effects of the transportation system on park resources and visitor experience. • Study geologic processes.
Planning Needs	• Visitor use management plan for Zion Canyon. • Commercial services management plan. • Curriculum based education plan (not included in the comprehensive interpretive plan). • Multimodal transportation plan in Zion Canyon. • South Entrance reconfiguration (includes campgrounds) to improve vehicle flow and wayfinding.
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • Americans with Disabilities Act of 1990 (28 CFR 36) • Architectural Barriers Act of 1968 • Architectural Barriers Act Accessibility Standards 2006 • Rehabilitation Act of 1973 • NPS Concessions Management Improvement Act of 1998 **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (Chapters 7, 8, 9, and 10) • Director's Order 6: *Interpretation and Education* • Director's Order 42: *Accessibility for Visitors with Disabilities in NPS Programs, Facilities, and Services* • NPS T*ransportation Planning Guidebook*

FRV – Preserving and Studying the Natural and Cultural History of Zion	
Related Significance Statements	• Zion is a geologic showcase of brilliantly colored strata highlighted by sheer Navajo sandstone cliffs that are among the highest in the world and expose ancient remnants of the largest known sand dune system. Geologic processes continue today as the free-flowing Virgin River rapidly cuts into the margin of the Colorado Plateau, incising a multitude of deep, narrow canyons. An abundance of canyon springs, fed by groundwater, create hanging gardens and grottos that support endemic varieties of flora and fauna. These exceptional features and processes contribute to the outstanding scenery and scientific value of the park. • Zion National Park's range of topography and location at the juncture of the Colorado Plateau, Mojave Desert, and Great Basin ecoregions have created the environment for a wide variety of life forms, including rare and endemic species that exist only in this small geographic area. This diversity of life forms provides opportunities for valuable scientific research. • The Zion Wilderness preserves the undeveloped character and natural environment of the spectacular network of colorful deep sandstone canyons, high forested plateaus, and striking rock towers, as well as opportunities for visitors to experience a strong sense of solitude and remoteness from civilization. • Utah's first designated wild and scenic rivers flow through the park carving a colorful labyrinth of canyons across layers of time. These rivers, fed by natural undiminished spring flows from the Navajo sandstone aquifers and sculpted by unimpeded torrents of flood waters, have an ecological value that far exceeds their spatial extent in the park. • In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research. • Zion National Park is a world-renowned destination that offers opportunities for a range of recreational and educational experiences including passive activities and high adventure excursions. Visitors are able to step inside the scenery and can find themselves surrounded by narrow cliff walls in places of extraordinary scale such as the Virgin River Narrows. These experiences often create profound emotional and personal connections for a diversity of visitors.
Current Conditions and Trends	**Conditions** • The general management plan identified nine research natural areas that cover 9,031 acres—areas set aside for the purposes of research. • Scientific research occurs on many levels, across multiples disciplines, and is supported by a variety of outside universities and institutions. • The park's collection includes noteworthy examples of historic photographs and documents, archeological resources, and biological resources. • Scientific literature includes at least 200 citations specific to Zion's geologic and hydrologic resources, as well as to adjacent resources. • Zion is a showpiece of erosion processes, geologic hazards, and extreme eolian deposition for earth scientists. • Research related to geology and hydrology is ongoing. • Conditions in wilderness areas are good to excellent, including resources and visitor experiences. • Monitoring wilderness character and conditions is completed on a 3–5 year interval. • Conditions in frontcountry areas in Zion Canyon are being impacted by increasing visitor use. • The quality and availability of scientific research varies depending on the discipline. **Trends** • Park collections are being protected in a secure, temperature- and humidity-regulated facility.

FRV – Preserving and Studying the Natural and Cultural History of Zion	
Threats and Opportunities	**Threats** • Diminished federal and state funding reduces research activities by NPS and academic researchers. • There is a loss of specimens through repeated handling. **Opportunities** • Enhance information exchange between researchers, park staff, and the public. • Continue to support NPS and independent research in the park to expand understanding and interpretation. • Prioritize research questions and topics. • Provide research support, including housing, camping, and office space. • Scientific research and museum collections provide tools for interpretation and connection to resources and historical uses. • Work with principal investigators to ensure that deliverables are received. • Develop relationships with universities with programs related to the disciplines represented in the park. • Digitize museum collections and archives. • Ensure that specimens are organized and available. • The Zion Wilderness and wild and scenic rivers provide outstanding opportunities for research in natural ecosystems with little evidence of contemporary human disturbance. • Educate researchers on special requirements for conducting research in wilderness areas.
Data and/or GIS Needs	• Digitize museum and archival collections.
Planning Needs	• Scientific research strategy. • Collections management plan.

FRV – Preserving and Studying the Natural and Cultural History of Zion	
Laws, Executive Orders, and Regulations That Apply to the FRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the FRV** • National Historic Preservation Act of 1966, as amended (16 USC 470) • Antiquities Act of 1906 • Archeological and Historic Preservation Act of 1974 • Archaeological Resources Protection Act of 1979 • American Indian Religious Freedom Act of 1978 • Historic Sites, Buildings, and Antiquities Act of 1935 • Museum Act of 1955, as amended • Native American Graves Protection and Repatriation Act of 1990 • Paleontological Resources Protection Act • 1988 Federal Cave Resources Protection Act • Endangered Species Act of 1973, as amended • National Invasive Species Act • Lacey Act, as amended • Federal Noxious Weed Act of 1974, as amended • The Clean Water Act • The Clean Air Act • Zion National Park Water Rights Settlement Agreement • Executive Order 13112, "Invasive Species" • Executive Order 11593, "Protection and Enhancement of the Cultural Environment" • Executive Order 13007, "American Indian Sacred Sites" • 36 CFR 79 "Curation of Federally Owned and Administered Archeological Collections" • 36 CFR 800 "Protection of Historic Properties" **NPS Policy-level Guidance (NPS *Management Policies 2006* and Director's Orders)** • NPS *Management Policies 2006* (§2.3.1.4, 4.2, 5.1, 8.10, 1.6, 4.1, 4.1.4, 4.4.1, 4.7.2) • Director's Order 24: *Museum Collections* • Director's Order 28: *Cultural Resource Management* • Director's Order 28A: *Archeology*, 4A(3) Native American Graves Protection and Repatriation Act • Director's Order 77-2: *Floodplain Management* • NPS *Museum Handbook*, parts I, II, and III • *Natural Resources Inventory and Monitoring Guideline* (NPS-75) • NPS *Natural Resource Management Reference Manual 77*

Analysis of Other Important Resources and Values

OIRV – An Engineered Way of Life	
Related Significance Statements	• In a canyon environment, Zion preserves human history of the Ancestral Puebloan, Paiute, pioneers, early 20th century tourism, and NPS development along the Virgin River. The remarkable integrity of these resources provides a setting ideal for future education and research.
Current Conditions and Trends	**Conditions** • Ninety-two structures listed in the National Register of Historic Places are currently in use. • The park has two recorded cultural landscapes, Zion Canyon and Zion Lodge/Birch Creek. • Maintenance of the Zion Lodge/Birch Creek facilities and Sand Bench Trail are the responsibility of the concessioners. • Structures in designated wilderness are maintained according to minimum requirements analysis to preserve wilderness character. • Historic structures are preserved to maintain historical integrity and significance. • Quantitative condition data for historic structures is documented in Facility Management Software System. • Detailed feature documentation for historic trails has been completed. **Trends** • Increased visitor use is impacting conditions. • Because of increased visitation, facilities need maintenance more often. • The life expectancy of components of structures are expiring. • Increased visitation and fewer park staff require adaptive measures to accommodate facility maintenance.
Threats and Opportunities	**Threats** • Increased visitor use of facilities is affecting the condition of those facilities. • Structural components are meeting/exceeding life cycle expectancy. • Lack of visitor understanding of cultural resources in general, and of the importance of protecting cultural landscapes and historic structures specifically, is of concern. • Fire and other natural events, such as rock-falls, landslides, pest infestation, flooding, etc., impact resources. • Visitors creating social trails adversely affect soil and vegetation. This is problematic particularly where vegetation is a contributing feature within a cultural landscape, or where erosion related to social trailing affects structural stability of built features, such as retaining walls on a historic trail. • Conflicts exist between vegetation management policies and preservation of significant cultural resources. • In a geologically active area, geologic hazards including seismic, rockfall, landslides, floods, and soil instability can cause injury and damage structures. • By increasing the potential for fires and accelerating weathering of park structures, climate change could threaten park facilities and cultural resources. **Opportunities** • Enhance interpretation and outreach regarding cultural landscapes and historic structures and buildings. • Continue partnerships with individuals and businesses providing commercial visitor services to enhance and communicate the importance of resource stewardship. • Provide specialized training to park staff, partners, and stakeholders to foster historic preservation skills, understanding, and stewardship.

OIRV – An Engineered Way of Life	
Data and/or GIS Needs	• Formal condition assessments for all historic properties. • Detailed feature documentation for historic roads. • National Register of Historic Places nominations for cultural landscapes.
Planning Needs	• Preparation of cultural landscape reports for the two existing cultural landscapes. • Trails management plan. • Historic structure reports for all historic properties.
Laws, Executive Orders, and Regulations That Apply to the OIRV, and NPS Policy-level Guidance	**Laws, Executive Orders, and Regulations That Apply to the OIRV** • National Historic Preservation Act of 1966, as amended (16 USC 470) • Antiquities Act of 1906 • Archeological and Historic Preservation Act of 1974 • Archaeological Resources Protection Act of 1979 • American Indian Religious Freedom Act of 1978 • Historic Sites, Buildings, and Antiquities Act of 1935 • Native American Graves Protection and Repatriation Act of 1990 • Executive Order 11593, "Protection and Enhancement of the Cultural Environment" • Executive Order 13007, "American Indian Sacred Sites" • 36 CFR 79 "Curation of Federally Owned and Administered Archeological Collections" • 36 CFR 800 "Protection of Historic Properties" **NPS Policy-level Guidance** • NPS *Management Policies 2006* (chapter 5) • Director's Order 28: *Cultural Resource Management* • Director's Order 28A: *Archeology*, 4A(3) Native American Graves Protection and Repatriation Act

Identification of Key Issues and Associated Planning and Data Needs

This section considers key issues to be addressed in planning and management, and therefore takes a broader view over the primary focus of part 1. A key issue focuses on a question that is important for a park. Key issues often raise questions regarding park purpose and significance, and fundamental resources and values. For example, a key issue may pertain to the potential for a fundamental resource or value in a park to be detrimentally affected by discretionary management decisions. A key issue may also address crucial questions not directly related to purpose and significance, but still indirectly affects them. Usually a key issue is one that a future planning effort or data collection needs to address and requires a decision by NPS managers.

The following are key issues for Zion National Park and the associated planning and data needs to address them:

Climate Change. Climate change is a far-reaching and long-term issue that will affect all aspects of Zion National Park. The combination of high elevation and a semi-arid climate makes the Colorado Plateau, including the park, particularly vulnerable to climate change. Climate models predict that over the next 100 years, the Southwest will become warmer and even more arid, with more extreme droughts. Warming-related changes that have been documented at the park in the past eight decades include: an increase in annual mean temperature of 1.8°F, the average number of days over 100°F have increased from 30 per year to 56 per year, the average number of days below freezing have decreased from 77 per year to 69 per year, and the centroid of spring runoff is about 8 days earlier than it was 80 years ago.[1] The mean annual temperatures for the region, including the park, are projected to increase 6.4–8.5°F by 2100. Expected changes with the highest degree of certainty include a longer growing season and similarly longer fire seasons; earlier snow melt and more winter precipitation falling as rain rather than snow; and more evaporation from plants, resulting in less groundwater recharge and reduced spring and stream flows. There will also probably be more large fires, invasion of warm-adapted nonnative species, and large-scale die-offs of vulnerable species during droughts. Less certain is the possibility that the summer monsoon might be stronger and there may be more El Niños, which would enhance winter precipitation, and greater year-to-year variability may be experienced.

A warmer and drier landscape will mean a decrease in water resources, both surface and groundwater. Water is important for sustaining the existing ecological systems and cultural landscape at Zion National Park. These changes will affect a wide variety of park resources and processes, including the diversity of high-elevation plant and animal species and pollinators (including the loss of species and establishment of new species), erosion/weathering rates, natural flow regimes, thermal stress on fish, the timing and severity of floods, spring and riparian ecosystems, fire regimes, vegetation phenology, and the natural quality of wilderness character. A warmer and drier climate may accelerate weathering of park structures. A dryer landscape may increase the potential for wildland fire that could threaten historic structures and/or cultural sites. A warming climate could change visitation patterns and interests and require innovations to accommodate these changes (e.g., installation of shade structures, education on the changing climate and sustainability, and alternative water supplies). Thus, there is a need to integrate climate change adaptation into planning and management for Zion National Park. Park management must be even more "forward looking," to anticipate plausible but unprecedented conditions.

The primary data needs related to climate change in Zion National Park include documenting changes in high-elevation plant communities, stream temperatures, stream flow, groundwater levels, and the flow of springs and hanging gardens, along with climate-related monitoring of temperature, precipitation, wind, and fuel conditions.

1. Most of the information here is taken from P. Gonzalez. 2013. "Climate Change and Ecological Vulnerabilities at Zion National Park, Utah." Unpub. paper. NPS, Natural Resource Stewardship and Science, Climate Change Response Program. Washington, D.C.

Visitor Crowding and Congestion. Visitation is continuing to increase at Zion National Park. In 2012, more than 2.9 million people visited the park. Although the park's shuttle system has addressed many of the vehicular congestion issues in the park, the shuttle system has also lead to shifting impacts in Zion Canyon, including an increase in the number of people who can access the main canyon at one time, leading to increased social and resource impacts in the canyon and on popular trails. The timing and dispersal of people in Zion Canyon is also problematic at times, leading to concentrated visitor use on certain trails. On peak visitation days, visitors may get caught in a traffic queue at the south gate to the park. Additionally, the park's campgrounds are full to capacity during the peak months. Some visitors are not able to obtain permits for certain areas and may have to choose alternate destinations and change the timing of their trip. Visitor-caused resource impacts and crowding are also occurring on some of the wilderness trails. Informal trails are still being created, affecting vegetation and soil. There are also issues with visitors not knowing where to park in Springdale to catch a shuttle. Traffic congestion in town has been increasing, particularly near the park entrance at the north end of town. The increased number of shuttles placed on the roads and the weight of full-capacity shuttles results in cupping or trenching of asphalt roads in and outside the park.

The primary planning need is development of a visitor use management plan and a commercial services plan. A visitor use management plan would establish a proactive process of planning for and managing characteristics of visitor use, the physical and social setting, and would establish a variety of strategies and tools to sustain desired resources conditions and visitor experiences. Visitor use characteristics could include the amount, type, timing, and distribution of visitor use, including visitor activities and behaviors. Any data collection or studies leading up to a visitor use planning effort would provide a better understanding of visitor dispersal in the canyon as linked to shuttle bus ridership, and a better understanding of pedestrian use, vehicle use, necessary visitor services, and impacts to resources and facilities. A commercial services plan would help the park determine which commercial services are necessary and appropriate in the developed areas of the park and how they should be managed.

Inholdings. There are 3,296 acres of private inholdings within the park boundary. The majority of the inholdings, 2,893 acres, remain undeveloped. Activities on these lands, such as livestock grazing, planting of nonnative plants, water use, construction of fences, wells, and other developments, can adversely affect park resources and visitor experiences. Most of the non-NPS water diversions in the park are associated with inholdings. In 2012, a large new home was built on a previously undeveloped inholding near the base of Firepit Knoll. The new building negatively impacts the viewshed throughout Lee Valley. New construction on additional inholdings would cause similar impacts. The park's land protection plan (1984) identifies incompatible uses on inholdings as a threat and targets acquisition from willing sellers as a remedy. However, coming to agreement on a fair value for the land has been a persistent problem.

Developments and Uses Adjacent to the Park. The park is bordered by a mix of federal, state, and private lands. The Bureau of Land Management (BLM) manages lands that border almost 57% of the park. State of Utah school trust lands are found next to slightly less than 8% of Zion's border. Privately owned lands border approximately 35% of the park and make up 65% of the watershed of the North Fork upstream of the park. The lands bordering the park are used for a variety of purposes, including livestock grazing and ranching, recreation, private residences, and commercial uses. Private lands adjacent to the park are being developed at a rapid rate. This development has increased incidences of illegal dog use, all-terrain vehicle use, mountain bike use, poaching, and trail construction. Private developments and management practices are, or may, affect night sky viewing, soil erosion, water quality, scenic views, air quality, the composition of native plant and animal communities, and wildlife migration/habitat corridors. Visitor access also may be restricted or closed off to parts of the park.

Data on adjacent developments and uses is needed to inform management strategies for night sky conditions, scenic views, plant and animal communities, visitor dispersal and access, water rights, and water quality. Additionally, a visual resource inventory is needed to quantify the scenic outstandingly remarkable values (ORVs) for segments of designated rivers.

Sustainability. Although the park staff is taking many actions to promote and incorporate sustainability in management of the park, adverse environmental impacts are still occurring. More actions are needed to reduce waste, conserve energy and water, recycle materials, eliminate toxic materials, reduce/eliminate sources of air and water pollution, and adopt energy efficient and ecologically responsible materials and techniques.

Planning needs for this issue include an integrated solid waste management plan and a sustainable fuels and fleet operations plan.

Degradation of Natural Soundscapes. The sources and intensity of noise in Zion National Park have increased in recent decades. Today, 14 operators are authorized by the Federal Aviation Administration to conduct commercial air tours over Zion, and commercial airlines, general aviation, and other aircraft routinely fly over the park. Tour buses, trucks, cars, and motorcycles, as well as park operations and other activities such as maintenance of infrastructure and the use of motorized equipment, also add to noise levels in many areas of the park. These human-caused sounds adversely affect wildlife, visitor experiences, and wilderness character, as well as the natural soundscape.

A soundscape management plan has been completed for Zion National Park. Continued acoustical monitoring is the primary data need to determine if standards identified in the soundscape management plan are being met.

Planning and Data Needs

To maintain connection to the core elements of the foundation, and the importance of these core foundation elements, the planning and data needs listed here are directly related to protecting fundamental resources and values, park significance, and park purpose, as well as addressing key issues. To successfully undertake a planning effort, information from sources such as inventories, studies, research activities, and analyses may be required to provide adequate knowledge of park resources and visitor information. Such information sources have been identified as data needs. Geospatial mapping tasks and products are included in data needs.

Items considered of the utmost importance were identified as high priority, and other items identified, but not rising to the level of high priority, were listed as either medium- or low-priority needs. These priorities inform park management's efforts to secure funding and support for planning projects.

It is important to note that Zion National Park has completed a number of plans and studies that play an important role in the overall management of the park. Staff members are also engaged in a variety of ongoing plans and studies that are not included in the planning and data needs listed below. Please see appendix F for a summary of past and ongoing plans and studies for the park.

Planning Needs – Where A Decision-making Process Is Needed			
Related to an FRV or OIRV?	**Planning Need**	**Priority (High, Medium, Low)**	**Notes**
FRV	Visitor use management plan	High	The plan would address visitor use levels and patterns in key areas of the park, including Zion Canyon. It would establish a proactive process for managing characteristics of visitor use, the physical and social setting, and would establish a variety of strategies and tools to sustain desired resources conditions and visitor experiences. Visitor use characteristics could include the amount, type, timing, and distribution of visitor use, and visitor activities and behaviors.
FRV	Virgin River restoration strategy	High	The strategy would address site planning, design, and compliance for the removal of levees and other bank stabilizations that impede natural river processes along the North Fork Virgin River.
FRV	Zion Canyon transportation plan	High	The plan would address multimodal transportation options and consider trail linkages between shuttle stops to improve visitor opportunities.
OIRV	Cultural resource sites management plan	High	The plan would address the protection and management of select cultural sites, including petroglyphs and pictographs.
FRV	Commercial services plan	High	The plan would help the park determine which commercial services are necessary and appropriate in the developed areas of the park and how they should be managed.
FRV	Comprehensive sustainability strategy	High	The plan would include a sustainable fuels and fleet operations plan and an integrated solid waste management plan.
OIRV	Historic structures reports	High	The historic structure reports would include inventory of historic structures, important character-defining architectural features, use history, detailed current condition data, threats, cyclic maintenance requirements, and preservation treatments.
FRV	South entrance reconfiguration plan	High	The plan would develop a strategy for reconfiguring the south entrance (including campgrounds) to improve vehicle flow and wayfinding.
FRV	Scientific research strategy	Medium	The strategy would identify important scientific research needed to better understand and manage the park's fundamental resources and values.
FRV	Fire management plan update	Medium	The plan would be updated with current information and management strategies. This periodic comprehensive review is a requirement.
FRV	Trail management plan	Medium	The plan would include a trail inventory, new trail needs and locations, maintenance needs, and strategies to accomplish maintenance.
OIRV	Cultural landscape report	Medium	The plan would identify cultural landscapes in the park and how they should be protected and managed.

Planning Needs – Where A Decision-making Process Is Needed			
Related to an FRV or OIRV?	**Planning Need**	**Priority (High, Medium, Low)**	**Notes**
FRV	Climate change plan	Medium	The plan would include climate change scenario planning and an adaptation strategy. Cultural and natural resource condition assessments and climate change vulnerability assessments would be completed as part of the plan.
FRV	Education plan	Medium	This plan would identify the messages that park management wants to communicate to the on-site and off-site public, identify who that public is, and determine how best to inform the target audience.
FRV	Resource stewardship strategy	Medium	The plan would identify all of the cultural and natural resources in the park, would identify current conditions, and trends if possible, and would outline management strategies to protect resources.
FRV / OIRV	Collections management plan	Medium	The plan would address how to protect and manage the park's museum collections.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV or OIRV?	**Data Need**	**Priority (High, Medium, Low)**	**Notes**
FRV	Visitor use data	High	Visitor use data would provide a better understanding of visitor preferences, visitor dispersal in the canyon as linked to shuttle bus ridership, and a better understanding of pedestrian use, vehicle use, necessary visitor services, and visitor-caused impacts to resources, facilities, and the experiential setting. The data would include information from the University of Idaho Visitor Services Project.
FRV	Visitor impacts on park resources	High	The effort would include gathering resource data from popular visitor locations, analyzing the data to determine the condition and trends, then identifying management strategies to improve conditions if needed.
FRV	Water quality	High	The data would include the continued collection of water quality parameters at existing monitoring sites and additional monitoring at new sites where there are threatened waters or where basic information is lacking.
FRV	Park operations and facilities	High	Data collection would focus on information to enhance visitor safety and accessibility.
FRV	Night skies	High	Updated data would include Zion-specific night sky data, trends, and management strategies to improve viewing of night skies.
FRV	Visual resource assessment	High	In order to protect and enhance wild and scenic values, complete a visual resource assessment for river segments with outstandingly remarkable scenic values.
FRV	Paleontology	High	The data would include inventory, monitoring, and management strategies to protect these resources.
FRV	Water rights legal notices	Medium	The data would include regular review of water rights legal notices for consistency with the settlement agreement and adverse impacts to the park, and timely response to the state engineer.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV or OIRV?	**Data Need**	**Priority (High, Medium, Low)**	**Notes**
FRV	Shuttle ridership data	Medium	The data would include visitor counts from shuttle entrances and exits.
FRV	Effectiveness of messaging in the park, including safety, sustainability, and stewardship	Medium	The data would include interviews with visitors to determine if messages are effective.
FRV	Nonnative (exotic) plants	Medium	The data would include information on the spread and impact of nonnative plants, such as the introduction and impacts of cheatgrass due to fire.
FRV	Impacts of removing the revetments along the Virgin River (modeling and data need)	Medium	The data would include information on certain plant and animal communities, visitor perceptions during and post construction, and changes in stream morphology sediment transport. New armoring along the scenic drive would be monitored for effectiveness and condition.
FRV	Aquatic invertebrates	Medium	The data would include inventory and monitoring of all major streams and habitat types within those streams at a level sufficient to discern changes.
FRV	Bighorn sheep disease transmission	Medium	The data would include information on domestic sheep grazing adjacent to the park and monitor bighorn sheep migration patterns.
FRV	Oral histories	Medium	The data would include interviews with those who have a connection with the park.
FRV	Fire management data	Medium	The data would include updating fire regime condition class assessments, historic fire maps and burn severity, vegetation maps, and fuel loading/potential fire behavior.
FRV	Stream and spring flows	Medium	The data would include continuous measurements of stream flows on the North and East forks, capturing base flow, average flow, floods and seasonality of flow, and the documentation of the park's consumptive use of water. Additional flow monitoring on other major tributaries and springs, none of which are currently monitored, would be desirable.
FRV	Soil mapping	Low	The data would include current mapping of the distribution of soils and interpretation of the characteristics and limitations of the soils.
FRV	Visitor injury tracking	Low	The data would include documentation of injuries—what type of injury, where the injury occurred, was medical attention needed, was medical transport needed.
FRV	Climate change impacts	Low	The data would include changes in plant communities, stream temperatures, stream flow, snowmelt timing, the flow of springs and hanging gardens, and weather data (e.g., temperature and precipitation).
FRV	Updated vegetation maps	Low	The data would include vegetation changes since the Kolob fire and Dakota Hill fires.

Data Needs – Where Information Is Needed Before Decisions Can Be Made			
Related to an FRV or OIRV?	**Data Need**	**Priority (High, Medium, Low)**	**Notes**
FRV	Cultural resource inventories	Low	The data would include new documentation for otherwise undocumented archeological sites. New documentation includes Intermountain Antiquities Computer System site recording forms, Archeological Sites Management System records, locational data in GIS, condition and fuels assessments, and significance assessments for listing in the National Register of Historic Places.
FRV	Ethnographic overview and assessment	Low	The data would include consultation with associated American Indian tribes to identify traditional cultural properties and sacred places.
FRV	Administrative history of the park	Low	The data would include gathering all of the information related to the management of Zion since designation.
FRV	Soundscape	Low	The data would include continued monitoring of soundscape to determine if standards identified in soundscape management plan are being met.
FRV	Geologic hazards	Low	The data would include information on floods, rock falls, seismic hazards, and problem soils.
FRV	Developments within the wild and scenic river corridor	Low	The data would include features that impact free-flowing condition or the outstandingly remarkable values of each river segment.
FRV	Reptiles and amphibian trends	Low	The data would include inventory of reptiles and amphibians, and monitoring populations to determine trends.
FRV	Vegetation conditions (health of plant communities)	Low	The data would include inventory of major vegetation types in park to determine condition and trend.
FRV	Cattle trespass	Low	The data would include continued monitoring and documentation of trespass and evaluation of impacts.
FRV	Effects of vehicle byproducts from roads washing into waterways	Low	The data would include gathering road runoff at various locations, identifying substances in runoff, then determining the effect on native plants and animals.
FRV	Digitizing museum and archival collections	Low	The data would include scanning all paper documents in the collection.
OIRV	Detailed feature documentation for roads	Low	The data would include survey of all park roads, documenting all features, historic and nonhistoric.
OIRV	National register nominations for cultural landscapes	Low	The data would include preparation of National Register of Historic Places nomination forms.

Part 3: Contributors

Zion National Park

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Appendixes

Appendix A: Presidential Proclamations, Enabling Legislation, and Legislative Acts for Zion National Park

- Mukuntuweap National Monument, Utah – Proclamation No. 877 – July 31, 1909 (36 Stat. 2498)
- Zion National Monument, Utah – Proclamation No. 1435 – March 18, 1918 (40 Stat. 1760)
- An Act to establish the Zion National Park in the State of Utah, approved November 19, 1919 (41 Stat. 356)
- Excerpt from "An Act to establish the Utah National Park in the State of Utah," approved June 7, 1924 (43 Stat. 593)
- Executive Order, March 24, 1925, [No. 4181], Utah
- An Act for the relief of the town of Springdale, Utah, approved May 28, 1928 (45 Stat. 787)
- Executive Order, January 28, 1929, [No. 5037], Utah
- An Act to add certain lands to the Zion National Park in the State of Utah, and for other purposes, approved June 13, 1930 (46 Stat. 582) (PL 351)
- Zion National Monument Establishment – Proclamation No. 2221 – January 22, 1937 (50 Stat. 1809)
- An Act to authorize the Secretary of the Interior to convey certain property to Washington County, Utah, and for other purposes, approved June 3, 1941 (55 Stat. 237)
- An Act to amend the description of the area affected by the Act of May 28, 1928, entitled "An Act for the relief of the town of Springdale, Utah," and for other purposes, approved July 8, 1943 (PL 122-78th Congress)
- An Act to Include the present area of Zion National Monument within Zion National Park, in the State of Utah, and for other purposes, approved July 11, 1956 (70 Stat. 527) (PL 695)
- An Act to revise the boundaries of the Zion National Park in the State of Utah, and for other purposes, approved February 20, 1960 (74 Stat. 4) (PL 86-387)
- An Act to provide for increases in appropriation ceilings and boundary changes in certain units of the National Park System, and for other purposes, October 21, 1976 (90 Stat. 2732) (PL 94-578)
- An Act Minor Boundary Adjustments and Miscellaneous Park Amendments Act of 1995 (HR 694)
- The Omnibus Public Land Management Act of 2009 (PL 111-11, H.R. 146) (Designated the Zion Wilderness and drainages as wild and scenic rivers in the park.)

Appendix B: Inventory of Administrative Commitments

Administrative Commitments

Agreement Type	Name	Start Date / End Date	Stakeholders	Purpose	Notes
Non-NPS water right	Camp Creek (81-2814, 81-2815, 81-240, 81-247)	--1880 to 1948 / N/A	Chekshani Water Company	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park
Non-NPS water right	North Fork Virgin River at Flanigan Diversion (81-3392)	--1870 / N/A	Springdale Town Corp.	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park; may have RS2339 ROW
Non-NPS water right	North Fork Virgin River at Flanigan Diversion (81-1412)	--1870 / N/A	Springdale Consolidated Irrigation Co.	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park; may have RS2339 ROW
Non-NPS water right	North Fork Virgin River at Flanigan Diversion (81-4739)	--2009 / N/A	Town of Rockville	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park
Non-NPS water right	Spring above Watchman Housing (81-105)	--1925 / N/A	Springdale Town Corp.	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and paces of use and storage outside the park
Non-NPS water right	Springs in Oak Creek (81-220)	--1950 / N/A	Springdale Town Corp.	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park
Non-NPS water right	Springs in Oak Creek (81-274)	--1951 / N/A	Springdale Town Corp.	Provide water under valid water right.	Point of diversion inside the park, on NPS lands and places of use and storage outside the park
Non-NPS water right	Hop Valley (81-387)	--1959 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park on NPS lands, and use or storage is on park lands and inholdings
Non-NPS water right	Salvation Spring (81-730)	--1903 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park on NPS lands, and use or storage is on park lands and private inholdings

Agreement Type	Name	Start Date / End Date	Stakeholders	Purpose	Notes
Non-NPS water right	Lamb Spring (81-3155)	--1903 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park on NPS lands and use or storage is on park lands and private inholdings
Non-NPS water right	Wolf Spring (81-504)	--1961 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park on NPS lands, and use or storage is on park lands and private inholdings
Non-NPS water right	Aspen Spring (81-729)	--1903 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park, on NPS lands, and use or storage is on park lands and private inholdings
Non-NPS water right	Pine Spring Wash, Bishops' Potato Patch, Lee property (81-185)	--1945 / N/A	Private	Provide water under valid water right.	Point of diversion inside the park, on NPS lands, and places of use and storage on inholding inside the park
Non-NPS water right	Well (81-637)	--1977 / N/A	Private	Provide water under valid water right.	Point of diversion outside the park, place of use on inholdings inside the park
Non-NPS water right	Lee Spring (81-2998)	--1903 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Spring Lamoreaux property (81-2111)	--1901 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Well (81-3468)	--2009 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Well (81-4362)	--2007 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Sand Wash (81-2736)	--1903 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Well (81-2479)	--2004 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding
Non-NPS water right	Well (81-4546)	--2004 / N/A	Private	Provide water under valid water right.	All features inside the park and all on private inholding

Agreement Type	Name	Start Date / End Date	Stakeholders	Purpose	Notes
Cooperative agreement	Sewage service agreement between the Town of Springdale and The National Park Service	1979 / N/A	Springdale Town Corp.	Provides for the joint construction, operation and management of a combined wastewater system serving Zion Canyon in the park and the Town of Springdale.	Cooperative Agreement Number: CA-ZION-79-0001
Cooperative agreement	Potable water provided to the Town of Springdale	1970, 1976, 1985 / N/A	Springdale Town Corp.	Commits park to providing up to 60 gpm of potable water to town of Springdale. Under the Agreement, Town of Springdale compensates the park for the cost of delivery of that water, and commits to not developing springs in the park for which the town possesses water rights.	Cooperative Agreement Number: CA-Zion-95-0001A Deliveries under this agreement have not occurred for the last several years because the town constructed a plant to treat river water and that supply has been adequate
Conservation agreement	Virgin spinedace conservation agreement and strategy	1995, 2011 / 2019	Utah Department of Natural Resources, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, Nevada Department of Wildlife, Washington County Water Conservancy District, Arizona Game and Fish Department, and U.S. Forest Service	Conservation and enhancement of Virgin spinedace populations, to preclude the need for federal listing pursuant to the Endangered Species Act.	Includes memorandum of understanding for implementation
Conservation agreement	Rangewide conservation agreement for roundtail chub, bluehead sucker, and flannelmouth sucker	2004 / 2014	Wildlife and game and fish departments from Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming; and U.S. Bureau of Land Management	Conservation and enhancement of flannelmouth sucker populations, to preclude the need for federal listing pursuant to the Endangered Species Act.	
Service contract	McDonald Transit Associates, Inc.	1/1/2010 / 12/31/2019	McDonald Transit Associates, Inc.	Provide transit (shuttle) service to park visitors.	Contract Number: N1590109001 authorized under federal acquisition regulations

Agreement Type	Name	Start Date / End Date	Stakeholders	Purpose	Notes
Concession contract	Xanterra Parks & Resorts, Inc.	1/1/2009 / 12/31/2018	Xanterra Parks & Resorts, Inc.	Contract provides for required and authorized visitor services within the assigned areas of the park. Required services include • lodging and overnight accommodations • food and beverage outlets • retail • pay telephones The concessioner is authorized but not required to provide the following visitor services under the contract: • step-on guide services • transportation service to trailheads outside parks and open air tram tours in canyon • vending services	Contract Number: CC-ZION003-09 Category II type concession contract (please refer to notation at the end of the table for more information)
Concession contract	Canyon Trail Rides	1/1/2003 / 12/31/2013*	Canyon Trail Rides	Contract provides for required and authorized visitor services within the assigned areas of the park. Required services include • guided and skilled interpretive 1-hour and 3-hour guided horseback ride services on approximately 5.6 miles of maintained trails The concessioner is authorized but not required to provide the following visitor services under the contract: • souvenir photographs • an ATM, which is located in the Zion Lodge lobby for use by all visitors	Contract Number: CC-ZION001-03 Category I type concession contract *Initial contract end date was 12/31/2012. One year extension granted 11/20/12
Cooperating agreement	Zion Natural History Association	2/17/2011 / 2/17/2016	Zion Natural History Association	To work together with the National Park Service to provide park visitors with valuable interpretive and educational materials to facilitate an expanded appreciation of the National Park Service.	
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial interpretive services in park under a one-year authorization.	(14) Level 2 commercial interpretive services (group size 16 to 50 people) commercial use authorizations issued in 2012

Agreement Type	Name	Start Date / End Date	Stakeholders	Purpose	Notes
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial interpretive services in park under a one-year authorization.	(47) Level 3 commercial interpretive services (group size 15 or fewer) commercial use authorizations issued in 2012
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial shuttles in park under a one-year authorization.	(5) Shuttle commercial use authorizations issued in 2012
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial motorcycle tours in park under a one-year authorization.	(5) Motorcycle tour commercial use authorizations issued in 2012
Commercial use authorization	Commercial use authorizations	1/1/2013 / 12/31/2013	Zion Natural History Association	Provide for sale of visitor convenience items (film, batteries, water) by the cooperating association.	(1) Visitor convenience Item commercial use authorization issued in 2013
Special use permit	Special Use Permit	Reference permit		Authorizes a short-term activity that takes place in the park.	(7) Commercial film or photography special use permits issued in 2012
Special use permit	Special use permit	Reference permit			(9) Special event special use permits issued in 2012
Special use permit	Special use permit	Reference permit			(19) Wedding special use permits issued in 2012
Special use permit	Special use permit	Reference permit			(2) First Amendment groups who performed church services each Sunday, Apr–Oct and May–Aug were issued special use permits in 2012
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial bicycle tours in park under a one-year authorization	(17) Bicycle tour commercial use authorizations issued in 2012
Commercial use authorizations	Commercial use authorizations	1/1/2012 / 12/31/2012	Private companies providing commercial services	Provide commercial photography and painting workshops in park under a one-year authorization	(13) Photography and painting workshop commercial use authorizations issued in 2012

Please note that the 1998 Concessions Management Improvement Act stipulates three types of concession contracts, Category I, II, and III. Under the terms and conditions of a concession contract, the Secretary has the authority to assign land and government improvements (facilities) to the concessioner for the conduct of its operations.

- A Category I contract allows a concessioner to spend capital to acquire facilities from a previous concessioner, make improvements to an existing facility, or build a new facility. When any of these occur they acquire a leasehold surrender interest in the facility until the interest is depreciated, bought out by the government, or acquired by a new concessioner.
- Category II concession contracts have land/facility assignments but the concessioner may not acquire any leasehold surrender interest. Category III concession contracts are for operations without any land/facility assignments or leasehold surrender interest.
- Category III and sometimes II replace what used to be called concession permits. By law, all contracts are issued by competitive bid. The typical term for a contract is 5 to 10 years although under certain financial situations where a large capital investment is involved a 20-year term can be authorized with specific approval from the NPS director.

Please note that Director's Order 53: *Special Park Uses* states that a special use permit authorizes a short-term activity that takes place in a park area, and that

- provides a benefit to an individual, group, or organization rather than the public at large
- requires written authorization and some degree of management control from the National Park Service in order to protect park resources and the public interest
- is not prohibited by law or regulation
- is not initiated, sponsored, or conducted by the National Park Service
- is not managed under a concession contract, a recreation activity for which the National Park Service charges a fee, or a lease

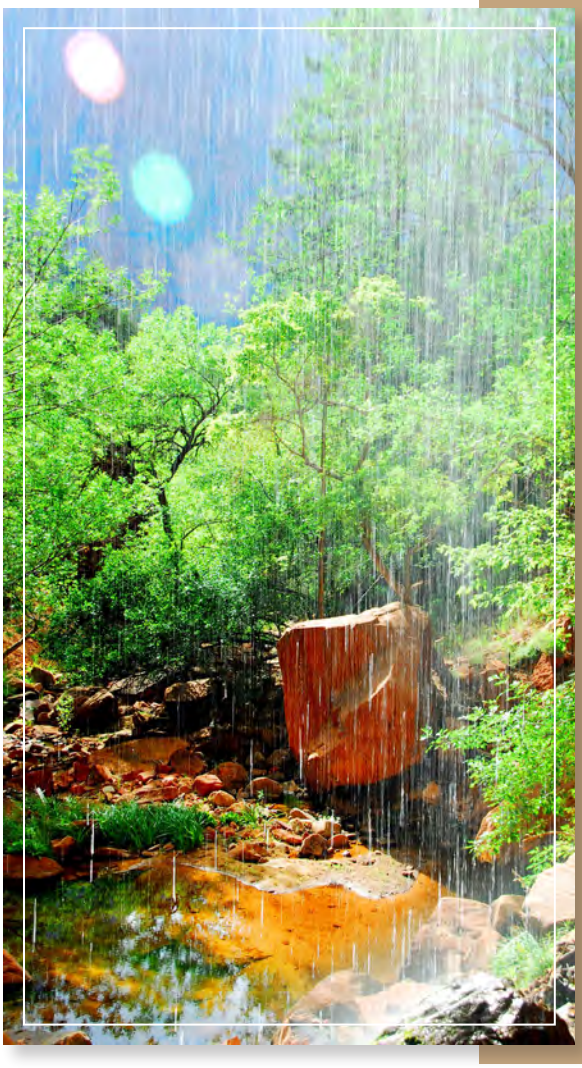
Appendix C: Basics for Wilderness Stewardship

History of Wilderness Designation

On March 30, 2009, the Omnibus Public Land Management Act (Public Law 111-11) designated the vast majority of Zion National Park as wilderness. The legislation also transferred ownership and management of more than 640 acres of wilderness from the Bureau of Land Management to Zion National Park. These lands are located on the west slope of the Watchman and Johnson Mountain near the Town of Springdale. A total of 124,406 acres of Zion National Park is designated wilderness (84% of the park), and an additional 9,047 acres in Kane County (6% of the park) are recommended for wilderness designation. This means that more than 90% of the park is managed as wilderness, as per NPS policy. Another 4,067 acres are potential wilderness (3% of the park) and will become wilderness once nonconforming uses are removed. Private lands within the park's legislative boundaries are the majority of park's potential wilderness. Additional nonconforming uses include access roads in Lee Valley and near Firepit Knoll, as well as a water right in Hop Valley.

Overview of the Wilderness Area

The Zion Wilderness is composed of a labyrinth of multicolored canyons carved out of the edge of the Markagunt Plateau. Forested plateaus and jagged slickrock peaks surround the canyons. Zion's unique geographic location and variety of life zones combine to create a diversity of habitats for a surprising array of plant and animal species. Located on the Colorado Plateau, but bordering the Great Basin and Mojave Desert provinces, the Zion Wilderness is home to plants and animals from each of the three regions. Hikers come from around the world to experience the challenge of the canyons, the solitude of the plateaus, and the beauty of the massive sandstone cliffs.



Everything in the Zion Wilderness takes life from the Virgin River's scarce desert waters. Water flows and solid rock is etched into cliffs and towers. Landscape changes as canyons deepen to create forested highlands and lowland deserts. A ribbon of green marks the river's course as diverse plants and animals take shelter and thrive in this canyon oasis. From the beginning people sought this place, this sanctuary in the desert's dry reaches. The very name Zion, a Hebrew word for refuge, evokes its significance.

Evidence of Ancestral Puebloans, known as the Anasazi, date from 2,000 years ago; Paiutes from about 800 years ago to present. Mormon settlers arrived in the 1860s. Park visitation in 1920 was 3,692; today Zion receives nearly 3 million visitors annually.

Visitors experience the wilderness by day hiking on designated trails and cross-country routes; backpacking and camping; canyoneering; and climbing. Two areas that attract many visitors in the wilderness area are the Virgin River Narrows and the Subway (Left Fork of North Creek).

Zion National Park completed a backcountry management plan in 2007. The plan provides direction for the National Park Service to manage more than 145,000 acres, most of which are now designated wilderness. The plan formalizes visitor carrying capacities based on visitor experience and resource protection (VERP) studies, identifies strategies to monitor the effects of visitors on park resources and visitor experiences, and identifies indicators, standards, and management options as part of a monitoring strategy. Standards and/or recommended actions are included for day and overnight group sizes and encounter rates, private stock use, aircraft use, campsite standards, climbing management, trail standards and management, and facilities in the wilderness.

Although this plan was created prior to the designation of the Zion Wilderness in 2009, a goal of the plan was to protect and preserve the park's natural and cultural resources and values, and the integrity of the wilderness character for present and future generations. The plan treated recommended wilderness lands as wilderness, and it does not need to be modified as a result of designation. As other existing plans, such as the fire management plan, are revised, they should be evaluated to ascertain whether they are appropriate for designated wilderness and appropriately incorporate the five qualities of wilderness character.

Zion National Park adapted indicators from the backcountry plan into measures for a wilderness character monitoring program. Additional measures were added to evaluate influences beyond those from park visitors to ensure a more holistic view of the management of the Zion Wilderness. The baseline year for the wilderness character monitoring program was 2011 and the measures will be tracked in future years as a means to quantify the health of wilderness character. The monitoring program will allow park managers to identify downward trends in wilderness character measures, which could lead to identifying future planning needs.

Wilderness Character Narrative

This wilderness character narrative describes what is unique and special about the Zion Wilderness organized under the framework of the five qualities:

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

Natural: Wilderness maintains ecological systems that are substantially free from the effects of modern human civilization.

Undeveloped: Wilderness retains its primeval character and influence, and is essentially without permanent improvements or modern human occupation.

Solitude or Unconfined Recreation: Wilderness provides outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Other Features of Value: Wilderness may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Note: This narrative is applicable to the designated Zion Wilderness as well as the recommended and potential wilderness in the park.

Untrammeled

The Zion Wilderness is composed of ecosystems that have evolved outside significant human influence. Stream flow in the large rivers and almost all tributaries is essentially natural and free-flowing. Flash floods are not restrained as they erupt out of side canyons or through the Zion Narrows. The wilderness is a superlative example of the effect of the erosional forces and paths of water, wind, and temperature on the uplift of the Markagunt Plateau. Tremendous canyons, towering peaks, arches, and natural bridges have been able to develop without human influence.

A "trammel" traditionally refers to a restraint for a horse; "untrammeled" connotes an area that is unhindered by modern people. This quality represents the wild in wilderness. Any intentional or unintentional, authorized or unauthorized action that manipulates the wilderness degrades this quality.

Managing for the untrammeled quality requires that managers show humility and restraint. Actions should be carefully considered recognizing that inaction may be the appropriate choice. The unintended results of management actions may reverberate well beyond their initial purpose. The untrammeled quality may conflict with other qualities requiring managers to judiciously weigh the consequences of an action.

The primary actions degrading the untrammeled quality of the Zion Wilderness are those taken by the National Park Service. Removal of nonnative vegetation is an example of trammeling. Park employees regularly manually remove species such as tamarisk, Russian olive, scotch thistle, and mullen. Park staff have judged that the trammeling is justified in an effort to improve the natural quality and allow the return of naturally occurring ecosystems. Wildlife research can also cause trammeling when a large percentage of the population of a species are captured or manipulated as part of a monitoring program, such as occurs with desert tortoises within the Zion Wilderness. Again, the trammeling actions are taken with the goal of improving the natural quality and encouraging the recovery of a threatened species.

Wildfire suppression, wildfire fuel reduction, and the ignition of fires are manipulative actions. Within the Zion Wilderness, wildland fires are allowed to burn unless there are other values at risk, such as nearby private structures found outside the park, cultural resources, or endangered plant species. Fuel reduction projects are also completed with the goal of reducing risk to other values at risk, and management ignition of fires allows the return of a more natural fire regime.

Actions taken by people outside the managing agency can also manipulate the biophysical environment. Illegal livestock trespass significantly trammels the wilderness and also degrades the natural quality.

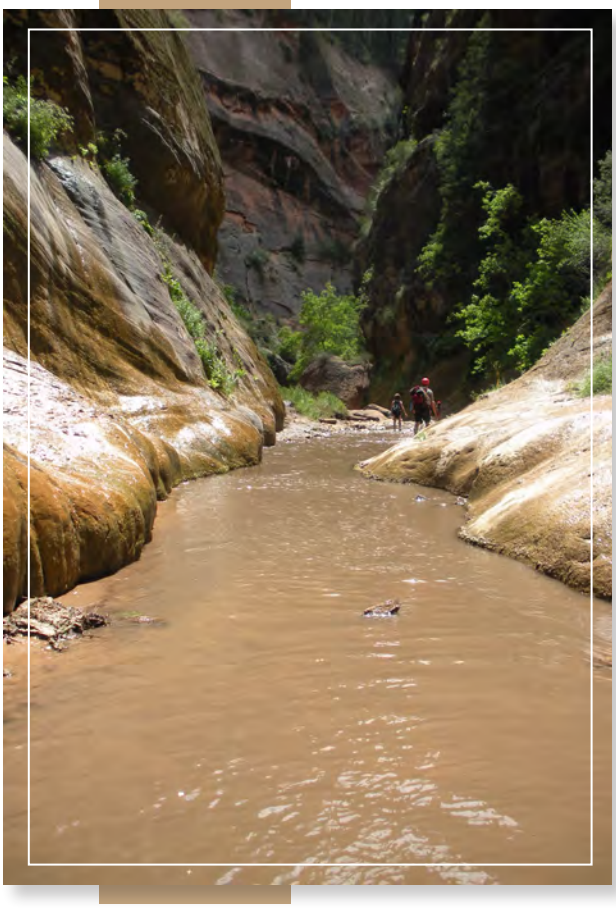
Natural

The Zion Wilderness is a large intact ecosystem. With an elevation ranging from 8,726 feet at Horse Ranch to 3,666 feet at Coal Pits Wash, Zion's varied topography leads to a diversity of habitats and species. Desert, riparian (river bank), pinyon-juniper, and conifer woodland communities all contribute to Zion's diversity. Neighboring ecosystems—the Mojave Desert, the Great Basin, and the Rocky Mountains—are also contributors to Zion's abundance. Due to a variety of elevations and life zones as well as perennial water sources, more than 1,000 native plant species are found within the wilderness.

The diverse plant communities within the park support a variety of wildlife species. Zion is home to 6 species of amphibians, 28 species of reptiles, 79 mammal species, 289 bird species, and 6 native fish species, many of which occur in Zion Wilderness. The Zion Wilderness is a place where threatened and endangered species such as Mexican spotted owls and Shivwitz milkvetch find a home. Rare/special concern species include the Zion snail, Virgin spinedace, and peregrine falcon.

Hanging gardens that occur in seeps at the base of the Navajo sandstone formation are largely undisturbed as are the many isolated mesa tops found throughout the park. The park contains fossiliferous deposits of unusual nature. Water quality conditions of the North and East Forks of the Virgin River and its tributaries are considered natural and high quality. They are reflective of the largely unaltered geohydrologic setting and are generally within state water quality standards. This is due to the relatively light level of development on the watershed, and to the fact that most, and for some tributary streams all, of the flow is from groundwater discharge from the Navajo sandstone.

Threats to the natural quality primarily occur when natural processes or biodiversity are altered. The quality is impacted when populations of native species are reduced or extirpated. Degradation is caused by climate change, air pollution, and the proliferation of nonnative species such as annual brome grasses. Impacts are being caused by air pollution from distant sources as well as by careless hikers stepping on biological soil crusts or crossing an eroded slope to enter a slot canyon. Illegal livestock grazing within the wilderness area causes erosion and the spread of nonnative species. Livestock grazing outside the park is affecting water quality within the wilderness area. Removal of vegetation by the wildland fire fuels program negatively affects the natural quality but also allows the positive impact of a return to natural fire regimes.



Undeveloped

The Zion Wilderness is largely undeveloped, and the number of nonrecreational developments affects a small area of the wilderness. There are six nonrecreational structures found within NPS-owned designated or potential wilderness (two radio repeaters, two nonhistoric cabins, a U.S. Geological Survey (USGS) station, and a communications repeater) with another five structures found on inholdings within potential wilderness (three stock ponds, one house, and one active irrigation ditch).

Perhaps the greatest continuing threat to the undeveloped quality of wilderness character comes from short-term incursions of NPS motorized equipment and mechanical transport into the area. Examples include helicopters being used for search and rescue missions or chainsaws being used during wildland fires. Additional actions that degrade the undeveloped quality include semi-permanent equipment placed by researchers, including rebar, tags, and electronic sensors.

Opportunity for Solitude or Primitive and Unconfined Recreation

Almost 3 million people visit Zion National Park each year, but opportunities for solitude or a primitive and unconfined type of recreation can still be found just a short hike from roadways in the Zion Wilderness. Visitors can experience an array of rich and diverse natural sounds and dark night skies in an environment relatively free of human-caused noise and light pollution. Opportunities for self-reliant recreation abound. Recreational development such as maintained trails, designated campsites, and signs are found in less than 15% of the wilderness.

The sport of canyoneering has blossomed in popularity in recent years and the canyons of the Zion Wilderness are one of the premier locations to participate in canyoneering activities. Backpacking through the Zion Narrows, along the rims of Zion Canyon, or through La Verkin Creek are popular, as are day hikes along the trails and slickrock routes of the wilderness. Management actions, such as a wilderness permits requirement or purposefully reduced parking lot size confine visitors prior to entering the wilderness. Regulations, such as designated campsites, prohibitions against campfires, or limited group size, can degrade the unconfined aspect of this quality during visitors' experience within the wilderness. At the same time, limiting the number of visitors who visit an area can protect resources and allow for a sense of solitude. Zion National Park currently requires permits for day trips into many slot canyons as well as for all overnight outings. Permits are not required for day hikes outside of the slot canyons. Camping is limited to designated campsites throughout most of the wilderness, but areas where visitors can select their campsite can still be found. One of the challenges enjoyed by canyoneers is the opportunity to overcome obstacles such as rappels or swims. Large numbers of visitors in a canyon can lead to confinement within the wilderness as visitors wait in line to complete obstacles. The sheer popularity of some activities, such as canyoneering, has reduced opportunities for solitude. Even though use limits have been in place for much of the period, the number of wilderness permits issued for the sport of canyoneering has almost tripled since 2000.

Other continuing threats to the solitude or a primitive and unconfined quality include a lack of understanding of wilderness values by park visitors who recognize Zion as a national park but may not understand goals of a wilderness experience including a desire to keep group size small or to minimize the use of technology and electronic devices. The sheer number of visitors coming to popular areas within the wilderness can also degrade the quality through the creation of social trails, enlargement of campsites, or deposition of human waste as well as trash.

Development outside the wilderness boundary degrades opportunities for a sense of solitude. Developments include agency-built fences and signs along the boundary, homes built on private land, noise caused by aircraft over-flights , as well as night time light pollution from surrounding communities. A form of development within the wilderness, climbing bolts, is currently unregulated and is detracting from opportunities for solitude. Climbers and canyoneers have left hundreds of bolted anchor stations throughout the Zion Wilderness.

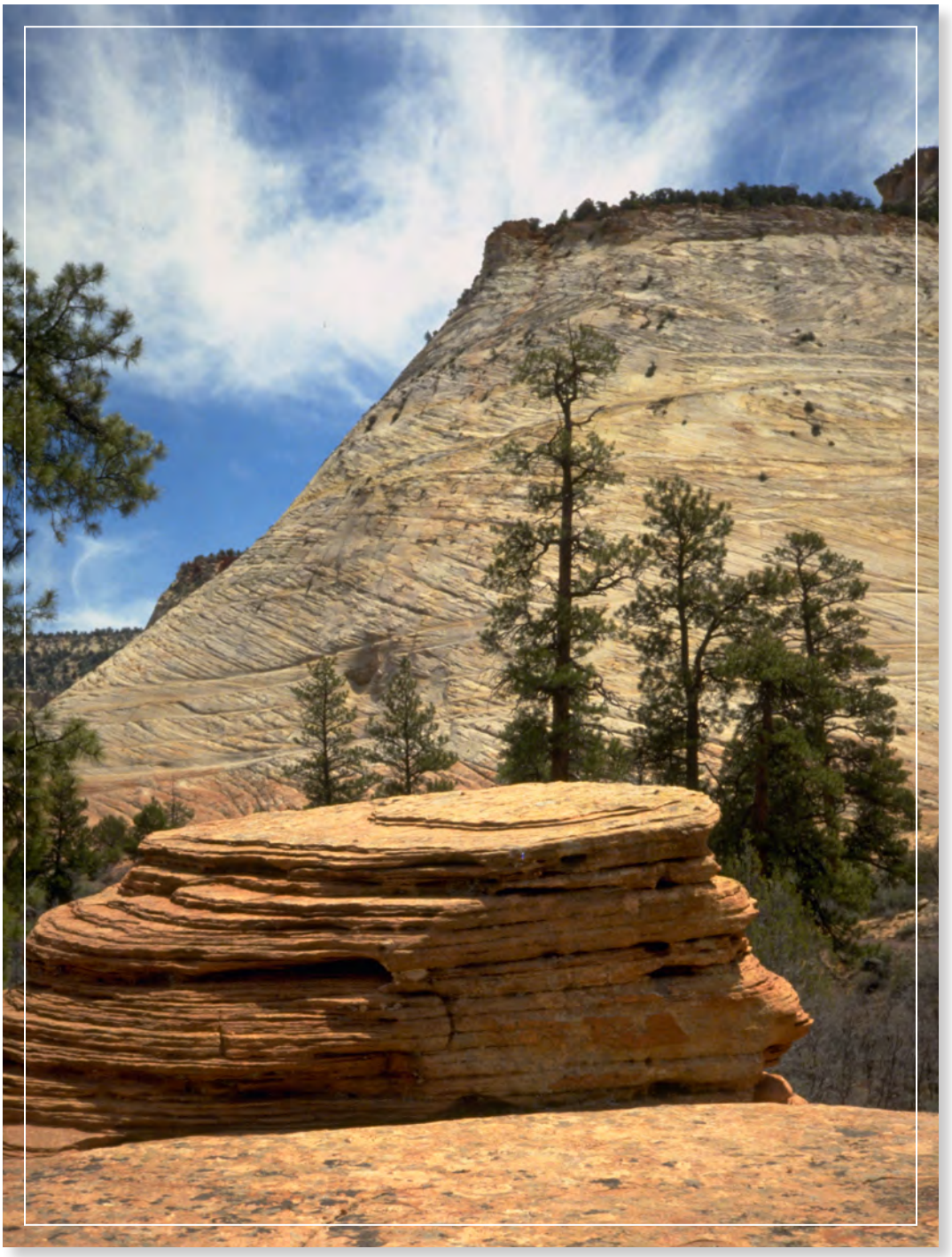
Other Features of Value: Cultural Resources

In addition to the above four wilderness character qualities, the Zion Wilderness has another feature or value—cultural resources—that is integral to the fabric of this wilderness. The natural environment has influenced, shaped, and impacted the numerous people who have lived inside the Zion Wilderness for thousands of years, and these people have left their mark on the land as well. Evidence of these unique, diverse cultures rests inside the Zion Wilderness. Preserved is evidence of cultures from prehistoric to modern times, including American Indian cultures, remnants of Mormon homesteading, early NPS history, and early 20th century tourism. The Zion Wilderness remains one of the few locations containing a geographically discrete, mostly undisturbed, collection of sites representing a long-term community occupation by the Virgin Branch of the Ancestral Puebloans. The human experience should not, and cannot, be separated from this environment; to separate it would leave the remnants of these cultures homeless and the story of the wilderness incomplete.

The quality is degraded when cultural sites are intentionally or unintentionally damaged or allowed to degrade. Visitors and natural erosion have degraded some cultural sites in the wilderness area.

Issues for Wilderness Planning

In addition to the key issues raised earlier in this document (e.g., climate change, visitor crowding, degradation of natural soundscapes) and the issues raised in the 2007 backcountry plan, another key issue for the Zion Wilderness is the use of fixed anchors/bolting in wilderness. The creation of new fixed anchors or the installation of climbing bolts is unregulated throughout the Zion Wilderness. Visitors are not permitted to use power drills to place bolts, but otherwise are allowed to decide where to place fixed anchors. NPS Director's Order 41, "Wilderness Stewardship" has identified the need to create a process to authorize new bolt placement within wilderness areas, including the Zion Wilderness. The format of the authorization process has not been identified.



Appendix D: Wild and Scenic River Values Statement for the Virgin River and its tributaries

Wild and Scenic Rivers Act

In 1968, Congress passed the Wild and Scenic Rivers Act. The act "declared to be the policy of the United States that certain selected rivers of the Nation, which with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

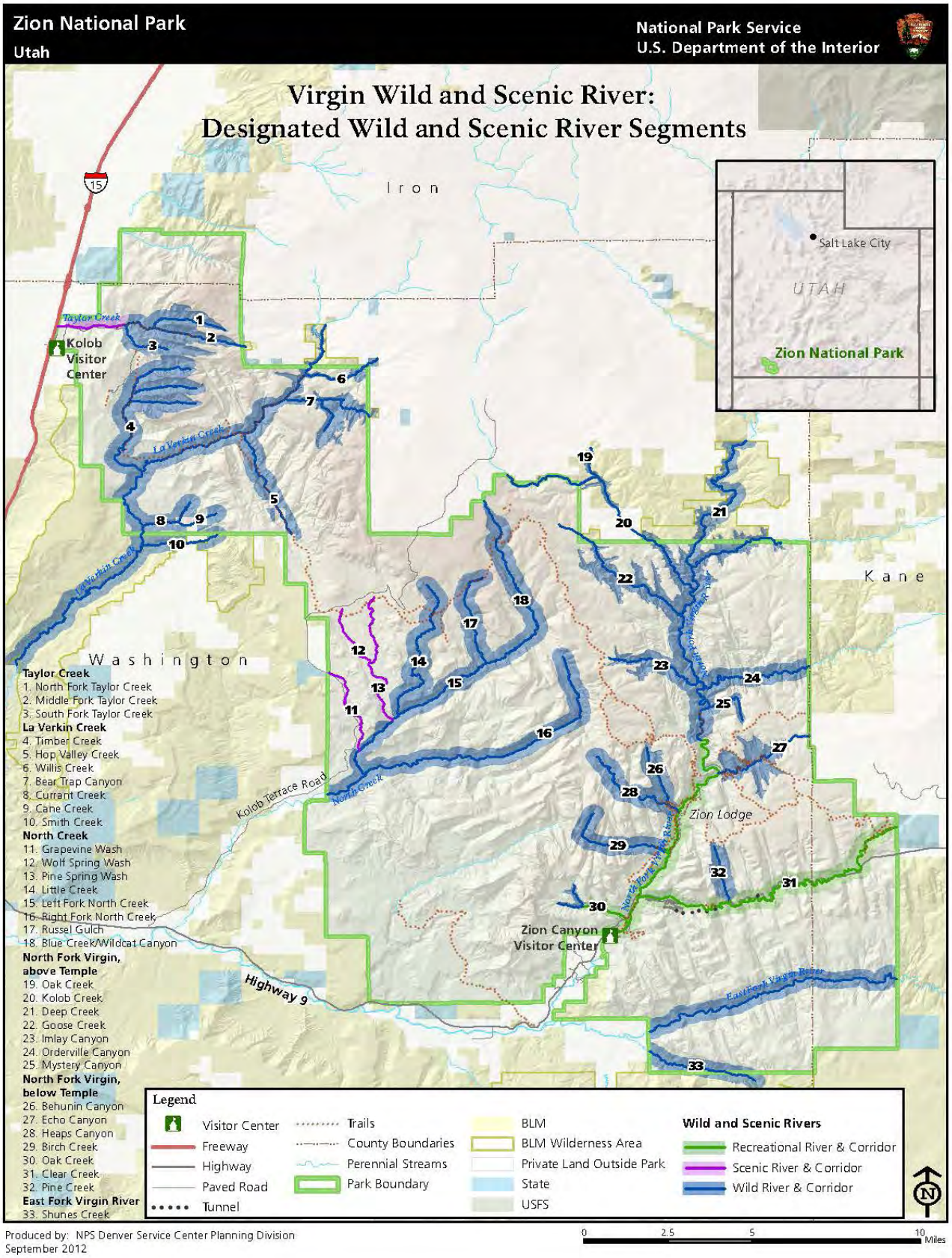
Under the Wild and Scenic Rivers Act, designated rivers are classified as wild, scenic, or recreational. The classifications primarily relate to the degree of development along the river. Regardless of the classification, each designated river in the national system is to be managed in a way that protects and enhances the values that prompted its designation. According to the act, the three classifications are defined as follows:

> **"Wild" River Areas.** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
>
> **"Scenic" River Areas.** Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
>
> **"Recreational" River Areas.** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some shoreline development, and that may have undergone some impoundment or diversion in the past.

Designation of the Virgin River and Its Tributaries

At the time of this writing, the park is undertaking a comprehensive river management plan. The river corridors and outstandingly remarkable values described below could change in the planning process, though any changes are expected to be very minor.

The Virgin River was added to the federal system by the Omnibus Public Land Management Act (2009). The act designating the rivers also designated 124,462 acres of wilderness in Zion National Park. Almost all of the wild river segments in the park are within designated wilderness. The designated segments of the Virgin River located within Zion National Park (and on adjacent BLM lands managed by the St. George Field Office) include 39 river and tributary segments. The river segments are shown on the "Virgin and Wild Scenic River: Designated Wild and Scenic River Segments" map.



Produced by: NPS Denver Service Center Planning Division
September 2012

Wild and Scenic River Values

Outstandingly remarkable values are defined by the Wild and Scenic Rivers Act as the characteristics that make a river worthy of special protection. In addition, free-flowing condition and water quality are also integral to the protection of wild and scenic rivers. Because free-flowing condition and water quality support the integrity of the outstandingly remarkable values and are key components for future management, they are included as part of this statement. Thus, the foundation for wild and scenic river management is a clearly defined set of outstandingly remarkable values, free-flowing condition, and water quality.

The Interagency Wild and Scenic Rivers Coordinating Council issued criteria for identifying and defining outstandingly remarkable values. The criteria guidance states that:

- An ORV must be *river related or dependent*. This means that a value must be located in the river or on its immediate shorelands (generally within 0.25 mile on either side of the river), contribute substantially to the functioning of the river ecosystem, and owe its location or existence to the presence of the river.
- An ORV must be *rare, unique, or exemplary* at a comparative regional or national scale. Such a value would be one that is a conspicuous example from among a number of similar values that are themselves uncommon or extraordinary.

Based on these criteria, the National Park Service has determined the wild and scenic segments of the Virgin River contain the following set of outstandingly remarkable values: cultural, geologic, recreational, scenic, ecological processes, wildlife, and fish (see table below). A description for each of these values is provided, followed by a description of the river's free-flowing condition and water quality.

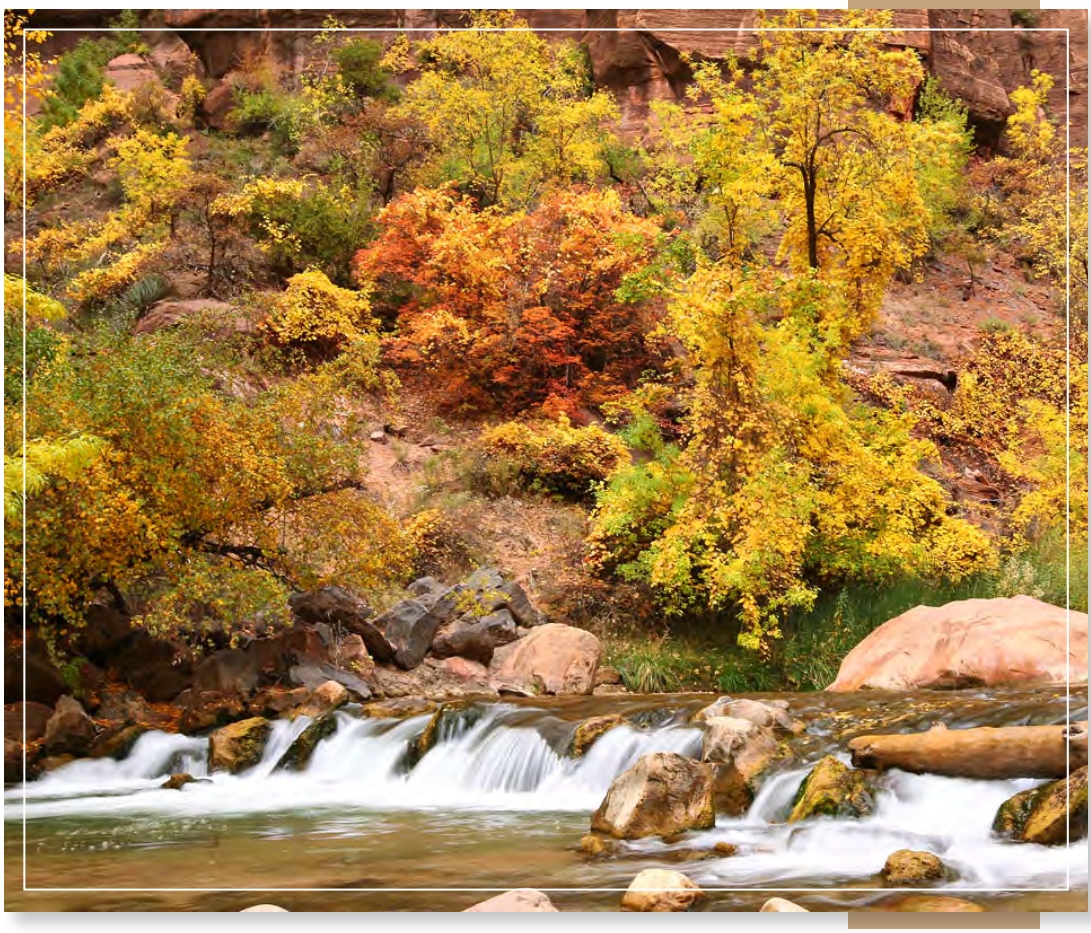


TABLE 1: ORV MATRIX

River Segment Main Segment or Tributary Segment	ORV Category						
	Cultural	Geologic	Recreational	Scenic	Ecological Processes	Wildlife	Fish
North Fork Virgin River above Temple (wild)		•	•	•	•	•	•
Kolob /Oak Creek (BLM) (wild)		•					
Goose Creek (wild)		•				•	
Imlay Canyon (wild)		•	•			•	
Orderville Canyon (wild)		•	•	•	•	•	
Deep Creek (wild)		•	•	•			•
Mystery Canyon (wild)		•	•	•			
North Fork Virgin River below Temple (recreational)	•	•	•	•			•
Birch Creek (wild)		•		•			
Pine Creek (wild and recreational)		•	•	•		•	
Oak Creek (wild and recreational)				•		•	
Heaps Canyon (wild)		•				•	
Behunin Canyon (wild)		•				•	
Echo Canyon (wild)		•				•	
Clear Creek (recreational)		•					
East Fork Virgin River (wild)	•	•			•	•	•
Shunes Creek (wild)					•		•
North Creek (wild)		•	•	•			•
Wildcat Canyon / Blue Creek (wild)						•	
Right Fork North Creek (wild)		•		•		•	
Left Fork North Creek (wild)		•	•	•		•	
Grapevine Wash (scenic)							
Wolf Springs Wash (scenic)							
Pine Springs Wash (scenic)							
Little Creek (wild)		•					
Russell Gulch (wild)		•		•		•	
La Verkin Creek (wild)		•	•			•	
Willis Creek (wild)		•				•	
Beartrap Canyon (wild)		•				•	
Timber Creek (wild)		•					
Current Creek (wild)		•				•	
Cane Creek (wild)		•					
Hop Valley Creek (wild)		•					
Smith Creek - BLM (wild)		•					
Taylor Creek (scenic)		•		•			
North Fork Taylor Creek (wild)		•		•			
Middle Fork Taylor Creek (wild)		•		•			
South Fork Taylor Creek (wild)		•		•		•	

Cultural Values

The continuum of human occupation along the Virgin River and its tributaries encompasses thousands of years and diverse people, cultures, and uses. In the arid Southwest landscape, the occurrence of plentiful water, accompanying vegetation, animal diversity, arable land, and other resources found along the Virgin River and its tributaries provided ideal conditions for communities to flourish. Not surprisingly, the Virgin River system contains some of the best examples in the region of prehistoric American Indian sites that provide a tangible connection between culturally affiliated tribes and their ancestors. Furthermore, the Virgin River corridor contains places and resources important to the cultural traditions of contemporary American Indian tribes.

Geologic Values

The Virgin River and its tributaries are uniquely situated along the western margin of the Colorado Plateau where the recent history of tectonic activity and erosional downcutting has resulted in a labyrinth of deep sandstone canyons, volcanic phenomena, and widespread exposures of brilliantly colored sedimentary deposits. Unique geologic features include Navajo sandstone exposures, a remnant of the world's largest sand dune desert, river-carved canyons forming the world's tallest sandstone cliffs, narrow slot canyons, hanging waterfalls, springs and seeps, and accelerated erosion processes. This dynamic geologic system creates a diverse landscape of channels, canyons, and springs that support a variety of ecological communities, including hanging gardens, desert fish, and other aquatic species. The geology of the Virgin River and its tributaries offer world-class opportunities for canyoneering, rock climbing, hiking, and wilderness experiences. The region of comparison for geology is the plateau and canyon area that includes Zion National Park and extends westward to Glen Canyon National Recreation Area.

A number of factors were used in determining whether a river segment had an outstandingly remarkable geologic value. The factors included the presence of high cliffs of Navajo sandstone, known to be the world's highest sandstone cliffs; slot canyons, which are deep and exceptionally narrow vertical-walled canyons; and springs discharging from the Navajo sandstone aquifer, which are extensive in these canyons, are unusual in this arid setting, and are known to support a large number of rare and endemic species. Other features include the landforms that indicate an exceptionally fast rate of erosion, e.g., deep canyons, cliffs, expanses of exposed bedrock, and extensive landslide deposits; high waterfalls and hanging valleys, resulting from the exceptionally high runoff from slickrock and differential rates of erosion and resulting in channels with large vertical drops; river channels dammed by landslides or lava dams in the recent geologic past; and inverted valleys, resulting from lava flowing down canyon bottoms followed by rapid erosion of surrounding rock layers and resulting in lava flow as elevated sinuous ridgelines. Each of these factors contributes to the unique and exemplary geologic values of the Virgin River and its tributaries.

Recreational Values

Exceptional recreational opportunities exist along the Virgin River and its tributaries, providing visitors from around the world with a chance to develop personal and lasting connections with the river within some of the most unique water-carved desert canyons in the region. The dramatic setting dominated by scenic grandeur contribute to a spectrum of river-related experiences—from the self-reliant adventure of canyoneering or hiking and backpacking through narrow river and creek channels, to enjoying photography and other artistic pursuits, to viewing scenery or camping along the river. For generations, the striking contrast of heat and water, stone and gardens have drawn people to this unique desert river and its tributaries. The region of comparison for recreation value is the plateau and canyon area, which includes Zion National Park, extends westward to Glen Canyon National Recreation Area and north to Interstate 70.

To qualify as having an outstandingly remarkable recreational value, a segment must have river-related or river-dependent recreational activities. The activity must occur within the river or immediate shorelands within the corridor or owe its existence to the river and its various characteristics. The recreational experience must be rare, unique, or exemplary, such as the hike through the Narrows. The region of comparison for the recreational outstandingly remarkable value is the portion of the Colorado Plateau that lies in southwestern Utah.

Scenic Values

The Virgin River and its tributaries create diverse opportunities for views of the river's unparalleled scenery, which can be both dramatic and subtle. The river creates a landscape of cross-bedded sandstone cliffs, towering thousands of feet above the canyon floor. The geologic tapestry of contrasting colors and textures—red, white, and pink cliffs; slivers of blue sky; and lush green ribbons of riparian vegetation and hanging gardens—encompass the sculpted and undulating canyons. Seasonal waterfalls flow over slickrock from hanging canyons more than 100 feet above the canyon floor.

The region of comparison for scenic value is the plateau and canyon area that includes Zion National Park and extends westward to Glen Canyon National Recreation Area.

River and tributary canyons offer a pleasing contrast in soil, rock, vegetation, and water, as well as views that greatly enhance the visual quality, with still or cascading water dominating the landscape. Light changes in the canyon depending on the time of day and the season. Rocks can appear fiery red, golden, bright white, grey, or black. Even the absence of water in some ephemeral tributaries or "phantom channels" creates drama and visual interest.

These elements combine to offer a landscape character that is unique and unforgettable on a scale that draws visitors from all over the world. To qualify as having an outstandingly remarkable scenic value, a segment must contain river-related or river-dependent scenery, be one of the most significant areas in the region for diversity of views, and have special features.

Ecological Processes Values

Ecological processes supporting vegetation is an outstandingly remarkable value in some of the Virgin River designated segments due to the presence of exemplary riparian corridors and rare plant communities. The region of comparison for ecological processes is the Colorado Plateau physiographic region.

The cottonwood galleries along the East Fork Virgin River and Shunes Creek provide rare examples of relatively intact, properly functioning riparian systems. Natural river processes proceed unimpeded, allowing for seasonal flooding and meander migration, vegetation recruitment, and plant succession. Riparian vegetation is abundant and diverse. The Virgin River and its tributaries have created unique habitats for rare plant communities in a desert Southwest ecosystem. Steep-walled canyons, carved over time by the rivers, create cool, moist microclimates that support hanging gardens, which are rare and exemplary in the region. These gardens, occurring at seeps along the vertical sandstone walls, support a complex biotic community including several plant and animal species found only in the Virgin River system. The hanging gardens in Zion National Park are more numerous and larger than gardens found elsewhere and are sought out by researchers due to their rareness in the region.

Experts included rare species and communities, riparian habitat quality, and scientific importance in the outstandingly remarkable ecological processes value.

Wildlife Values

Wildlife is an outstandingly remarkable value in the Virgin River and its tributaries due to the habitat for and populations of desert bighorn sheep, Mexican spotted owl, and the endemic Zion snail. The region of comparison for this value was generally southwestern Utah, northwestern Arizona, and southeastern Nevada. The criteria for the wildlife value included river-related and river-dependent wildlife, current population, habitat needs, and scientific importance.

Fish Values

The Virgin River and its tributaries provide a unique and intact habitat for six native species including four found in the park, Virgin spinedace, flannelmouth sucker, desert sucker, and speckled dace. The Virgin spinedace is nationally significant and only exists in the Virgin River system. Both the Virgin spinedace and the flannelmouth sucker are managed under conservation agreements. The Virgin River and several of its tributaries support regionally significant levels of natural and sustainable reproduction for all four native fish species. The North and East Forks Virgin River provide the most productive habitat for these fish in the Virgin River basin. The geologic setting and flow regime lead to floods and large sediment loads, unique water quality, and frequent disturbance, which are effective deterrents to nonnative species. Other factors contributing to the productivity for native fish are connectivity to tributary systems and habitat diversity for spawning, rearing, and supporting adult fish. Additionally, the Zion stonefly, an important component of the food web, is found along the Virgin River and its tributaries. The type specimen for this species was identified in Zion National Park in 1949.

To determine if fish contributed to the outstandingly remarkable value of a stream segment, the following criteria were used. The first criterion included the presence of native species and species of concern. There are four native species: (1) speckled dace, (2) desert sucker, (3) Virgin spinedace, and (4) flannelmouth sucker. The latter two species are species of concern and are managed under conservation agreements with other agencies. The second criterion included natural and sustaining populations and habitat quality and diversity. Habitat quality and diversity included such elements as connectivity, water quality (including sediment), food availability (including Zion stonefly), cover, stream diversity (pools, riffles, runs), spring inflows/nurseries, and natural hydrology.

The area of comparison for this value included the remainder of the Virgin River watershed, the Colorado River basin, and the nation. The remainder of the Virgin River watershed was included because native fish abundance is greatest in the park portion of the watershed. The Colorado River basin was included because some of the fish are more widely distributed within its streams. Because the native fish in the Virgin River system are unique to this system, they reach the level of national significance.

Free-flowing Condition

According to the Wild and Scenic Rivers Act, free-flowing is defined as "flowing in a natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway." However, the act states that "the existence of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion provided that this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the National Wild and Scenic Rivers System."

The Virgin River and its tributaries have carved, and continue to carve, spectacular vertical-walled canyons through the Navajo sandstone and surrounding sedimentary strata. The erosive force is provided by frequent flood events that occur most often from sudden summer monsoon storms and from spring snowmelt, and, rarely but significantly, from large winter rain-on-snow flood events. Annual flow is highly variable and large runoff years are more likely during El Niño climate events.

Sediment transport from the North Fork Virgin River is estimated at 800,000 to 1 million tons per year, and yield from other tributaries is of similar magnitude when scaled for the relative size of each drainage basin.

Streamflow in the large rivers and almost all tributaries is natural and free-flowing. There are no large reservoirs on the watershed that would significantly reduce flood flows, affect base flows, cause daily hydropower fluctuations, or modify stream temperatures. Therefore, discharge patterns show the full range of natural conditions.

Water flow in the park is protected by federal reserved and appropriated water rights held by the National Park Service and recognized in the Zion National Park Water Rights Settlement Agreement. Additionally, the Utah state engineer manages the Virgin River Basin as if it is fully appropriated, so no new diversions of water are permitted.

Consumptive use of water upstream of the park amounts to about 6%–10% of the average annual discharge, reducing total discharge by that amount, but not altering flood flows or the range of natural variation. The greatest influence on flows is Kolob Reservoir located on Kolob Creek (2 miles upstream of the park) which has the capacity to substantially alter flows on Kolob Creek, capturing much of the spring runoff and augmenting summer and fall flows, typically by releasing 5–10 cubic feet per second (cfs) in the summer or fall. The Crystal Creek Pipeline provides for the diversion of an average of 4,000 acre-feet per year from the upper reaches of Crystal Creek, piping water to Kolob Reservoir and releasing it down Kolob Creek to meet the water needs of the Washington County Water Conservancy District downstream near St. George. Controlled reservoir releases are limited to 35 cfs under the Zion National Park Water Rights Settlement Agreement.

Related to free-flowing condition is the function of floodplains. Through much of the lower Zion Canyon (i.e., from the park's south boundary upstream to Canyon Junction bridge), the 100- and 500-year floodplains closely follow the banks of Virgin River. Earthen levee systems present along the riverbanks near Zion Lodge and through The Watchman campground have altered the historic floodplains in these areas. The area inundated by the Probable Maximum Flood (PMF or the largest conceivable flood from the current watershed) flows onto some open river terraces including portions of the housing areas, campgrounds, headquarters building, and much of the valley floor in the vicinity of the lodge. All of the existing park facilities near Oak Creek are within the probable maximum floodplain of that creek. The current headquarters building parking area, resource management offices, and one historic residence are within the 100-year floodplain of Oak Creek; the visitor center, most other housing, and the maintenance area are within the 500-year floodplain. The water tank and corrals at Birch Creek are within the probable maximum floodplain of the river. A floodplains Statement of Findings was prepared for the 2000 general management plan to document the risks associated with having facilities in flood hazard areas and identify mitigation. Given the confinement of the canyon walls and other hazards associated with being too near the cliffs and talus, relocation of facilities out of the flood zone is not practical and mitigation must be conducted in place.

The channel of the North Fork above Birch Creek was channelized in the 1920s and 1930s to protect the newly constructed Zion Lodge. The stream was confined to the westernmost portion of the 1,000-foot-wide floodplain by excavating the channel deeper and by building levees along the eastern side of the channel for about 4.5 miles. Some levees are armored with rock-filled gabions. The wires along the bottom of many of the gabions have rusted away, but the levees have been periodically repaired. One breech of the levee has occurred, allowing the river to form a meander.

High water levels occur in the spring of most years as snow melts off at higher elevations. A combination of deeper than normal snowpack and sudden warm spring temperatures or heavy rain can cause flooding throughout the watershed. Global climate change would affect the timing and severity of flood events. Natural floodplains in Zion Canyon are currently impacted by park development, levees, and river channelization.

In Zion the instream flows for the designated wild and scenic river segments and tributaries are protected under the Zion National Park Water Rights Settlement Agreement that was signed in 1996 and the interlocutory decree issued on November 29, 2001. This agreement was to settle NPS water rights claims as part of an adjudication of water rights in the Virgin River basin. It addresses NPS-owned appropriative rights and federal reserved water rights, and it is considered protective of park waters and related values, water rights, and outstandingly remarkable values of the river and tributaries. The designation of Virgin River as part of the National Wild and Scenic River System does not affect the agreement among the United States, State of Utah, Washington County Conservancy District, and Kane County Water Conservancy District, as contained in Zion National Park Water Rights Settlement.

Water Quality

Water quality conditions of the North and East Forks of Virgin River and its tributaries are generally considered natural and high quality. They are reflective of the largely unaltered geohydrologic setting and are generally within state water quality standards. This is due to the relatively light level of development in the watershed and to the fact that most, and for some of the tributary streams all, of the flow is from groundwater discharge from the Navajo sandstone. The Navajo sandstone is made up of more than 99% pure quartz sand and provides a near perfect sandstone filter. Major cations in the water are calcium, magnesium, and sodium, while anions are dominated by bicarbonate, sulfate, and chloride. The dissolved minerals are present at levels that would be expected in an arid watershed of sedimentary rock and increase in a downstream direction as the river contacts lower geologic layers with a greater amount of soluble minerals. Water temperatures are marginal for cold-water fish, but are well suited for native fish species.

Two water quality characteristics that could be considered problematic are suspended sediment and fecal bacteria. The sediment loading in these streams is high during floods, and, while it might be influenced to some degree by upstream land use practices, it is generally considered to be a reflection of the extreme rate of natural erosion of this watershed. This level of sediment loading and turbidity during floods would be considered a major deficiency elsewhere, but in these rivers it is an attribute of natural conditions rather than a concern, and sediment levels appear to be a major factor in preventing the invasion of nonnative aquatic species.

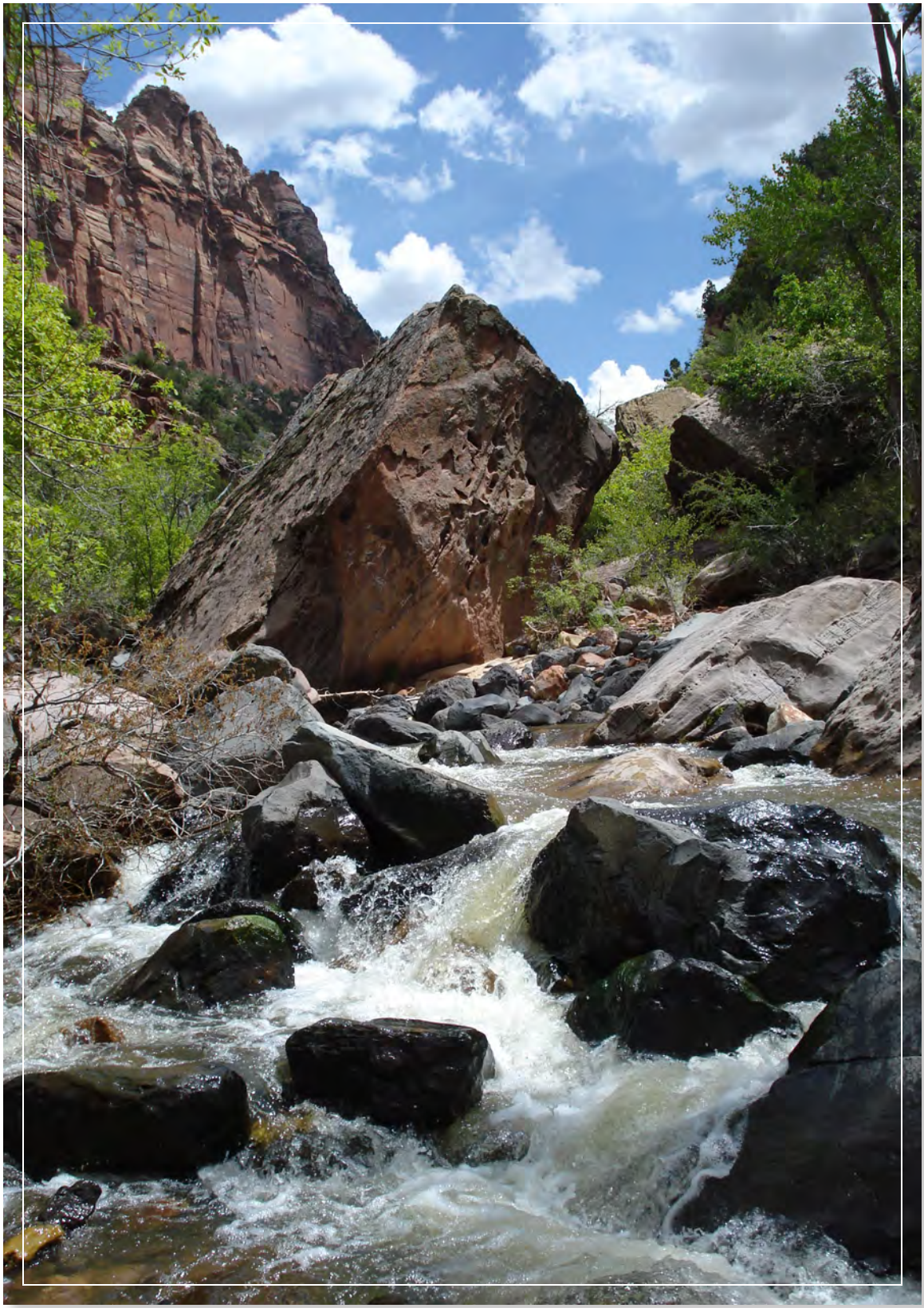
The level of fecal bacteria has proven to be a chronic problem on the North Fork Virgin River upstream of the Temple of Sinawava near Chamberlain's Ranch. The State of Utah has included this reach on the list of rivers not meeting water quality standards, and the park advises extra caution for visitors hiking the upper reaches of the North Fork Virgin River. The source of the contamination is under investigation and corrective actions are expected in 2013–2015. Occasional spikes of bacteria concentrations also occur on other rivers, usually during flood events when such occurrences would be expected.

Protection from water quality degradation is provided under the Clean Water Act by state-designated protected uses. All segments are protected as a source of irrigation water. The North and East Forks of Virgin River and North Creek are protected as sources of domestic drinking water. All of the segments except the North Fork Virgin River are protected for secondary contact recreation; the North Fork Virgin River is designated for primary contact recreation in recognition of the large number of people engaging in water play and swimming. To protect fish and aquatic life, the North Fork Virgin River, Kolob Creek, and Taylor Creek carry a designation for cold-water fisheries; La Verkin Creek has a designation for warm-water fisheries; and the East Fork Virgin River and North Creek are designated for nongame fish. In addition, the North and East Forks of Virgin River and Kolob Creek have a high quality category 1 designation that precludes new point-source discharges. A stream-specific standard for total dissolved solids is established for North Creek at 2,035 mg/L, though this has little bearing on park waters upstream in a different geologic setting.

Appendix E: Past and Ongoing Park Planning and Data Collection Efforts

Document	Completion Date
General Management Plan The general management plan described the general path the National Park Service intends to follow in managing the park over 20 years. The plan provides a framework for proactive decision making on managing visitor use, natural and cultural resources, and park development. The plan zones the park to ensure resources are protected and opportunities are provided for a range of high-quality visitor experiences. The plan also proposes several boundary adjustments and wild and scenic river designations.	2001
Backcountry Management Plan The backcountry management plan provides direction for the National Park Service to manage more than 145,000 acres of backcountry, most of which are now designated wilderness. The plan formalizes visitor carrying capacities based on VERP studies, identifies strategies to monitor the effects of visitors on park resources and visitor experiences, and identifies indicators, standards, and management options as part of a monitoring strategy. Standards and/or recommended actions are included for day and overnight group sizes and encounter rates, private stock use, aircraft use, campsite standards, climbing management, trail standards and management, and facilities in the backcountry.	2007
Soundscape Management Plan This plan is intended to protect the acoustic experience of park visitors and ensure that natural sounds continue to play an important role in the enjoyment of park resources and values, protect acoustic conditions for wildlife and the role of soundscape in ensuring healthy and dynamic ecosystems, and provide an approach to managing the acoustic environment that is consistent with NPS policy. The plan describes soundscape objectives tiered off the GMP desired condition for natural sounds, appropriate and inappropriate sound sources, soundscape objectives, soundscape indicators and standards, monitoring approaches and protocols, and methods for modifying the soundscape management plan using an adaptive management approach.	2010
Zion Water Rights Settlement Agreement This document represents a negotiated settlement of NPS claims for federal reserved and appropriative water rights for Zion National Park. It was undertaken in response to a state-initiated adjudication of all rights in the Virgin River basin in 1980, and federal claims filed in 1987 for rights to protect the waters of Zion. The agreement includes a recognition that by virtue of being designated by Congress, the park has a reserved right to all water in the park that was unclaimed at the time of designation. In addition, it reduces that right by all water rights dated between designation and 1996, and some additional prescribed amounts of new appropriation, the combined total of which would not exceed 4% and 6% of the average annual flow of the North and East Forks of the Virgin River respectively. It prohibits new large reservoirs from being built upstream of the park. The result is that surface and groundwater flows are essentially natural and protected in perpetuity.	1996
Mapping of Geological Hazards Zion National Park is subject to a host of geological hazards, primarily due to the high rate of natural erosion occurring in the park, its location near major active faults, and undesirable characteristics found in some of the rock layers. A project was completed that included a description of the many hazards present and maps of the occurrence of each (Utah Geological Survey Special Study 133). The specific hazards that were described and mapped were: flooding, rockfall, landslides, earthquakes (surface deformation and ground shaking), liquefaction, and problem soils (expansive soils, collapsing soils, and gypsumiferous soils). In many areas these present a significant risk to park employees, facilities, and visitors, and thus limit the nature and location where some uses are practical.	2010

Document	Completion Date
Identification of Inventory and Monitoring Vital Signs The Northern Colorado Plateau Network consists of 16 parks in the region including Zion. Beginning in 2000, the NPS Inventory and Monitoring program undertook an effort to identify the key natural resource features that must be monitored in order to document the overall health of the park, and called these "vital signs." Protocols were developed and monitoring initiated for air quality, climate and weather, integrated riparian communities, integrated upland soils and plant communities, invasive nonnative plants, landscape dynamics remotely sensed land-cover change, landbirds, seeps and springs, and water quality. Vegetation mapping was completed in 2003. Inventories were conducted or compiled from other sources of fish, amphibians and reptiles, mammals, vascular plants, and invasive plants.	2009
Geologic Mapping All of the lands within Zion were mapped for surface geology between 1990 and 2002. This included 11 USGS 7.5 minute quadrangles mapped at the 1:24,000 scale. These maps provide a valuable information base for interpreting vegetation, soils, water quality, and geological hazards.	2002
Air Quality Monitoring Air quality, and specifically visibility, is an essential resource protecting the scenery of Zion. When air becomes hazy with particulates from natural or anthropogenic sources, distant scenery becomes obscured and the nearby colorful scenery for which Zion is famous are muted. Various measures of air quality have been monitored in Zion and other parks in the vicinity since the 1980s. Continuous monitoring has been conducted at Zion for particulates and visibility since 2000 and for ozone since 2003.	Ongoing
Native Fish Monitoring Native fish are monitored annually in the North and East Forks of the Virgin River. Additional monitoring in other tributaries occurs on an intermittent basis.	Ongoing
Water Quality Monitoring Water quality is monitored jointly by the National Park Service and Utah Division of Water Quality at six locations in and near the park. Areas of special concern are added and deleted as needed. The primary areas of concern are for fecal contamination from livestock, irrigation and wilderness users, nutrients, and temperature.	Ongoing
Avian Monitoring Mexican spotted owl and peregrine falcon are monitored yearly. Mexican spotted own are monitored to determine if they are present in a particular area. Peregrine falcon nest sites are monitored to determine if the young fledge.	Ongoing
Fire Monitoring Vegetation plots are installed before prescribed fires and in areas likely to burn through natural ignitions. These plots are monitored after fire to assess the effects of fire on the vegetation in the area.	Ongoing
Stream Flow Monitoring Stream gauges track stream flow on the North and East Forks and the main Virgin River with records dating from 1923, 1993, and 1910 respectively. Flow data from other streams including North Creek, La Verkin Creek, Deep Creek, Shunes Creek, and Pine Creek are lacking.	Ongoing
Climate Monitoring Climate data is collected at seven climate stations in and adjacent to the park. Four of these stations are permanent installations intended to build a long-term record. Three are more temporary installations.	Ongoing



Intermountain Region Foundation Document Recommendation
Zion National Park

October 2013

This foundation document has been prepared as a collaborative effort between park and regional staff and is recommended for approval by the Intermountain Regional Director.

9/23/13

RECOMMENDED
Superintendent, Zion National Park **Date**

9/25/13

APPROVED
Regional Director, Intermountain Region **Date**

Acting

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 historic 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.

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