

Table of Contents

Chapter 1 – Background	1
Introduction	1
Goals and Objectives	1
Planning Direction, Regulation, and Policy	2
Coordination with Other Plans	8
Chapter 2 – The Plan	11
Management Zones/Desired Conditions.....	11
Pristine Zone	11
Primitive Zone	12
Transition Zone	16
Research Natural Area Zone	16
Management Common to All Zones & Detailed Zone Specific Management	21
Resource Conditions	21
Visitor Experience Conditions	23
Administrative Conditions and Management Activities	32
Mitigation Measures	41
Indicators and Standards for Visitor Experience and Resource Protection	42
Chapter 3 – Resource Descriptions.....	49
Wilderness	49
Visitor Use and Experience	49
Threatened, Endangered, and Sensitive Animal Species	50
Threatened, Endangered, and Sensitive Plant Species	53
Vegetation	54
Soils	56
Floodplains.....	61
Chapter 4	61
List of Preparers.....	61
References.....	62
Glossary	64

Maps

Map A: General Location and Adjacent Land Ownership.....	3
Map B: Area Covered by the Backcountry Plan.....	5
Map C: Recommended Wilderness	9
Map D: General Management Plan Zones.....	13
Map E: Trails and Popular Routes.....	17
Map F: Designated Backcountry Campsites.....	19
Map G: Major Vegetation Complexes (North).....	57
Map G: Major Vegetation Complexes (South).....	59

Tables

Table 1: VERP Survey Data 2002.....	24
Table 2: VERP Survey Data 2003.....	24
Table 3: Visitor Acceptance of Management Options for Slot Canyons.....	24
Table 4: Visitor Acceptance of Management Options for the Narrows.....	25
Table 5: Day Use with Permit in Canyons.....	26

Table 6: Day Use with Permit in Canyons – Summary.....	26
Table 7: Day Use with Permit in Narrows.....	26
Table 8: Day Use with Permit in Narrows – Summary.....	26
Table 9: Overnight Backpacker Use.....	27
Table 10: Overnight Backpacker Use – Summary.....	27
Table 11: Canyoneering Day Use – Group Size Preference.....	28
Table 12: Overnight Backpacker Use – Group Size Preference.....	28
Table 13: Use Limits.....	28
Table 14: Resource Protection Indicators and Standards.....	43
Table 15: Visitor Experience Indicators and Standards.....	48
Table 16: Visitor Use.....	50
Table 17: Threatened and Endangered Animal Species.....	50
Table 18: Threatened and Endangered Plant Species.....	53
Table 19: Sensitive Plant Species by Habitat.....	53
Table 20: Major Vegetation Complexes within the Backcountry.....	55

Appendices

Appendix A: Finding of No Significant Impact (FONSI)
Appendix B: Leave No Trace Principles
Appendix C: Minimum Requirement Analysis Worksheet and Instructions
Appendix D: Zion National Park Legislation
Appendix E: Commercial Use Analysis
Appendix F: Floodplain Statement of Finding
Appendix G: Campsite Monitoring Manual
Appendix H: Trail Monitoring Manual
Appendix I: U.S. Fish & Wildlife & Utah State Historic Preservation Office Consultation

ACRONYMS

ADA	Americans with Disabilities Act
BLM	Bureau of Land Management
BMP	Backcountry Management Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
FMP	Fire Management Plan
FMU	Fire Management Unit
GMP	General Management Plan
MOU	Memorandum of Understanding
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
NWS	National Weather Service
UDWR	Utah Division of Wildlife Resources
USC	United State Code
USDI	United States Department of the Interior
USFWS	United States Fish & Wildlife Service
VERP	Visitor Experience & Resource Protection
ZION	Zion National Park

This page left intentionally blank.

Chapter 1 – Background

Introduction

Zion National Park (ZION) is located on the southwestern edge of the Colorado Plateau (Map A). The 148,024 acre park lies in portions of three counties in Utah; Washington, Iron, and Kane. The park is approximately 300 miles southwest of Salt Lake City, Utah; 105 miles northeast of Las Vegas, Nevada; and 380 miles northeast of Los Angeles, California. Interstate 15, a major north-south thoroughfare, is located west of the park.

The park is characterized by high plateaus, a maze of narrow, deep sandstone canyons, and striking rock towers and mesas. The lowest elevation in the park, 3,666 feet, is found at Coalpits Wash in the southwest corner. The highest elevation, 8,726 feet, is Horse Ranch Mountain in the Kolob Canyons section.

The majority of the park is considered backcountry – almost 98 percent. And almost 90 percent of the park has been recommended as wilderness. Visitors experience the backcountry by day hiking on designated trails and cross-country routes; backpacking and camping; canyoneering; and climbing. In general, visitor use in the backcountry has increased over time. With increasing visitation it becomes more of a challenge for the National Park Service (NPS) to manage visitor use, provide a quality visitor experience, and protect park resources.

This Backcountry Management Plan (BMP) provides the direction for the NPS to manage the 145,060 acres of backcountry within ZION. Backcountry within the park includes: recommended and potential wilderness; General Management Plan (GMP) Pristine, Primitive, Research Natural Area Zones and portions of the Transition Zone that overlay recommended wilderness; and any technical rock climbing areas regardless of where they occur in the park. For this document, these areas will be collectively referred to as the “backcountry” (Map B).

This plan also provides direction for management of natural and cultural resources within the context of wilderness and backcountry management policies, with primary focus on visitor use and impacts to wilderness values and resources and administrative actions to mitigate associated impacts. This plan treats any proposed or recommended wilderness the same as officially designated wilderness, based on NPS *Management Policies 2006* (6.3.1).

Alternative management strategies were analyzed through an environmental assessment which culminated in a Finding of No Significant Impact which was signed on November 26, 2007 (Appendix A).

Goals and Objectives

Visitors traveling through the backcountry of ZION will have the opportunity for a variety of personal outdoor experiences, ranging from solitary to social. Visitors will be able to continue to experience the backcountry with as little influence from the modern world as possible. The visitor experience will relate intimately to the splendor of the wilderness resource of ZION. The goals and objectives for the management of backcountry and wilderness resources and values in ZION are as follows.

Goals for Backcountry Management

- Protect and preserve the park’s natural and cultural resources and values, and the integrity of the wilderness character for present and future generations.
- Provide for freedom of public use and enjoyment of the park’s backcountry in a manner that is consistent with park purposes and the protection of park resources and values.
- Provide for public understanding and support of wilderness values.

Objectives for this Plan

- Serve as guidance for field and management staff in application of backcountry management techniques and integration of wilderness management objectives into other aspects of park management.
- Provide a broad range of opportunities to facilitate backcountry use while protecting the wilderness resource.
- Apply policies consistently, thereby enhancing backcountry user’s experiences and ensuring compliance with regulations.
- Provide public information to promote Leave No Trace skills and wilderness ethics in order to reduce behaviors that are harmful to natural and cultural resources and backcountry experiences (Appendix B).
- Instill and apply the Minimum Requirement Concept (Appendix C) into management actions and practices.
- Base management decisions on sound scientific research and knowledgeable observation. Incorporate new data and information, as necessary, into a dynamic backcountry management program.

Planning Direction, Regulation, and Policy

Enabling Legislation Summary

Mukuntuweap National Monument was designated by Presidential Proclamation 877 in 1909 under the authority of the 1906 Antiquities Act. In 1918, Presidential Proclamation 1435 changed the name to Zion National Monument and added additional acres to the monument. On November 19, 1919 Congress established Zion National Park (41 Stat. 356). The proclamations recognized ZION as “an extraordinary example of canyon erosion” and stated that ZION “is of the greatest scientific interest and contains many natural features of unusual archaeological, geologic, and geographic interest.” Appendix D contains the complete legislative history of the park.

Park Purpose and Significance

Park purposes tell why the park was set aside as a unit in the national park system. The significance of the park addresses what makes the area unique – why it is important enough to our natural and cultural heritage to warrant national park designation and how this area differs from other parts of the country. All of the management prescriptions in this plan are consistent with and support the park’s purposes and significance.

Based on ZION’s enabling legislation, legislative history, agency management policies, and the knowledge and insights of park staff, the following are the purposes and significance statements for the park.

Map A – Front

Map A - Back

Map B - Front

Map B - Back

The purposes of ZION are to:

- Preserve the dynamic natural process of canyon formation as an extraordinary example of canyon erosion.
- Preserve and protect the scenic beauty and unique geologic features: the labyrinth of remarkable canyons, volcanic phenomena, fossiliferous deposits, brilliantly colored strata, and rare sedimentation.
- Preserve the archeological features that pertain to the prehistoric races of America and the ancestral Indian tribes.
- Preserve the entire area intact for the purpose of scientific research and the enjoyment and enlightenment of the public.
- Provide a variety of opportunities and a range of experiences, from solitude to high use, to assist visitors in learning about and enjoying park resources without degrading those resources.

ZION is significant for the following reasons:

- ZION's stunning scenery features towering brilliantly colored cliffs and associated vegetation highlighted by a backdrop of contrasting bright, southwestern skies.
- ZION is a geological showcase with sheer sandstone cliffs among the highest in the world.
- The Virgin River – one of the last mostly free-flowing river systems on the Colorado Plateau – is responsible for the ongoing carving of this deeply incised landscape.
- Because of its unique geographic location and variety of life zones, ZION is home to a large assemblage of plant and animal communities.
- ZION preserves evidence of human occupation from prehistoric to modern times, including American Indian sites, remnants of Mormon homesteading, and engineering and architecture related to park establishment and early tourism.

Pre-Existing Factors Affecting Backcountry Management

Inholding – There are 3,296 acres of private inholdings within the park boundary. The majority of the inholdings, 2,893 acres, remain undeveloped and are identified as potential wilderness in the 1974 Wilderness Recommendation. If these areas are acquired by the NPS, they could become wilderness. There are no inholdings within recommended wilderness. The 1984 *Land Protection Plan* for ZION outlines how the park will address non-federal land ownership and uses within the park boundary. Although the plan is over 20 years old, many of the management strategies are still appropriate today. Until the existing plan is updated, it will continue to be the main tool the park will use to address inholdings. The park will continue to work with inholders to help protect adjacent park resources while continuing to use their lands for their own purposes and enjoyment.

Park Boundary – 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 percent of the park. State of Utah school trust lands are found next to slightly less than 8 percent of ZION's border. Privately owned lands border approximately 35 percent 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, just to name a few.

Trailheads to some of the most popular backcountry areas in the park are accessed from adjacent private property. Once these properties are developed access may be limited or curtailed. The park must work with adjacent land owners to secure easements to ensure that visitors have continued access. The areas of concern include, but are not limited to the following: Dalton Wash Trailhead/Crater Hill area, Ponderosa Ranch, various areas in Springdale, Rockville Bench, Camp Creek, Taylor Creek, and Chamberlain's Ranch.

Native American Rights – In 2005 ZION, the Kaibab Band of Paiute Indians, the Paiute Indian Tribe of Utah, and the Moapa Band of Paiute Indians signed a Memorandum of Understanding (MOU) *Regarding the Gathering of Plant Resources for American Indian Traditional Religious Purposes from National Park Lands*. In general, the MOU outlines who can collect, what can be collected, where collections can take place, and group size during collections. This plan is consistent with and supports the MOU and does not change anything identified in the MOU.

Other – There are no known mineral or mining claims, rights-of-way, or grazing permits within recommended wilderness in ZION.

Coordination with Other Plans

Previous Wilderness/Backcountry Planning Efforts

In the early 1970s ZION began the wilderness inventory and environmental analysis process. The Zion Wilderness Draft Environmental Impact Statement (EIS) was completed in October 1973. The Zion Wilderness Final EIS was completed in June of 1974 and identified 120,620 acres for wilderness recommendation and 12,120 acres as potential wilderness. The Secretary of the Interior forwarded the recommendation to President Ford the same month.

Bills to designate wilderness in ZION were proposed in March of 1975 (Senate Bill S1100) and in June 1985 (House Bill HR2670). Neither bill passed. Another attempt to designate wilderness was made in 2006 (S3636 & HR5769) with the same result.

In July 1984 the park revised the wilderness recommendation because of the acquisition of private land and water rights, revision of State mineral rights, and termination of all grazing rights in the park. Recommended wilderness was now 126,585 acres, with potential wilderness 4,519 acres.

As part of the 2001 GMP process, recommended wilderness acres were again reviewed. In a letter to the Regional Director in 1999, the park identified 132,334 acres of recommended wilderness and 3,491 acres as potential wilderness. Again the increased acreage was a result of private land and water rights acquisition.

With the increased accuracy of geographic information systems the park refined the acreage figures for the GMP. The 2001 GMP identified 132,615 acres as recommended wilderness and 4,175 acres as potential wilderness (Map C).

The park has worked on various backcountry management plans. A Backcountry Management Plan was completed in 1979, which is now out of date and no longer applicable. In 1987 the park completed a Draft Backcountry Management Plan, but it was never finalized.

Map C – Front

Map C - Back

The 2001 GMP identified desired conditions and management strategies for many aspects of backcountry management. The GMP also identified interim visitor use numbers for the backcountry.

Other Park Plans

The following plans outline various aspects of park management. Although these plans are not specific to backcountry management, they all identify the importance of the backcountry visitor experience. This backcountry management plan is consistent with and supports the goals and objectives identified in the following plans:

- **Zion National Park Master Plan, May, 1977** – Overview of management strategies for the park.
- **Land Protection Plan for Zion National Park, November, 1984** – Overview of protection alternatives for private lands within the park boundary.
- **Zion National Park General Management Plan, March 2001** – Desired conditions and management strategies for all resources in the park.
- **Statement for Management, Zion National Park, August 2002** – Management overview of park.
- **Zion National Park Fire Management Plan, April 2005** – Allows for a full range of fire management strategies including allowing fire to take a natural role in ecosystem maintenance.

Chapter 2 – The Plan

This plan will guide the NPS in providing opportunities for a variety of backcountry recreational activities and experiences while recognizing and protecting the wilderness resource values of ZION’s backcountry. Backcountry visitor use management decisions will be based on standards developed through the NPS Visitor Experience and Resource Protection (VERP) process.

Chapter 2 – The Plan is divided into four broad sections. The first section outlines Management Zone related/dependent conditions, actions, and activities. The second section provides more detail on the zone dependent conditions, actions, and activities; and provides detail for conditions, actions, and activities that are common to all zones. The third section describes mitigation measures to be applied to all activities and actions in the backcountry. The fourth section outlines the monitoring strategies including the indicators and standards for VERP.

Management Zones/Desired Conditions

All backcountry areas in ZION are within one of four Management Zones designated in the GMP approved in 2001 (Map D). Each management zone is described in terms of the desired resource condition, visitor experience, management and scientific uses, and appropriate kinds of activities and developments.

Pristine Zone

The Pristine Zone, 119,446 acres, includes routes such as Mystery Canyon and Heaps Canyon. This zone offers the feeling of being entirely alone in ZION’s remote and isolated wildlands. The zone provides visitors a chance to experience a natural landscape. Visitor use in these areas is low and group encounters are infrequent.

Visitor Use

- Day and overnight use.
- In general use is low. Visitors are not expected to encounter more than 2-groups per day.
- Visitors are not expected to encounter other groups larger than 6 people.
- The group size limit in technical canyons is 6.
- The group size limit is 12 elsewhere in zone. Group encounters will be monitored and could be reduced if the VERP standard is exceeded (Tables 15).
- Use limits are based on VERP indicators and standards (Table 15).

Access and challenge

- Generally moderate to difficult, all areas requiring specialized skills.

Opportunity for solitude

- Outstanding opportunities for solitude.
- Chance of seeing other visitor/park staff will be low.
- Natural sounds prevail.

Acceptable resource conditions

- Resources managed to perpetuate natural conditions and processes.
- Natural landscape predominates.
- Only sign of human-use will be faint hiking routes and bolts on climbing and canyoneering routes.
- Some resources may be altered to restore an area that has been disturbed or to preserve cultural resources.

Management

- There are no designated trails.
- Routes are generally non-discernable. Short sections of routes may be maintained to prevent erosion or other resource degradation.
- Signs or cairns will only be erected to protect resources or for safety concerns.
- Designated campsites could be established to protect cultural or natural resources.
- Stock use is prohibited.
- Commercial use is prohibited.
- Aircraft or motorized equipment are not allowed (except during emergency operations or absolutely critical for the protection of natural or cultural resources as determined on a case-by-case basis through a Minimum Requirement Analysis (Appendix C) and approved by the Superintendent).

Primitive Zone

The Primitive Zone, 16,480 acres, includes such areas as the West Rim Trail and the Narrows. This zone provides opportunities for visitors to experience wildlands and solitude. The landscape is largely undisturbed, with natural processes predominating. However, compared to the Pristine Zone, access is easier into this zone, there are signs of people, and the area feels less remote.

Visitor Use

- Day and overnight use.
- Visitors are not expected to encounter more than 10 other groups per day (Table 15).
- Group size limit is 12.

Map D - Front

Map D - Back

- Use limits are based on VERP indicators and standards (Table 15).
- Stock group size is limited to 6 people and 6 animals per day.
- Stock parties are expected to encounter no more than one other stock party in a single day.

Access and challenge

- Generally moderate to difficult, some areas requiring specialized skills.

Opportunity for solitude

- Some outstanding opportunities for solitude.
- During the high-use season, visitors should expect to see other visitors/park staff.
- Natural sounds prevail.

Acceptable resource conditions

- Resources managed to perpetuate natural conditions and processes.
- Some resources may be altered to restore an area that has been disturbed or to preserve cultural resources.

Management

- Trails are designated and maintained (Map E).
- Routes are generally discernable, although not maintained except to protect resource values.
- Signs and cairns are allowed.
- Designated campsites are in place on the West Rim Trail, the Narrows, LaVerkin Creek, and Coalpits/Chinle area; at large camping is allowed elsewhere in the zone unless VERP standards are exceeded. If standards are exceeded campsites could be designated (Table 14 & Map F).
- Stock is limited to horses, mules, and burros.
- Stock must be fed certified weed-free feed 24 hours prior to entering the park and while they are in the park.
- Trails are closed to stock use during periods of wet weather or due to other resources concerns.
- Stock use is allowed on the following designated trails: Chinle Trail to Coalpits Wash, West Rim Trail from Lava Point to Cabin Springs and the Telephone Canyon Trail, Wildcat Canyon Trail and Northgate Peaks Trail, Connector Trail, Hop Valley Trail, LaVerkin Creek Trail from Lee Pass to junction with Beartrap Canyon, East Mesa Trail from east park boundary to junction with Observation Point Trail (not allowed out to Observation Point), East Rim Trail from East Entrance and east park boundary to Cable and Deer Trap Mountains (Map E).
- Off-trail stock use is only allowed in the lower Coalpits Wash from the trailhead to the junction with Scoggins Wash, Scoggins Wash itself and the Stock Trail, and Huber Wash where the surrounding terrain confines use to the wash bottom (Map E).
- Overnight camping with stock is allowed at one designated campsite in Hop Valley (Site A) and is limited to a one night stay (Map F).
- Commercial use is prohibited.
- Aircraft or motorized equipment are not allowed (except during emergency operations or absolutely critical for the protection of natural or cultural resources as determined on a case-by-case basis through a Minimum Requirement Analysis (Appendix C) and approved by the Superintendent).

Transition Zone

A portion of the Transition Zone lies within recommended wilderness and includes the Observation Point Trail, the lower Narrows from Mystery Falls upstream to Orderville Canyon and Timber Creek Overlook Trail. Encounters with other hikers are high.

Visitor Use

- Day use only.
- Use is very high.
- Group size limits and the numbers of groups per day are not limited by permit. Unless use limits exceed VERP standards (Table 15).

Access and challenge

- Access relatively easy.

Opportunity for solitude

- Some opportunities for solitude.
- Chance of seeing other visitor/park staff is very high.
- Natural sounds can predominate depending on the time of day and year.

Acceptable resource conditions

- Resource conditions are managed on the basis of VERP indicators and standards (Table 14).

Management

- Trails are designated and maintained (Map E).
- Trails are signed.
- Backcountry camping is prohibited.
- Stock use is prohibited in the Transition Zone within recommended wilderness.
- Limited commercial interpretive guiding is allowed, by permit, on specified trails: Observation Point Trail, lower Narrows from Mystery Falls upstream to Orderville Canyon, and Timber Creek Overlook Trail (Map E).
- Aircraft or motorized equipment are not allowed (except during emergency operations or absolutely critical for the protection of natural and cultural resources as determined on a case-by-case basis through a Minimum Requirement Analysis (Appendix C) and approved by the Superintendent).

Research Natural Area Zone

The Research Natural Area Zone covers 9,031 acres and includes nine areas. This zone applies the intent of the national network of “research natural areas,” which are field ecological areas designated primarily for research and education and/or to maintain biological diversity. Baseline inventory and long-term ecological observations are emphasized in this zone, with the primary purpose of creating an ecological/environmental benchmark over time.

General

- Areas are closed to recreation use.
- Group size for researchers is 6, unless a larger group size is critical for the protection of natural or cultural resources. This will be determined on a case-by-case basis through a Minimum Requirement Analysis (Appendix C) and approved by the Superintendent.

Map E - Front

Map E - Back

Map F - Front

Map F - Back

- There are no designated or maintained trails.
- Routes are generally non-discernable.
- Signs or cairns are not allowed.
- Campsites are not designated.
- Stock use is prohibited.
- Commercial use is prohibited.
- Aircraft or motorized equipment are not allowed (except during emergency operations or absolutely critical for the protection of natural and cultural resources as determined on a case-by-case basis through a Minimum Requirement Analysis (Appendix C) and approved by the Superintendent).

Management Common to All Zones & Detailed Zone Specific Management

This section provides detailed information for some actions and activities described above by zone. This section also outlines conditions, activities, and actions that are common to all management zones. This section is divided into **Resource Conditions**, **Visitor Experience Conditions**, and **Administrative Conditions and Management Activities**.

Resource Conditions

Native Vegetation

The elevation gradients, topography, and geologic substrates create a diverse flora in ZION. The park is home to over 800 species of native plants, including one federally protected endangered species – the Shivwits milkvetch. The Shivwits milkvetch has an extremely limited range: it grows only on the Chinle Formation. ZION hosts the largest population of this endangered species and has the greatest area designated as critical habitat (1,201 acres). Plant populations will continue to be monitored. Management actions to ensure that the species are protected may be applied as outlined in Table 14.

ZION also hosts 22 species considered sensitive by the park and the state of Utah because of their limited distribution or are disjunct from more abundant population centers. Many of these and other native plants and the communities they inhabit are still in a natural condition. Increasing visitor use in backcountry areas can impact these communities. The park will continue to balance the enjoyment of visitors to the backcountry and the protection of native vegetation. Table 14 identifies indicators and standards that will assist park managers with monitoring and implementing strategies to reach this goal.

Use of Native Materials

In keeping with wilderness character, natural materials are preferred to repair or construct wilderness facilities (e.g., water bars, sign posts, tent pads) or restore desired conditions to impacted areas. Any proposed rehabilitation or construction will need to go through the Environmental Screening Process including the completion of the Minimum Requirement Analysis (Appendix C) and approval from the wilderness committee.

Non-native Vegetation

The establishment of non-native/noxious plants is one of the greatest threats to the integrity and biological diversity of the park. There are over 100 non-native plants in the park, 12 of which are

high priority for control and eradication. Most of these species occur in areas of past or current disturbance. Many of these species can out-compete native species because they have different growth cycles (i.e., sprout earlier in the season and absorb all available water and nutrients), have no natural predators, or produce substances that prohibit the growth of competing native plants.

The park has an active program to control the spread of non-native species. Control efforts will continue, especially in riparian areas, along trails, and where past livestock grazing has occurred.

Social Trails

Social trails are defined as those trails that are non-designated and undesirable. They are trails made by people short cutting to campsites, water sources, etc. Social trails (braided) are also prevalent in some canyon bottoms where visitors simply walk where ever they choose. They generally cause resource impacts such as soil erosion and vegetation damage.

Eradication of social trails continues to be a priority in ZION. The indicators and standards in Table 14 will assist the park in monitoring and providing management strategies to help mitigate this problem.

Fish and Wildlife

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 7 fish species.

Threatened and endangered species management will continue to be closely coordinated with the U.S. Fish and Wildlife Service (USFWS). Management and use restrictions may be necessary to protect these species. In Mexican spotted owl nesting areas, use levels will be kept at or below existing use limits. The park will continue to monitor nest sites and if disruption to nesting occurs because of visitor use, this use could be adjusted (Table 14).

Wildlife will be protected as much as possible from incidences of humans touching, feeding, teasing, frightening, and generally harassing wildlife. This will mainly be accomplished through visitor education. Although, temporary closures of, or use limits in specific areas may be necessary to protect wildlife during critical periods of time or in critical habitats (i.e., climbing closures during peregrine falcon nesting).

Fire Management

The Fire Management Plan (FMP) completed in 2005 outlines fire management strategies and identifies four fire management units for the park. The FMP identifies the use of the Minimum Requirement Analysis (Appendix C) and minimum impact suppression techniques. The area addressed in this plan overlay all four fire management units (FMU) as follows:

- Suppression FMU – along most of the park boundary; focus to minimize threat of fire to life and property.
- Modified FMU – along part of park boundary and buffer to Suppression FMU; focus to allow fire to maintain its natural role while protecting life, property and resources.
- Conditional FMU – interior of the park and the largest area; fire will be managed to perform its natural role in ecosystem maintenance.
- Natural FMU – encompasses isolated mesa tops, slickrock areas, Research Natural Areas where risk to life and property is low; fire allowed to continue its natural role in ecosystem maintenance.

The following five fire management strategies can be used to varying degrees and with mitigation in the above FMUs unless otherwise stated below:

- Wildland Fire Use Strategy – naturally ignited wildland fire will be managed to accomplish specific resource management goals (not allowed in Suppression FMU).
- Prescribed Fire Strategy – used to reduce hazard fuels, remove/reduce non-native plant species, restore natural ecosystems, etc.
- Mechanical Strategy – used to reduce fuels as a stand-alone treatment or in combination with other treatments in preparation for prescribed fire or restoration.
- Herbicide Strategy – used on a limited basis and only after all other options have been considered.

Cultural Resources

In general, cultural resources in ZION's backcountry are in good condition and do not show impacts from visitation. Cultural sites will continue to be monitored and management actions taken if visitor use begins to affect sites (Table 14). Mitigation to minimize the impacts to cultural sites from actions outlined in this plan can be found in the *Mitigation Measures* section of this document.

There is still a great deal of work to be done to truly understand the human history of this area. Any proposed surveys or excavations will go through the Environmental Screening Process and Minimum Requirement Analysis (Appendix C) to determine any impacts to wilderness values.

Visitor Experience Conditions

Overview of Group Encounter Rates and Group Size Limits

The GMP set interim visitor encounter rates and group size limits for backcountry settings. The GMP's interim use limits were intended to be in place until the completion of VERP studies and this backcountry management plan.

As part of the VERP study, qualitative surveys were conducted with several groups of backcountry visitors during the summer and fall of 2002 and 2003 (Manning et. al., 2004). Surveys addressed baseline data on visitor use and users and potential indicators of the quality of the visitor experience (Tables 1 & 2).

The results of this survey indicate that when given the concrete options to choose from, visitors were generally willing to accept the risks of not getting access to ensure high quality trail conditions. Second the visitors perceived purposes of the park explained the majority of the variance in visitor decision making. Among the implications of these results are that visitors can and will deliberate on proposed management actions in ways that consider an impact on their personal experience. In this case, visitors were overwhelmingly willing to sacrifice aspects of their experience for the good of the park environment.

Visitors whose view of the park was dominantly as an ecological reserve were most willing to sacrifice theirs and others experiences in order to protect natural and cultural resources. It is also notable that visitors with this natural value orientation continue to be willing to make a trade-off even as the probability of permit denial increases. This illustrates that visitors with a natural value orientation toward the park, make the big decision when deciding that a trade-off is appropriate and that subsequent increments or probabilities of denial have little influence on the decision. This value orientation was dominant among the surveys and is consistent with the purpose and significance of ZION. While visitors who saw the park primarily as a recreation area were less

willing to sacrifice their experience, they were largely still willing to make some trade-offs (Tables 3 & 4).

Encounter rates are a primary means by which opportunities for solitude will be measured. Encounters will be monitored by all ZION employees completing backcountry trips. If these trips do not mimic those taken by the general public, those differences will be taken into account prior to implementing management actions.

A visitor experience standard has been proposed for Transition Zone within recommended wilderness. This is because there are no group size limits and encounter rates will be difficult to measure or control. The standard will be based on the level of satisfaction of the visitors hiking experience (Table 15).

Table 1: VERP Survey Data 2002				
Area Surveyed	Permit Required	Sample Size	Percent Response	Survey Method
Trails – Day Use	No	357	80	On-site
Canyons – Day Use	Yes	204	78	Mail-back
Camping – Overnight	Yes	133	74	Mail-back
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004).				

Table 2: VERP Survey Data 2003				
Area Surveyed	Permit Required	Sample Size	Percent Response	Survey Method
West Rim Trail – Day use	No	159	80	On-site
Narrows – Day use	No	213	88	On-site
East Rim – Day use	No	138	87	On-site
Camping – Overnight	Yes	91	44	Mail-back
Narrows – Day use	Yes	80	67	Mail-back
Canyons – Day use	Yes	169	65	Mail-back
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004).				

Table 3: Visitor Acceptance of Management Options for Slot Canyons					
We are interested in the type of management you think is appropriate for this canyon. Please indicate the degree to which you support or oppose the following management actions for this canyon.					
	Strongly Oppose	Oppose	Support	Strongly Support	Don't Know
Restrict visitor use through a permit system to ensure opportunities for solitude	9.1	14.5	37.6	37.6	1.2
Restrict visitor use through a permit system to protect natural resources	4.8	4.8	42.4	47.9	0.0
Implement short-term area closures for the protection of sensitive resources	13.4	21.3	34.1	28.7	2.4
Install artificial anchors to avoid creation of paths around the small obstacles to movement up & down the canyon	10.4	20.1	41.7	19.6	8.0
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – Canyoneering Mail-back Survey 2003.					

Table 4: Visitor Acceptance of Management Options for the Narrows					
We are interested in the type of management you think is appropriate in the Virgin River Narrows. Please indicate the degree to which you support or oppose the following management actions for this area.					
	Strongly Oppose	Oppose	Support	Strongly Support	Don't Know
Restrict visitor use through a permit system to ensure opportunities for solitude	9.6	17.8	35.6	34.2	2.7
Restrict visitor use through a permit system to protect natural resources	4.0	12.0	34.7	45.3	4.0
Implement short-term area closures for the protection of sensitive resources	14.1	21.1	38.0	21.1	5.6

Data from *Research to Support Application of the VERP Framework at ZION* (2004) – The Narrows Mail-back Survey 2003.

Group Encounter Rates in the Pristine Zone

The group encounter rate for the Pristine Zone will be that 90 percent of groups will encounter no more than two other groups per day while traveling through this zone.

This encounter rate is slightly higher than the interim encounter rate of zero that was set by the GMP. The higher rate is based on the VERP study which indicated that the majority of all surveyed groups of backcountry users found an encounter rate greater than zero to be very acceptable. The majority of those surveyed indicated that encountering two other groups was very acceptable (a value of +3 or +4) (Tables 5 & 6).

Group Encounter Rates in the Primitive Zone

The group encounter rate for the Primitive Zone will be that 90 percent of groups will encounter no more than 10 other groups per day while traveling through this zone.

This encounter rate is slightly lower than the interim encounter rate of 12 that was set by the GMP. The lower rate is based on the VERP study which indicated that the majority of all surveyed groups of backcountry users found an encounter rate of 12 to be very unacceptable. The median encounter rate at which point visitors stated that they would consider not returning to ZION was 10 for two of the three user groups surveyed. Likewise, the majority of users groups (two of the three) indicated that encountering 10 other groups was not highly unacceptable (a value of -3 or -4). While encountering 12 other groups was highly unacceptable to more than 50 percent of those surveyed. Based on the same values, the third user group (canyoneering day use) prefer a slightly lower encounter rate (Tables 5, 6, 7, 8, 9, & 10).

Interim use limits for canyoneering day trips in place since 2003 are 12 people per day in the Pristine Zone and 50 people per day in the Primitive Zone. Based on encounter rate monitoring conducted by park staff during the 2004 and 2005, this plan raises the use limits to 20 people per day in the Pristine Zone and 80 people per day in the Primitive Zone. Encounter monitoring will continue and the numbers will be re-evaluated every 3-years. Use limits could be adjusted based on resource protection or visitor experience (Tables 14 & 15).

Table 5: Day Use with Permit in Canyons										
We would like to know how many groups you think could use the canyon for which you obtained a permit without it being too crowded. How many other groups do you think it is acceptable to see and/or hear in the canyon for which you received a permit? Please rate the acceptability of each of the following numbers of other groups seen and/or heard in this canyon. A rating of “-4” means the number of other groups seen/heard is very unacceptable, and a rating of “+4” means the number of other groups seen/heard is very acceptable.										
	-4	-3	-2	-1	0	+1	+2	+3	+4	Mean
No other groups	7.1	1.3	1.3	0.0	6.5	1.3	3.9	2.6	76.1	2.86
Up to 2 other groups	4.5	0.6	0.0	0.6	7.0	3.8	9.6	25.5	48.4	2.73
Up to 4 other groups	7.2	2.6	3.9	4.6	11.7	5.9	22.2	12.4	29.4	1.56
Up to 6 other groups	17.5	4.5	7.1	10.4	11.8	9.7	12.3	7.8	18.8	0.25
Up to 8 other groups	31.1	7.9	9.9	7.9	14.6	7.3	6.6	3.3	11.3	-1.01
Up to 10 other groups	46.7	10.7	7.3	8.0	8.7	4.0	3.3	2.0	9.3	-1.87
Up to 12 other groups	57.0	10.6	6.6	6.0	5.3	6.0	1.3	1.3	6.0	-2.42
Up to 14 other groups	68.4	7.2	7.2	1.3	6.6	1.3	0.7	1.3	5.9	-2.81
Up to 16 other groups	77.0	3.3	3.3	3.3	5.3	0.7	0.7	0.7	5.9	-3.00
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – Canyoneering Mail-back Survey 2003.										

Table 6: Day Use with Permit in Canyons – Summary		
	Mean	Median
Acceptability	6.4	
Preference	3.6	2.0
Displacement	8.6	8.0
Management Action	9.5	8.0
Typically Seen/Heard	2.8	2.0
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – Canyoneering Mail-back Survey 2003.		

Table 7: Day Use with Permit in Narrows										
We would like to know how many other groups you think it is acceptable to see on this hike (between the head of the Virgin River Narrows and Orderville Canyon) without this area being too crowded. Please rate the acceptability of each of the following numbers of other groups seen in this area. A rating of “-4” means the number of other groups seen is very unacceptable, and a rating of “+4” means the number of other groups seen is very acceptable.										
	-4	-3	-2	-1	0	+1	+2	+3	+4	Mean
No other groups	5.6	0.0	1.4	4.2	2.8	4.2	1.4	4.2	76.4	2.96
Up to 2 other groups	1.4	1.4	1.4	2.8	2.8	6.9	6.9	22.2	54.2	2.89
Up to 4 other groups	0.0	0.0	4.1	5.4	10.8	6.8	25.7	21.6	25.7	2.12
Up to 6 other groups	5.6	4.2	6.9	5.6	13.9	19.4	18.1	12.5	13.9	0.94
Up to 8 other groups	14.3	7.1	12.9	11.4	18.6	12.9	7.1	7.1	8.6	-0.33
Up to 10 other groups	22.9	17.1	10.0	17.1	15.7	5.7	2.9	5.7	2.9	-1.40
Up to 12 other groups	35.7	17.1	17.1	8.6	7.1	4.3	1.4	4.3	4.3	-2.00
Up to 14 other groups	53.5	19.7	7.0	4.2	2.8	4.2	0.0	4.2	4.2	-2.58
Up to 16 other groups	71.0	4.3	7.2	4.3	1.4	2.9	2.9	1.4	4.3	-2.86
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – The Narrows Mail-back Survey 2003.										

Table 8: Day Use with Permit in Narrows – Summary		
	Mean	Median
Acceptability	7.5	
Preference	4.0	3.0
Displacement	10.5	10.0
Management Action	14.0	10.0
Typically Seen	6.0	4.0
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – The Narrows Mail-back Survey 2003.		

Table 9: Overnight Backpacker Use										
We would like to know how many other groups of hikers per day you think it is acceptable to see without backcountry trails being too crowded. Please rate the acceptability of each of the following numbers of other groups seen per day along backcountry trails. A rating of “-4” means the number of other groups seen is very unacceptable, and a rating of “+4” means the number of other groups seen is very acceptable.										
	-4	-3	-2	-1	0	+1	+2	+3	+4	Mean
No other groups	2.2	0.0	0.0	1.1	3.3	2.2	5.5	0.0	80.2	3.4
Up to 2 other groups	1.1	1.1	0.0	0.0	2.2	2.2	6.6	24.2	57.1	3.3
Up to 4 other groups	0.0	2.2	1.1	2.2	6.6	15.4	14.3	31.9	22.0	2.3
Up to 6 other groups	2.2	3.3	4.4	8.8	16.5	24.2	9.9	14.3	11.0	1.0
Up to 8 other groups	12.1	5.5	14.3	13.2	14.3	11.0	11.0	6.6	6.6	-0.3
Up to 10 other groups	28.2	12.9	10.6	16.5	14.1	2.4	5.9	5.9	3.5	-1.4
Up to 12 other groups	35.2	12.1	17.6	7.7	4.4	7.7	5.5	1.1	2.2	-2.0
Up to 14 other groups	51.2	18.6	9.3	5.8	4.7	5.8	2.3	1.2	1.2	-2.7
Up to 16 other groups	65.1	9.3	9.3	4.7	4.7	3.5	1.2	2.3	0.0	-3.0
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – Overnight Mail-back Survey 2003.										

Table 10: Overnight Backpacker Use – Summary		
	Mean	Median
Acceptability	7.5	
Preference	2.3	2.0
Displacement	11.1	10.0
Management Action	9.9	10.0
Typically Seen	3.3	2.0
Data from <i>Research to Support Application of the VERP Framework at ZION</i> (2004) – Overnight Mail-back Survey 2003.		

Group Size in the Pristine Zone

The group size limit in the Pristine Zone differs by area. Within slot canyons the group size limit will be 6. Elsewhere in the zone the group size limit will be 12. One reason for different group size limits is because visitors hiking through slot canyons are far more likely to encounter other groups. Visitor use will continue to be monitored. If 10 percent of visitor hiking through the Pristine Zone (outside of canyons) encounter groups larger than 6, the group size limit throughout the zone will be reduced to 6 (Table 15).

The majority of visitors surveyed (through the VERP surveys) found a group size of 6 to be very acceptable (a value of +3 or +4). While the same group found a group size of 8 to be unacceptable (Table 11).

Group Size in the Primitive Zone

The group size for the Primitive Zone will be 12. The majority of visitors surveyed did not find a group size limit of 12 to be unacceptable (value of -3 or -4). In both user groups, the majority of users did find that a group size limit of 14 to be very unacceptable (Tables 11 & 12).

Table 11: Canyoneering Day Use – Group Size Preference										
	N	Very Unacceptable					Very Acceptable			
		-4	-3	-2	-1	0	+1	+2	+3	+4
		Percent								
Four	194	20.6	1.0	0.0	0.5	3.1	1.0	3.6	6.2	63.9
Six	195	14.4	3.1	2.1	1.5	8.2	5.1	5.1	13.3	47.2
Eight	195	14.9	4.6	4.6	7.2	10.8	10.3	11.3	9.2	27.2
Ten	193	22.3	8.3	8.8	7.3	13.5	6.2	10.4	7.8	15.5
Twelve	194	33.5	5.2	11.3	4.6	13.9	4.6	6.2	4.1	16.5
Fourteen	193	49.2	8.8	10.4	4.7	6.7	4.7	3.6	3.6	8.3
Sixteen	194	63.4	4.6	4.6	4.6	5.7	4.6	3.1	2.1	7.2

Data from *Research to Support Application of the VERP Framework at ZION* (2004) – Day Use with Permit Backcountry Mail-back Survey 2002.

Table 12: Overnight Backpacker Use – Group Size Preference										
	N	Very Unacceptable					Very Acceptable			
		-4	-3	-2	-1	0	+1	+2	+3	+4
Four	126	5.6	0.8	0.0	0.8	1.6	0.8	4.8	4.8	81.0
Six	127	3.9	1.6	0.8	0.8	11.0	8.7	13.4	14.2	45.7
Eight	126	12.7	2.4	4.0	7.1	18.3	18.3	8.7	11.9	16.7
Ten	126	26.2	4.8	9.5	10.3	20.6	8.7	7.1	5.6	7.1
Twelve	125	38.4	7.2	16.8	8.8	12.8	3.2	2.4	4.0	6.4
Fourteen	126	63.5	11.9	7.1	7.1	4.0	0.8	2.4	0.0	3.2
Sixteen	125	72.8	6.4	8.8	3.2	2.4	2.4	1.6	0.0	2.4

Data from *Research to Support Application of the VERP Framework at ZION* (2004) – Overnight Backcountry Mail-back Survey 2002.

Per Day/Night Use Limits

Social and resource indicators and standards will both be considered when determining use limits. Use limits will be re-evaluated on a yearly basis for resource concerns and every 3-years for social concerns. Based on the current evaluation of standards, Table 13 indicates use limits that are proposed for implementation in 2008 for commonly visited areas in the backcountry. These values are examples of what will be used for all backcountry areas. Use limits may be adjusted seasonally in areas where Mexican spotted owls occur.

Table 13: Use Limits		
Area	Use Limit	Limiting Factor
Zion Narrows	12 groups/night 40 day users/day	Social/Primitive Zone
LaVerkin Creek	17 groups/night	Social/Primitive Zone. Day use is currently not limited. Combination of day & overnight use currently exceeds standard & will be adjusted
West Rim	9 groups/night	Social/Primitive Zone. Day use is currently not limited. Combination of day & overnight use currently falls within standards.
Subway (Left Fork)	80 people/day	Social/Primitive Zone
Pine Creek Canyon	50 people/day	Mexican spotted owls/Primitive Zone ¹
Keyhole Canyon	80 people/day	Social/Primitive Zone
Orderville Canyon	50 people/day	Mexican spotted owls/Primitive Zone ¹
Mystery Canyon	12 people/day	Eroded access trail/Pristine Zone
Spry Canyon	12 people/day	Eroded access trail/Pristine Zone
Behunin Canyon	12 people/day	Mexican spotted owls/Pristine Zone ¹
Echo Canyon	12 people/day	Mexican spotted owls/Pristine Zone ¹
Englestead Canyon	20 people/day	Social/Pristine Zone

¹If areas where Mexican spotted owls are a limiting factor, use limits could be raised outside the nesting season.

Bottlenecks

When traveling through slot canyons visitors may encounter obstacles that usually require some technical ability in order to navigate. These obstacles could be a waterfall, dry pour-off, large rock, or pool. Navigating these obstacles takes time, causing groups to bunch up and experience more encounters than in other parts of the trip. In order to improve visitor experience and safety the park proposes the following standards:

- Pristine Zone – 90 percent of groups will not have to wait more than 15 minutes at an obstacle more than one time per day.
- Primitive Zone – 90 percent of groups will not have to wait more than 15 minute at an obstacle more than three times per day.

If the standards are exceeded, management actions could include education, reducing the group size, or reducing the encounter rates. Monitoring will occur during backcountry patrols and projects. Data will be reviewed every 3-years.

Visitor Safety in the Backcountry

Travel in ZION’s backcountry has inherent risks and visitors assume complete responsibility for their own safety. Although it is the park’s responsibility to ensure that visitors have the information available to make their visit to the park’s backcountry as safe as practical. Visitor education is the primary means through which the park will continue to encourage safe backcountry travel.

When conditions or areas are deemed by park staff to be clearly unsafe for average visitors, the area will be closed. Examples include the Narrows during spring runoff or other areas during active flood events or during wildland fire occurrences.

Outreach education opportunities to promote backcountry safety and resource protection will continue. The park’s website, the backcountry trip planner, displays at the backcountry desk, and signing at trailheads also provide opportunities to educate visitors on backcountry safety.

The backcountry desk and the backcountry permitting process allow contact with visitors prior to their adventures. Experienced backcountry desk employees assist visitors in making wise trip decisions based on their abilities, skill levels, their equipment, and environmental conditions. The contact during the permitting process is particularly important for visitors entering flood hazard areas.

Employees patrol backcountry trails and routes and discuss safety protocols with backcountry visitors. As valuable as these patrols are, they are not sufficiently frequent to be considered a primary source of backcountry safety information.

Communicating flash flood safety to visitors is very important to the park. The National Weather Service (NWS) provides information that enables visitors to estimate the risk of flooding on a particular day (e.g., weather forecast, flash flood potential, flash flood watch, flash flood warning), but flash floods can occur at any time including periods of low risk. When the NWS issues a flash flood warning indicating that a flash flood is occurring or imminent, permits will not be issued for any narrow canyon in the park. The park will continue to assist visitors in making educated choices concerning flash flood risk.

Wilderness Use by Persons with Disabilities

In General – Congress reaffirms that nothing in the Wilderness Act is to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual whose disability requires use of a wheelchair, and consistent with the Wilderness Act, no agency is required to provide any

form of special treatment or accommodation, or to construct any facilities or modify any conditions of lands within a wilderness area to facilitate such use.

Definition – For the purposes paragraph (1), the term wheelchair means a device designed solely for the use by a mobility-impaired person for locomotion that is suitable for use in an indoor pedestrian area [Section 507(c), 104 Stat. 327, 42 USC 12207 – Americans with Disabilities Act of 1990 (ADA)].

In meeting the goal of accessibility, emphasis will be placed on ensuring that persons with disabilities are afforded experiences and opportunities along with other visitors to the greatest extent reasonable (NPS *Management Policies 2006*, 9.1.2).

Wheelchairs – Wheelchairs are appropriate in wilderness only if they meet the definition of the ADA. The intent of this definition is that a wheelchair is a person’s primary mode of locomotion, manual or electric, that is suitable for indoor pedestrian areas. This definition does not include wheelchairs that function like an all terrain vehicle. This definition is also intended to ensure persons using wheelchairs are reasonably accommodated in wilderness without the need to compromise either the wilderness resource or its character.

Service Animals – The NPS will allow service animals within wilderness when it makes these areas accessible and usable by persons with disabilities. The ADA defines service animals as any guide dog, signal dog, or other animal individually trained to provide assistance to a person with a disability. Trained service animals are permitted within wilderness when they are required for day-to-day activities by persons with disabilities.

Public Use of Motorized Equipment and Mechanized Transport

The Wilderness Act prohibits the use of motor vehicles, motorized equipment, motorboats, and other forms of mechanical transport, except as necessary to meet the minimum requirements for administering an area as wilderness. The use of snowmobiles is prohibited in the backcountry areas of the park.

As a general rule, public use of any form of mechanical transport, including bicycles, wheelbarrows, and person or horse drawn carts is prohibited, with the exception of manual or motorized wheelchairs (as defined by the ADA and Title 36, CFR) used by disabled visitors.

Day Use

Appropriate day use activities in the park’s backcountry include hiking, canyoneering, climbing, sightseeing, wildlife viewing, cross country skiing, snowshoeing, etc. Day use will be monitored through VERP indicators and standards (Table 14 & 15). If standards are exceeded, actions may need to be taken to reduce encounters or to protect resources.

Data from monitoring (2003 through 2006) indicate that three areas may already be out of standard including LaVerkin Creek, the Middle Fork of Taylor Creek, and the Narrows between Orderville Canyon and Big Spring. Actions may need to be taken in the near future to reduce use in these areas.

Pets

Dogs, cats, and other pets are not allowed in the backcountry. Pets can disturb wildlife and visitors. In addition wildlife can potentially cause harm to pets and pet owners.

The use of search dogs may be authorized during emergencies such as search and rescue or law enforcement operations. Guidelines for service animals are found above in the section titled *Wilderness Use by Persons with Disabilities*.

Campfires

Campfires are not allowed in any backcountry area within the park.

Commemorations/Memorialization

Historic burial plots and commemorative features, such as plaques or memorials that have been previously approved may be retained. No additions may be made. The scattering of human ashes from cremation within the backcountry may be allowed on a case-by-case basis and will require a special use permit issued by the Superintendent and will contain specific terms and conditions to ensure that wilderness conditions and the visitor's wilderness experience are not adversely impacted (as outlines in 36 CFR 2.62).

Commercial Services

Commercial services include activities such as guide services for hiking, outfitted horseback use, mountain climbing, canyoneering and other similar activities. The 2001 GMP states: *currently, guided hiking and climbing activities in the park are not permitted*. The GMP goes on to state that the park should complete a backcountry management plan that analyzes: *...whether or not commercial guiding should be allowed in recommended wilderness and if so how should it be managed*.

Through the backcountry management planning and environmental assessment process, the park determined that commercial services (guiding) will not be allowed within the Primitive and Pristine Zones.

Commercial services (guiding) will be allowed within the Transition Zone including those areas within recommended wilderness: Observation Point Trail, the Narrows below the Orderville Canyon, and the Timber Creek Overlook Trail.

This decision was based on several factors including The Wilderness Act, *NPS Management Policies 2006*, and public comments.

Section 4 (c) of The Wilderness Act states: *Except as specifically provided for in this chapter, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this chapter and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this chapter (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area*.

The Act goes on to state in Section 4 (d) (6): *Commercial services may be performed within the wilderness areas designated by this chapter to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas*.

NPS Management Policies 2006 Section 6.4.4 states: *Wilderness oriented commercial services that contribute to public education and visitor enjoyment of wilderness or provide opportunities for primitive and unconfined types of recreation may be authorized if they meet the "necessary*

and appropriate” tests of the NPS Concessions Management Improvement Act of 1998 and section 4 (d)(6) of the Wilderness Act...

Refer to Appendix E for the process used to determine necessary and appropriate uses as they relate to backcountry commercial uses.

Native American Access

Native Americans will be permitted access within the backcountry for sacred or religious purposes consistent with the regulations and intent of the American Indian Religious Freedom Act, Executive Order 13007 of May 24, 1996 on *Indian Sacred Sites*, the Wilderness Act, related laws, policies, and according to criteria for special park uses.

Hunting/Fishing

Hunting is not allowed in the park. Fishing is allowed with a valid state license. Fishing is not a very popular activity in ZION because most streams and ponds support few trout or other game fish due to their frequent flooding and periods of high turbidity.

Administrative Conditions and Management Activities

Minimum Requirement Concept

The Wilderness Act of 1964 states in section 4(c) that: *...except as necessary to meet the minimum requirement for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area) there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing aircraft, no other form of mechanical transport, and no structure or installation...* within a wilderness area. The Act allows for the administrative exception, but it is an exception not to be abused and to be exercised very sparingly and only when it meets the test of being the minimum necessary for wilderness management. NPS policy dictates that all management decisions affecting wilderness must be consistent with the Minimum Requirement Concept.

In wilderness, how a management action is carried out is as important as the end product. When determining minimum requirement, the potential disruption of wilderness resources and character will be considered before, and given more weight than, economic efficiency and convenience. If a compromise of wilderness resources or character is unavoidable, only those actions that preserve wilderness character in the long run and/or have localized, short-term adverse impacts will be accepted.

To apply the Minimum Requirement Concept, a Minimum Requirement Analysis will be completed for any management action proposed within recommended wilderness, including but not limited to natural and cultural resource projects, administrative facilities, trail and camp area projects and research. Completion of the Minimum Requirement Analysis is usually part of the environmental screening process and accompanies an Environmental Screening Form.

The Minimum Requirement Analysis is a two-part process. Part A helps determine whether or not the proposed management action is appropriate or necessary for administration of the area as wilderness, and does not pose a significant impact to wilderness resources and character. Part B describes alternatives for the proposed action and evaluates each to determine if the techniques and tools and equipment (minimum tool) needed to ensure that overall impacts to wilderness resources and character are minimized. The Minimum Requirement Analysis Worksheet and instructions for its completion can be found in Appendix C.

Aircraft Use

Aircraft not under the direction of the NPS are not permitted to land in the park. All aircraft landings require prior approval unless justified by an in-flight emergency. Landings should occur at sites identified in an Aviation Management Plan or approved by the Incident Commander during an emergency operation. Permanent cleared or constructed aircraft landing sites (e.g., heliports, helipads, airstrips) are not permitted in the recommended wilderness. Permanent site improvements or markings of any kind are not permitted. Temporary sites (helispots) are to be located in natural openings on stable, durable surfaces such as dry meadows, rock, etc. Temporary improvements may only be authorized during emergency operations, when serious risk to human health and safety would result (search and rescue operations) or substantial resource damage is imminent (wildland fire suppression), if no reasonable alternative exists. Restoration to as near original condition as possible is required following the emergency.

Emergency Services

During emergency incidents, consideration will be given to protecting the park's backcountry, and natural and cultural resources. While hazard mitigation may be required, under no circumstances will pure convenience dictate the destruction of any park resources. Leave No Trace (Appendix B) minimum impact techniques will be incorporated into incident action plans and used whenever possible to lessen impacts to recommended wilderness resources during emergency operations.

NPS *Management Policies 2006* provide for the administrative use of motorized equipment or mechanical transport *...in emergency situations involving human health and safety*. For the purposes of this plan, emergency situations include:

- response to those in need of medical or physical assistance when threats to human health and safety are reasonably assumed,
- response to those who are determined to be unjustifiably overdue and threats to human health and safety are reasonably assumed,
- any response to downed aircraft,
- any response to an unknown emergency (e.g., mirror flash, second-hand visitor report, radio distress signal),
- any reported disaster,
- special law enforcement operations when threats to human health and safety are reasonably assumed, and
- response to wildland fires which threaten life, property, cultural or natural resources.

Backcountry Permit and Reservation System

ZION's backcountry permit system allows the park to maintain levels of backcountry use consistent with a high quality visitor experience, safety, and resource protection by:

- regulating use through a quota system,
- providing education concerning resource protection and other Leave No Trace (Appendix B) techniques,
- providing education concerning safety issues,
- providing a means to track visitor use, and
- identifying a starting point for search and rescue efforts.

Backcountry permits have been required for all overnight trips in ZION's backcountry as well as for day trips through the length of the Narrows and its tributaries for over 26 years (prior to

1980). A group size limit of 12 was put into place in 1992. In the 1990s, designated campsites, and a limitation on the number of overnight groups, were established in the Narrows, LaVerkin Creek, and the West Rim Trail. A use limitation of 50 people per day was instituted for the Left Fork of North Creek (Subway) in 1997, and permits were required for all technical canyons in 1998.

Prior to 1997, backcountry permits were issued by interpretive rangers at the Visitor Center. In 1997, a dedicated backcountry permit staff was established and funded through the fee demonstration program.

In 1998, a telephone permit reservation system was created for the Subway. The desire for permits soon outgrew the telephone reservations system. In 2002, the park initiated an e-mail based lottery system for the Subway.

In 2004, ZION became the first NPS unit to allow visitors to obtain both backcountry reservations and permits via the internet. Reservations for permits can be made in two ways. Reservations for the most difficult to obtain permits (in 2007, the Subway and Mystery Canyon) are available through a lottery. The remaining reservations for these areas as well as reservations for many other areas are available via a calendar reservation system. Frequent visitors can obtain their permits via the internet with no need to visit ZION's backcountry desk.

Despite the on-line permit and reservation system, visitors continue to encounter long lines at the backcountry permit desk. This is a common complaint of frequent canyoneers and other backcountry users. On weekends, it is common for visitors who have arrived prior to the backcountry desk's 7 am opening to not receive their permit until after 8 am. In addition to delaying the start of a visitor's trip, the long lines prevent backcountry staff from spending quality time with inexperienced backcountry users discussing critical Leave No Trace and safety information.

The on-line system has been well received, but the system is currently lightly used. The park continues to look for ways to encourage experienced visitors to obtain permits by means other than the backcountry desk. This will make it easier for visitors to obtain permits and allow park staff to spend more time with less experienced backcountry visitors.

Prior to 1997, visitors were not charged for backcountry permits. In 1997 a newly created, dedicated backcountry permit staff was funded by a cost recovery project through the fee demonstration program. Visitors were charged \$5 per visitor per day/night (i.e., two people spending two nights in the backcountry were charged \$20 for a permit). In 2000, the fee was reduced to \$5 per permit. Fees were raised to the current rate of \$10 to \$20 per permit in 2004, based on group size, which covers all of the costs associated with issuing permits as well as some of the costs associated with monitoring the condition of backcountry resources, backcountry rehabilitation, and backcountry patrol.

Designated Campsites

Campsites are designated to prevent resource damage and to improve visitor experience by focusing camping impacts on a few resilient sites. In ZION campsites are designated in the Narrows (12 sites for 72 people), LaVerkin Creek (17 sites for 90 people), Hop Valley (3 sites for 26 people – includes 1 site for horse use), West Rim Trail (9 sites for 56 people), and the newly designated Coalpits/Chinle area (6 sites for up to 72 people) (Map F).

Some of these designated sites are located in flood hazard areas where no suitable alternative locations exist. The risks associated with requiring camping in flood hazard areas and actions to mitigate these risks are identified in the Floodplains Statement of Finding in Appendix F.

Campsites could be designated in other areas of the park if certain resource or social conditions occur (Refer to *Campsite Designation Criteria* below). Designated campsites will be monitored to ensure that the VERP indicators stay within the standards identified in Tables 14 and 15. Monitoring methods are outlined in the *Campsite Monitoring Manual* version 11/1/02 developed by Dr. Jeff Marion (Appendix G).

Campsite Designation Criteria

In the future campsites could be designated in the Primitive Zone because a resource or social standard (Tables 14 & 15) has been exceeded. Sites will be chosen based on the following:

- Resource protection will be of primary importance.
- Campsites will be selected to avoid flood hazard areas where practical.
- Campsites will be placed out of view of the trail.
- Campsites will be placed far enough apart so that you can not hear other campers from your site.
- Sites will be sized to accommodate either 6 or 12 people.
- Campsites will be placed in areas with slopes, buried rocks, or other features that limit the unintended expansion of sites.
- Campsite placement will be subject to cultural resource mitigation outlined in *Mitigation Measures* of this document.

Non-Designated Camp Areas

The majority of the park is open to at-large camping meaning visitors can camp anywhere they choose with the following exceptions where camping is prohibited:

- within 1-mile of any road,
- within ¼-mile of a spring,
- within ¼-mile of the park boundary,
- within site of trails,
- under rock overhangs, or
- on private inholdings.

At-large camping will be monitored according to VERP standards outlined in Table 14. If permanent obvious campsites are found, measures will be taken as outlined in Table 14. A permanent obvious campsite is defined as an area where the campsite is obvious. Meaning the vegetation cover has been lost and/or organic litter pulverized in the primary use area. A site is not considered a campsite if the area is barely distinguishable as such with a slight loss of vegetation cover and/or minimal disturbance of organic litter.

As stated in the 2001 GMP and reaffirmed in this plan, the Pristine Zone will remain open to at-large camping. The Pristine Zone will be monitored and management options implemented if standards are exceeded as identified in Table 14.

Climbing and Canyoneering Management

Erosion off the rock – Climbers and canyoneers often bushwhack and scramble to gain access to the base of the cliff or into/out of a slot canyon. Numerous approach trails have resulted in some areas. These access trails typically are braided with other trails to the same area. Because they travel either straight up or down grade, water flows down the trails, causing soil loss, trenching

and vegetation loss. Also, at the base of some climbs in high use areas, the ground is compacted and denuded of vegetation. Social trails often contour along the base of the rock formation to the start of other climbs.

To remedy these problems access trails to the base of well-known and heavily used climbing routes and slot canyons will be identified and delineated in order to prevent further erosion and loss of vegetation. In some instances signs may be placed to direct climbers away from problem or sensitive areas in order to protect resources. No more than one access route up/down a slope to the base of a climb, area, or canyon will be allowed.

Educational efforts could also be used to encourage visitors to use non-erosional surfaces or to follow one identified access route. Within the Pristine Zone, any efforts to control erosion should be disguised such that it is not apparent that they are human built.

Social trails that have developed over time, but currently see infrequent use, will be rehabilitated to discourage further travel. Travel in high use areas will be on established access routes.

Erosion on the rock – Through continuous use the rock surface becomes smoother and freer of lichens, moss and dirt. Ledges and cracks also lose dirt and vegetation from climbing use. Toe and finger holds become worn off or are not a useful location for some climbers. To make a climbing route more accommodating a few climbers alter routes by gluing an artificial hold or they may chip or pry the rock to create improved holds. The gluing and chipping of holds is prohibited. Aggressive, intentional cleaning the rock or soil and vegetation is prohibited.

Specific climbing routes will be closed (seasonal or permanent) to address a specific resource concern. Examples include nesting species, hanging gardens, or archeological sites. Closures will be kept to the minimum area and duration necessary to protect the affected resource.

Visual impacts associated with climbing vary depending on the viewer's attitude towards climbing in general and their proximity to the activity. Bright colored slings, shiny metal bolts, white chalk and the sight of climbers and ropes on an otherwise undisturbed formation can be viewed as intrusive.

Climbers will be encouraged to use rock climbing protection, slings, and other equipment that blend with the natural surroundings. If anchors detract from the aesthetics of the cliff faces of ZION and thus general visitor's experience, additional management actions will be taken. The use of chalk is allowed, however climbers will be encouraged to be sensitive to this issue. It is also the responsibility of climbers to ensure that their ropes are not left on walls for long periods of time. If problems persist, management actions could include requiring the use of natural colored anchor material, closing area, and/or the creation of a climbing management plan.

Bivouacs are allowed on the wall of climbs only. Overnight camping at the base of the cliff is prohibited.

Climbers must tube or bag human waste and toilet paper and carry it out. Waste must be deposited in an RV dump station. The presence of human waste at the base of climbs will be monitored using the same standard as designated campsites (90 percent of climbs will have no more than two visible piles of human waste near the base of a climb). If a climbing area is found to be out of standard, actions that could be taken include education, requiring the use of a portable toilet system, or closing areas.

Bolts should be considered the tool of last resort by visitors who are creating anchors. As mentioned above climbers, canyoneers, and others creating anchors will be encouraged to use natural colored anchor material (slings and hangers). The park will continue to monitor bolting in the backcountry.

Trails Management

ZION has over 90 miles of designated trails and over 90 miles of non-designated popular routes (Map E). In 1987 ZION compiled a *Trail Standards Guide* that provided a standard of maintenance for park trails, an inventory of park trails, and outlined the park's trail maintenance program. Although this plan is out of date, some of the information is still useful. The park currently does not have funding for a trail maintenance crew, nor does the park have a schedule for maintaining backcountry trails. So generally, little or no backcountry trail maintenance is done, and when it does occur it is only where safety concerns or resource damage becomes severe.

The routes into and out of slot canyons are not constructed: they have been made by hikers going into and out of these canyons. Because of continued use many of these routes are eroding affecting native vegetation, soils and potentially visitor safety. In many of these areas it is not practical or even possible to construct a trail. The park will continue to monitor routes as outlined in Table 14 and will apply the identified management actions if standards are exceeded. The park will also continue to partner with user groups to find solutions to this problem.

As part of the VERP studies some trails were surveyed and a monitoring protocol was established. The *Trail Monitoring Manual (version 4/03)* (Appendix H) developed by Dr. Jeff Marion will be used to monitor the trail and route resource indicators and standards outline in Table 14.

Maintenance, in the form of a trail reroute, has been identified for a portion of the Chinle Trail in the southwest area of the park. It is proposed to reroute a short section (estimated at 1,000 feet in length) of the Chinle Trail within 1-mile of the park boundary. The purpose of the reroute is twofold: the trail is eroding away where it crosses a wash and the trail needs to be moved away from sensitive plant populations. The exact trail reroute has not been identified. When the route is identified, an Environmental Screening Form and a Minimum Requirement Analysis Worksheet (Appendix C) will be completed. Additional consultation with the USFWS will also be required at this time. The reroute will be designed to disrupt as little native vegetation as possible and will not impact any cultural resources.

Historic Trails

Two trail complexes, the West Rim and East Rim, are on the National Register of Historic Places (NRHP). Other backcountry trails may be considered for nomination to the NRHP in the future. Trails that are either on the register or may be considered for the register will be preserved and protected while stabilizing the trail structure for safety and historic preservation. In reconstruction, particular care and attention will be given to matching the historic appearance of the trail.

Trail Maintenance Equipment and Tool Use

The Minimum Requirement Analysis (Appendix C) will be used during trail work planning and operations. Hand tools will be used as a first choice. The use of motorized equipment and mechanized transport will be assessed on a case-by-case basis.

Trailhead Parking Area Size and Function

Although trailhead parking areas are outside of the area covered in this plan, they are considered integral to the management of the backcountry areas they adjoin. For these reasons the following trailhead and trailhead parking area actions will be implemented.

- Trailhead parking areas will be appropriate to the adjoining backcountry area use limits and use types (horse trailer parking in areas with horse use).
- Trailhead areas will be used to educate backcountry visitors (bulletin boards).
- Trailheads will be identified to concentrate use to appropriate areas (as opposed to dispersed use throughout a boundary area).
- Trailhead parking areas will be placed within the park boundary in order to maintain control of appropriate size, function, and location.
- Where needed, the conditions for trailhead access will be negotiated with adjacent land owners.

Radio Repeaters

There are two radio repeaters within the backcountry. They are located on West Temple and on Timber Top Mountain. These structures are considered essential for public safety and administrative use. Repairs and improvements to these facilities will be accomplished using the Minimum Requirement Analysis (Appendix C).

Generally, new radio repeaters, or other communication towers, equipment or facilities, will not be allowed in backcountry unless approved following an environmental analysis which at a minimum includes an Environmental Screening Form and the Minimum Requirement Analysis (Appendix C).

Food Protection Devices

Feeding of wildlife by visitors, both intentional and unintentional, can adversely affect wildlife by altering natural diet and causing nuisance behavior to develop. Food protection systems can be an important tool in minimizing unacceptable interactions.

If unacceptable impacts between visitors and wildlife occur, or the potential for problems is high, visitors may be required to carry and use portable food storage systems or use fixed food storage systems provided. Visitors will be encouraged to report negative animal/human interaction. Any incidents where animals obtain food, damage equipment, or acts in an aggressive manner will be investigated.

Food storage devices may be placed at designated campsites. These devices may only be placed where a demonstrated need exists and should be removed when determined that they are no longer necessary. They are to be kept to the minimum necessary, since resource impacts could result from the design and placement of such systems. An Environmental Screening Form and Minimum Requirement Analysis (Appendix C) are required before a device is put in place. Currently there are food protection devices at three backcountry campsite along LaVerkin Creek because of a problem with ringtail cats.

Route and Other Markings

Cairns may be used as necessary to define a route or to provide for public safety. However, the construction of new cairns is discouraged except in cases where it is necessary to protect natural or cultural resources.

Flagging and other temporary markings in any area are prohibited except during emergency operations or as approved for research and monitoring. If used, they must be removed once the activity has concluded.

Signs

Signs to provide orientation, safety and regulatory information are allowed in the backcountry. Signs may be necessary to manage and protect resources and visitors.

Signs necessary to protect natural and cultural resources will be the minimum size and number necessary. Signs to convey natural and cultural history of the area are not allowed within recommended wilderness; this information will be provided through trailhead signage, publications, or other means.

Fencing, Retaining Walls, Paved Trails

Fences, retaining walls and paved trails detract from the wilderness scene and are generally not allowed. On a case-by-case basis, in order to protect resources or provide for visitor safety, they may be allowed if other techniques (e.g., education, signing) are not adequate or feasible. Fencing will be removed when no longer needed. The historic paved trails to the West Rim and East Rim will continue to be maintained as such.

Any proposal to erect fencing, a retaining wall or maintain the paved trails will require the completion of an Environmental Screening Form and a Minimum Requirement Analysis (Appendix C).

Historic fences will be documented and then allowed to disintegrate in place. Likewise, rock walls, cairns and other features that may be either historic or prehistoric in age will not be disturbed.

Use of Minimum Tool for Facility Maintenance

In general, the maintenance, rehabilitation, and reconstruction of any structure in the backcountry will be accomplished using the minimum tool necessary for the job. This requires analysis of the impacts of the tools to be used on wilderness values. Issues such as duration and intensity of noise levels, means for transporting materials and tools to the job site, use of local materials versus materials brought to the site, etc. will be considered in the determination of minimum tool. The consideration of minimum tool will be addressed during the completion of the Environmental Screening Form and Minimum Requirement Analysis (Appendix C).

Convenience alone will not be considered sufficient justification for the use of motorized equipment and mechanical transport. However, it is recognized that certain modern tools may expedite a project and thereby minimize the duration of disturbance to wilderness values and reduce the exposure of employees to hazardous conditions. In cases that these tools are approved for use, efforts will be made to minimize the duration and intensity of the disturbance.

Parachuting (Base Jumping)

During the scoping process BASE jumping was not identified as an activity the public would like to see allowed in ZION. Although during the comment period on the draft plan/environmental assessment over 50 comments we received asking the park to allow BASE jumping. The BMP covers areas within the park that are recommended wilderness and are within GMP management zones that are Primitive, Pristine, or Research Natural Areas. All of these areas are managed to preserve natural processes, where natural sights and sounds are all one sees and hears.

Mechanized forms of recreation are not appropriate in these areas. Parachutes are considered a form of mechanized transport and therefore are not appropriate in these areas. BASE jumping will continue to be prohibited in ZION and will be subject to the regulations outlined in 36 CFR 2.17.

The following guidance contributed in the above decision:

NPS Management Policies 2006 8.2.2.7 states: *Parachuting (or Base Jumping), whether from an aircraft, structure, or natural feature is generally prohibited by 36 CFR 2.17(a)(3). However, if determined through a park planning process to be **an appropriate activity**, it may be allowed pursuant to the terms and conditions of a permit.*

NPS Management Policies 2006 1.5 states: *An “appropriate use” is a use that is suitable, proper, or fitting for a particular park, or to a particular location within a park. Not all uses are appropriate or allowable in units of the national park system, and what is appropriate may vary from one park to another and from one location to another within a park.*

NPS Management Policies 2006 6.3.1 states: *The NPS **will take no action that would diminish the wilderness eligibility** of an area possessing wilderness characteristics until the legislative process of wilderness designation had been complete. Until that time, management decisions will be made in expectation of eventual wilderness designation.*

The Wilderness Act section 4c states *...there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, **no other form of mechanical transport**, and no structure or installation within any such area.*

Wilderness Committee

The Superintendent chartered a Wilderness Committee in September 2003. The committee was established to facilitate the review of projects proposed (Minimum Requirement Analysis Appendix C) within recommended wilderness in ZION. The committee concept is working in the park and will continue into the future.

The committee is lead by the Plateau District Ranger with committee members from visitor and resource protection, Kolob District, concession management, fire management, interpretation and resource management. Monthly meetings are held to evaluate proposals, provide mitigation when necessary, and make recommendations to the Superintendent.

Mountain Bike Use

NPS Management Policies 2006 section 6.4.3.3 states: *Public use of motorized equipment or any form of mechanized transport will be prohibited in wilderness except as provided for in specific legislation. Operating a motor vehicle or possessing a bicycle within designated wilderness outside Alaska is prohibited (36 CFR 4.30(d)(1).*

As stated in Director’s Order-41, the NPS manages recommended wilderness: *to preserve their wilderness character and values undiminished until Congress acts in the recommendations. Decisions will be made in the expectation of eventual wilderness designation.* Therefore, any mechanized transport, including mountain bikes are prohibited in recommended wilderness in ZION.

Mitigation Measures

Mitigation is defined in the Code of Federal Regulations (40 CFR 1508.20) as:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

The following mitigation applies to any activities and actions in the backcountry.

Wilderness

- Minimize use of motorized equipment or mechanical means of transport through the use of Minimum Requirement Analysis (Appendix C).
- In keeping with wilderness character, natural materials will be preferred to repair or construct wilderness facilities (e.g., water bars, sign posts, tent pads) or restore desired conditions to impacted areas.

Visitor Use and Experience

- Inform visitors of planned and current area closures due to management activities through press releases, notices at trailhead and visitor facility bulletin boards, backcountry permitting, the park website, and other means as necessary.
- To protect visitors, temporarily close trails and/or roads, use cautionary signing on trails and/or roads, and close facilities if warranted.
- Limit the number, area, and duration of trail and areas closures in order to maintain opportunities for solitude and primitive, unconfined recreation.

Threatened, Endangered, and Sensitive Animal Species

- Comply with the Endangered Species Act.
- Consult threatened and endangered species recovery plans and scientific literature when proposing management activities in species habitats.
- Limit disturbances near nest sites/eyries for Mexican spotted owl, peregrine falcon, and goshawks (March-September).

Threatened, Endangered, and Sensitive Plant Species

- Comply with the Endangered Species Act.
- Consult threatened and endangered species recovery plans, specialists, and scientific literature when proposing management activities in species habitats.

Vegetation

- Stock must be fed certified weed-free feed 24 hours prior to spending the night in the backcountry and while in the backcountry.
- All equipment, including hand tools, must be washed before use in the park. This is to ensure that all soil and potential weed seeds are removed.

Soils

- Trails will be closed to stock use during periods of wet weather or due to other resources concerns.

Cultural Resources

When proposing to designate campsites the following approach will be used:

- an archeological survey will be conducted around all proposed campsites;
- if cultural sites are found (1) the campsite will be relocated, (2) if the campsite can not be relocated a detailed site recording will be conducted including on-site artifact identification, analysis, spatial analysis from artifact distributions, systematic artifact collection, and detailed feature documentation;
- document data recovery efforts in a professional report and submit it to the Utah State Historic Preservation Office for review; and
- curate all cultural resource materials - artifacts and documentation - in park collections.

Indicators and Standards for Visitor Experience and Resource Protection

While social and resource indicators generally remain the same across Management Zones, standards may be different. Table 14 outlines: resource protection indicators, standards, monitoring methods and schedules, and management options. Table 15 outlines: visitor experience indicators, standards, monitoring methods and schedules, and management options.

Table 14: Resource Protection Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Methods & Schedule	Management Options
Pristine	Non-designated campsites	Permanent obvious campsite (soil & vegetation)	Zero	<ul style="list-style-type: none"> · Count & document number of obvious campsites · Every year – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Obliterate campsite · Reduce camping group size · Temporarily close areas for recovery · Delineate camping areas within a canyon/area, rotate camping between areas by year – each year an area(s) is closed to camping · Designate campsites for administrative use (sometimes focusing use is more desirable) – need authorization from wilderness committee
	Non-maintained access routes – to climbs/areas or into/out of canyons (Mystery Canyon)	Soil loss	Route Cross Sectional Area =140 (35” wide X 4” deep) (using a moving average to analyze)	<ul style="list-style-type: none"> · Trail monitoring protocol (5-measurements per route) (Appendix H) · Every year for identified problem routes – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Limit use (reduce group size, numbers per day, etc.) · Add erosion control devices · Improve route · Build trail · Close route
		Number of access routes to climb/area, canyon (soil & vegetation)	No more than 1 to climbing route/area, canyon	<ul style="list-style-type: none"> · Count & document number of routes · Every year for identified problem routes – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Obliterate access routes
	Non-maintained routes (cross-country travel)	Number of routes to/from feature/area (soil & vegetation)	No more that 1 over 90% of the route	<ul style="list-style-type: none"> · Count & document number of routes · Every year for identified problem routes – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Limit use (reduce group size, numbers per day, etc.) · Obliterate excess routes · Close area (temporary or permanent)

Table 14: Resource Protection Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Methods & Schedule	Management Options
Primitive	Designated campsites (West Rim, LaVerkin Creek, Narrows, Chinle Trail/Coalpits Wash)	Area of campsite disturbance (soil & vegetation)	Up to 3% increase from identified campsite square foot measurement	<ul style="list-style-type: none"> · Campsite monitoring method (Appendix G) · 3-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Add natural barriers to delineate site (iceberg rocks, plant cactus, etc.) · Reduce group size for campsite · Relocate campsite · Close campsite
		Number of trails that connect to the campsite boundary (soil & vegetation)	No more than 4 trails at 90% of the campsites	<ul style="list-style-type: none"> · Count & document number of trails as part of campsite monitoring · 3-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Obliterate excess trails · Reduce group size for campsite · Sign necessary trails
		Human waste	50% of campsites within campsite area will have no visible human waste 90% of campsites will have no more than two human waste sites	<ul style="list-style-type: none"> · Monitor as above as part of campsite monitoring 	<ul style="list-style-type: none"> · Education · Recommend visitors carry out waste · Require visitors to carry out waste · Close campsite
	Non-designated camp areas (1) East Rim & East Mesa (2) Lower Right Fork (3) Northgate Peaks & Wildcat Canyon Trails	Area of campsite disturbance (soil & vegetation)	Up to 3% increase from identified campsite square foot measurement	<ul style="list-style-type: none"> · Campsite monitoring method (Appendix G) · 3-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Add natural barriers to delineate site (iceberg rocks, plant cactus, etc.) · Reduce group size for campsite · Designate campsite · Relocate campsite · Close campsite
		Number of identifiable campsites by trail system (soil & vegetation)	No increase over existing	<ul style="list-style-type: none"> · Count & document number of campsites as part of campsite monitoring · 3-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Reduce group size for campsite · Obliterate campsite · Designated campsite

Table 14: Resource Protection Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Methods & Schedule	Management Options
Primitive	Maintained dirt trails (West Rim, Telephone Canyon, East Mesa, East Rim, Cable Mountain, Deertrap Mountain, Northgate Peaks, Connector, LaVerkin Creek, Hop Valley, Chinle Trail)	Soil loss (erosion)	Trail Cross Sectional Area =140 (35" wide X 4" deep) (using a moving average to analyze)	<ul style="list-style-type: none"> Trail monitoring protocol (Appendix H) 5-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> Reroute trail Add erosion control features Limit number or close trail to horses where this use is allowed (permanent or seasonal closure) Limit human use (seasonal, number per day, etc.)
		Number of informal visitor-created trails off designated trails (soil & vegetation)	No more than 4 visitor-created trails per trail mile	<ul style="list-style-type: none"> Count & document number of trails as part of trail monitoring 5-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> Education Obliterate excess trails Signs
	Non-maintained dirt routes (Left Fork North Cr., Right Fork North Cr., North Fork Taylor Cr., Middle Fork Taylor Cr., South Fork Taylor Cr., Narrows, Orderville Canyon, Coalpits-below spring, Scoggins, Huber)	Number of parallel routes – often in a canyon bottom (soil & vegetation)	No more than 2 over 90% of the route	<ul style="list-style-type: none"> Count & document number of routes 3-year interval – monitor at the same time of year 	<ul style="list-style-type: none"> Education Obliterate excess routes Signs Limit use (reduce group size, numbers per day, etc.) Build or designate trail
	Non-maintained access routes to climb/area or into-out of canyon (Left & Right Forks North Creek, Spry Canyon, Keyhole Canyon, Pine Creek)	Soil loss	Route Cross Sectional Area =140 (35" wide X 4" deep) (using a moving average to analyze)	<ul style="list-style-type: none"> Trail monitoring protocol (5-measurements per route) (consider photo point) Every year for identified problem routes – monitor at the same time of year 	<ul style="list-style-type: none"> Education Obliterate excess routes Signs Limit use (reduce group size, numbers per day, etc.) Build or designate trail
Number of access routes to climb/area, canyon (soil & vegetation)		No more than 1 to climbing route/area, canyon	<ul style="list-style-type: none"> Count & document number of routes Every year for identified problem routes – monitor at the same time of year 	<ul style="list-style-type: none"> Add erosion control features Improve route Limit use (reduce group size, numbers per day, etc.) Build or designate trail Close route 	

Table 14: Resource Protection Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Methods & Schedule	Management Options	
Transition	Maintained paved trails (Observation Point)	Number of visitor-created trails (soil & vegetation)	No more than 7 per trail mile	<ul style="list-style-type: none"> · Count & document number of trails · Every year – monitor at the same time of year 	<ul style="list-style-type: none"> · Education · Obliterate excess trails · Signs · Barriers (fences, etc.) 	
	Maintained dirt trails (Observation Point-on rim, Timber Creek Overlook)	Soil loss	Trail Cross Sectional Area = baseline measurement – not getting worse no more than 30% of the time	<ul style="list-style-type: none"> · Trail monitoring protocol (Appendix H) · 5-year interval 	<ul style="list-style-type: none"> · Reroute trail · Add erosion control features · Barriers (fences, etc.) · Limit use (season, numbers per day, etc.) 	
		Number of visitor-created trails (soil & vegetation)	No more than 7 per trail mile	<ul style="list-style-type: none"> · Count & document number of trails · Every year – monitor at the same time each year 	<ul style="list-style-type: none"> · Education · Obliterate excess trails · Signs · Barriers (fences, etc.) 	
	Non-maintained access routes – to climbs/areas or into/out of canyons	Refer to above Primitive.				
	Lower Narrows (end of Riverside Walk to Orderville Canyon)	Number of parallel routes (soil & vegetation)	No more than 2 over 90% of the route	<ul style="list-style-type: none"> · Count & document number of routes · Every year – monitor at the same time each year 	<ul style="list-style-type: none"> · Education (onsite & offsite) · Obliterate excess routes · Barriers (fences, etc.) · Signs · Limit use (number of people) 	
Soil loss – maximum incision per route segment (route segment = exit the river, walk over land until you reenter the river)		2-foot maximum incision depth	<ul style="list-style-type: none"> · One measurement per route segment at the deepest point on route segment · Every year – monitor at the same time each year 	<ul style="list-style-type: none"> · Education (onsite & offsite) · Reroute and/or maintain route · Barriers (fences, etc.) · Signs · Limit use (number of people) 		
Research Natural Area	Non-designated campsites	Permanent obvious campsites (soil & vegetation)	Zero	<ul style="list-style-type: none"> · Count & document number of campsites · Every year in identified RNAs, as needed in others 	<ul style="list-style-type: none"> · Education · Obliterate campsite · Limit group size · Designate campsites for administrative use (focusing use may be more desirable) – 	

Table 14: Resource Protection Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Methods & Schedule	Management Options
					need authorization from wilderness committee
	Non-maintained routes	Number of routes (soil & vegetation)	No more than 1 to area or feature	<ul style="list-style-type: none"> · Count & document number of routes · Every year in identified RNAs, as needed in others 	<ul style="list-style-type: none"> · Education · Obliterate excess routes · Limit use (numbers of people) · Temporarily close area
All	Mexican Spotted Owl	Spotted owl nesting & fledging	No evidence of adverse effect from human activity	<ul style="list-style-type: none"> · Continue to monitor nest site on a yearly basis · Continue to search for new nest sites as time and money allow 	<ul style="list-style-type: none"> · Limit number of day hikers · Limit day use beyond a certain point · Close canyon during critical nesting periods · Move campsite · Close area to camping
All	Peregrine Falcon	Falcon nesting & fledging	No evidence of adverse effect from human activity	<ul style="list-style-type: none"> · Continue to monitor active sites on a yearly basis · Continue to search for new nest sites as time and money allow 	<ul style="list-style-type: none"> · Close area to climbing during critical times · Close area to climbing on permanent basis
All	Shivwits Milkvetch	Number & health of plants	No evidence of adverse effect from human activity	<ul style="list-style-type: none"> · Continue to monitor yearly in the spring 	<ul style="list-style-type: none"> · Better define trail · Move trail · Patrol when soil is wet · Close trail to horse use
All	Cultural Resource Sites	Site condition – vandalism of sites	No evidence of adverse effect from human visitation – no vandalism	<ul style="list-style-type: none"> · No regular schedule – visit sites with features as part of regular backcountry patrol – highest priority sites are those with heavy visitation · Other sites visited as needed 	<ul style="list-style-type: none"> · Education · Limit access to sites · Limit access to area · Physical barriers around sites · Signs · Increased law enforcement patrols · Temporary or permanent closure of area

Table 15: Visitor Experience Indicators and Standards

Zone	Item Monitored	Indicator	Standard	Monitoring Method & Schedule	Management Options
Pristine	Hiker encounters	Number of encounters	90% of visitors will not see or hear more than 2 group per day	Staff will complete form whenever in backcountry	<ul style="list-style-type: none"> · Education · Reduce group size limit · Limit number of hikers on route
	Group encounters	Number of group encounters larger than 6 people per group outside of canyons	90% of visitors hiking will not encounter groups larger than 6	Staff will complete form whenever in backcountry	<ul style="list-style-type: none"> · Reduce group size limit
Primitive	Hiker encounters	Number of encounters	90% of visitors will not see more than 10 other hiker groups per day	Staff will complete form whenever in backcountry	<ul style="list-style-type: none"> · Education · Reduce group size limit · Limit number of hikers on trail
	Stock group encounters	Number of encounters	On trail open to stock use; stock users will not see more than 1 other stock group on the same trail	Staff will complete form whenever in backcountry	<ul style="list-style-type: none"> · Education · Reduce group size limit · Limit number of stock on trail
Transition · Observation Point Trail · Narrows below Orderville Cyn. · Timber Creek Trail	Visitor satisfaction	Visitor satisfaction	80% of visitors satisfied with hiking experience	Visitor survey completed every 5-years.	<ul style="list-style-type: none"> · Education · Establish group size limit · Limit number of hikers on trail

Chapter 3 – Resource Descriptions

Wilderness

In 1974, approximately 131,000 acres of ZION were recommended to Congress for formal wilderness designation (Map C). This includes potential wilderness (inholdings, private water diversions) as well as recommended wilderness. While not yet legislatively designated, this recommended wilderness is managed as wilderness in accordance with *NPS Management Policies 2006*.

The 1964 Wilderness Act defined wilderness as: *an area where the earth and its community of life are untrammeled by man. In addition, the act states that ...except as necessary to meet the minimum requirements for the administration of the area for the purposes of this act, there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.*

The GMP completed in 2001 stated the following desired condition: *All of the lands within recommended wilderness areas retain their wilderness characteristics and values. Visitors continue to find opportunities for solitude and primitive, unconfined recreation. Signs of people remain substantially unnoticeable. The area continues to be affected primarily by the forces of nature.*

Wilderness includes both the biophysical resources of wilderness as well as wilderness character, which can be thought of as the human experience of wilderness. Two commonly used terms to describe wilderness resources and character are naturalness and wildness. While the two terms are similar, they each describe a different value of wilderness. Naturalness encompasses the ecosystem components and processes that belong in the wilderness, such as native plant communities and native wildlife species. Wildness encompasses the lack of direct human control, such as vast road less landscapes and free-flowing rivers.

All activities affecting wilderness must be considered under the Minimum Requirement Analysis concept (Appendix C). This concept is a documented process used to determine if administrative activities affecting wilderness resources or the visitor experience are necessary and how to minimize impacts.

Visitor Use and Experience

In 2006, over 2.5 million people visited ZION (Table 16). Visitors participate in a wide range of activities, including hiking, canyoneering, rock climbing, attending ranger guided programs, and nature observation. Zion Canyon attracts the majority of visitors; most walk on at least one trail during their visit. Trails range from short, easy walks from points along the Zion Canyon Scenic Drive to long, strenuous hikes such as the East and West Rim Trails.

Visitors hike on over 90 miles of maintained trails, with the majority of those trails in the backcountry. Visitors also hike cross-country, often on well-used routes. There are over 90 miles of well-used routes in the park, mainly through technical slot canyons (Map E).

Backcountry camping continues to be a popular activity in ZION, although this use has leveled off since 2000. There are 47 designated backcountry campsites (Map F) accommodating 316 people per night. In general, the rest of the park is open to at-large camping by permit with some limitations (e.g., total number of campers per area, distance from trailhead).

Visitor use in ZION has changed over the years, especially for those backcountry activities that require a permit. In 1998 backcountry camping (with a permit) was more popular than day use activities that required a permit. With the popularization of canyoneering, day use requiring a permit has risen from 26 percent of the total permits distributed to over 58 percent. While backcountry camping permits decreased from 47 percent of the total permits distributed to 26 percent (Table 16).

Overall, backcountry visitors seek varying degrees of solitude and visitors enjoy natural sounds during most of their experiences. The park’s shuttle buses, which operate on the Zion Canyon Scenic Drive from April through October, are propane powered and produce a minimum of unnatural sound. Once a visitor ventures from traveled roadways, unnatural sound diminish.

Year	Total Park Visitors	All Backcountry (permits/people)	Narrow Canyon Day Use (permits/people)	Narrow Canyon Camping (permits/people)	Backcountry Camping (permits/people)	Climbing Bivouacs (permits/people)
2006	2,589,250	7,677 / 27,726	4,461 / 18,781	898 / 3,030	2,062 / 5,379	198 / 385
2005	2,608,564	6,049 / 20,712	3,214 / 13,365	463 / 1,452	2,066 / 5,285	200 / 375
2004	2,699,241	7,292 / 25,739	4,142 / 17,166	952 / 3,065	1,944 / 5,005	241 / 458
2003	2,480,690	7,156 / 24,944	3,692 / 16,204	852 / 2,608	2,316 / 5,549	298 / 583
2002	2,614,734	7,801 / 27,298	3,812 / 16,623	1,091 / 3,414	2,505 / 6,471	392 / 789
2001	2,249,389	7,358 / 25,999	3,437 / 15,641	934 / 3,046	2,519 / 6,351	433 / 881
2000	2,454,248	6,947 / 23,875	2,910 / 13,095	1,051 / 3,493	2,618 / 6,547	371 / 754
1999	2,471,564	5,358 / 16,835	1,990 / 8,392	761 / 2,482	1,938 / 4,608	669 / 1,353
1998	2,387,714	3,950 / 11,963	1,039 / 4,554	471 / 1,703	1,874 / 4,603	566 / 1,103

Threatened, Endangered, and Sensitive Animal Species

The animal species listed in Table 17 and described below either occur in or have the potential to occur within ZION. The list is based on consultation with the USFWS (Appendix I).

Common Name	Scientific Name	Federal Status
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened
California Condor	<i>Gymnogyps californianus</i>	Endangered
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	Candidate
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered
Desert Tortoise	<i>Gopherus agassizii</i>	Threatened
Virgin River Chub	<i>Gila seminuda</i>	Endangered
Woundfin	<i>Plagopterus argentissimus</i>	Endangered

The **Mexican spotted owl** (*Strix occidentalis lucida*) was listed as a threatened species in 1993. In 1995 the Mexican Spotted Owl Recovery Plan was completed and provided a basis for management actions undertaken by land management agencies to remove recognized threats and to recover the spotted owl. The Recovery Plan divided spotted owl habitat geographically into six recovery units in the United States. ZION is within the Colorado Plateau Recovery Unit (USDI, USFWS, 1995a). ZION has 26 historical Mexican spotted owl territories, which are widely distributed. A spotted owl monitoring program for park was initiated in 1995 and continues today.

All of ZION was designated as critical habitat for spotted owl in August 2004 (USDI, USFWS, 2004). The identification of critical habitat is based on data available at the time of designation. The focus for critical habitat is on the physical and biological features essential to the conservation of the species, referred to as the primary constituent elements, that are within areas occupied by the species at the time of listing, and that may require special management considerations and protection. The primary constituent elements necessary to ensure the conservation of Mexican spotted owl include: the presence of water; abundance of canyon walls with crevices, caves, and ledges; clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, or riparian vegetation; and a high percentage of ground litter and woody debris.

A nonessential, experimental population (Section 10(j) of the Endangered Species Act) of the federally endangered **California condor** (*Gymnogyps californianus*) was reintroduced into northern Arizona in 1996 (USDI, USFWS, 1996). The condor must be treated as a listed threatened species under the 10(j) designation on National Park lands. During the summer of 2004, 10 to 14 condors were sighted in the area north of the park and were known to venture regularly into the park during that time. Condors were observed in the main canyon in the summer of 2006. The condors appear to be expanding their range farther to the north and may be expected to visit ZION more frequently in the future. They currently are not known to use the park year-round, and do not use the park as a breeding or nesting area.

The **western yellow-billed cuckoo** (*Coccyzus americanus occidentalis*) has candidate species status and is considered a rare summer resident and migrant in the park (Wauer, 1997). No more than a few sightings occur each year. Their primary breeding habitat is an overstory of cottonwood canopy that is present in the park although not in abundance. Western yellow-billed cuckoos are not known to breed or nest in the park (Wauer, 1997).

The federally endangered **southwestern willow flycatcher** (*Empidonax traillii extimus*) nests primarily in mid-to-low elevation riparian habitat along rivers, streams, or other wetlands where a dense growth of willows or other plants are present. There was one confirmed sighting of this neotropical migrant in the park in 1994 along the East Fork of the Virgin River. A 1998 survey of the park's riparian habitat that seemed capable of supporting flycatchers found no birds, although several pairs have been found downstream of the park along the Virgin River. One bird was located in the Birch Creek survey area in 1999 but apparently was a migrant.

A small population of federally threatened **desert tortoises** (*Gopherus agassizii*) occurs in one small area of the park. A study was completed in 2003 using line distance sampling techniques, which resulted in an average of 14 individuals, with a 95 percent confidence interval from 12 to 26 individuals (P. Stephen Corn, personal communication). The Upper Virgin River Recovery Plan unit for the tortoise does not encompass lands within the park, and there is no critical habitat designated within the park (UDWR, 2000).

The endangered **Virgin River chub** (*Gila seminude*) and **woundfin** (*Plagopterus argentissimus*) are not known to occur in ZION. They are both known to occur downstream from the park in the Virgin River below the town of LaVerkin.

The following wildlife species are either under conservation agreements or are listed as a Utah sensitive species.

The **peregrine falcon** (*Falco peregrinus anatum*) was removed from the federal list of endangered and threatened species in 1999 due to its successful recovery. In ZION peregrine falcons were a regular, but uncommon sight in Zion Canyon from the late 1920s through the late 1940s. The first report of nesting falcons was in about 1933. Peregrine falcons were added to the checklist of birds of ZION in 1935. Beginning in the early 1960s the NPS documented, although not regularly, peregrine observations until the mid-1980s. In the mid-1980s surveys and monitoring studies began and continue today.

Currently ZION hosts a high concentration of breeding peregrines that nest on steep cliffs throughout the park. ZION is known to have 18 historic falcon breeding territories. A subset of those territories, with technical climbing routes, are monitored each year (USDI, NPS, 2001a). Each year cliffs with known nest sites are closed to technical climbing at the beginning of nesting season. If a nest site is not used, the area is opened to climbing. In areas where the nest sites are used the areas are closed to climbing until the young falcons have fledged.

The **bald eagle** (*Haliaeetus leucocephalus*) was removed from the endangered species list on July 9, 2007 due to its successful recovery. The bald eagle winters in the vicinity of the park, especially in the Sevier River Valley east of the park. Although they are commonly observed near the Blue Creek Reservoir to the north, only a few bald eagles are observed each year in the park during the winter and early spring months. Birds that occasionally enter the park perch along the North Fork of the Virgin River in the main canyon. Bald eagle use in the park is sporadic, uncommon, and unpredictable. Large congregations of the birds do not occur, and there are no known, regularly used, winter perch sites or known roost sites within the park.

A survey conducted in 1999 found three active **northern goshawks** (*Accipiter gentilis*) nests in the park (USDI, NPS, 1999). Two of the nests are not near any trails, routes, or visitor attractions. The third site is near a designated trail that does not receive much use. These birds inhabit higher elevations in the park. They prefer coniferous forests, but will also inhabit mixed forests.

The **Virgin spinedace** (*Lepidomeda mollispinis mollispinis*) and **flannelmouth sucker** (*Catostomus latipinnis*) are both managed under Conservation Agreements in lieu of listing as a threatened or endangered species. Both fish have similar ranges in the park and are found in the North Fork and East Fork of the Virgin River and several short tributaries within Zion and Parunuweap Canyons. They are found downstream of the park in North Creek and LaVerkin Creek. Since 1994, the Utah Division of Wildlife Resources (UDWR) has been monitoring these fish at two park locations (UDWR, 2003). Monitoring will continue annually.

Threatened, Endangered, and Sensitive Plant Species

The plant species listed in Table 18 and described below either occur in ZION or nearby. The list is based on consultation with the USFWS (Appendix I).

Common Name	Scientific Name	Federal Status
Shivwits Milkvetch	<i>Astragalus ampullarioides</i>	Endangered
Holmgren Milkvetch	<i>Astragalus holmgreniorum</i>	Endangered
Dwarf Bear-poppy	<i>Arctomecon humilis</i>	Endangered
Siler Pincushion Cactus	<i>Pediocactus sileri</i>	Threatened

One federally listed endangered plant species, the **Shivwits milkvetch** (*Astragalus ampullarioides*), occurs in ZION. This species was listed in 2001 by the USFWS because of its extremely limited range on the Chinle Formation and its rapidly vanishing habitat due to development outside the park (USDI, USFWS, 2001). The Recovery Plan for Shivwits milkvetch was finalized in September 2006. On December 27, 2006 the USFWS designated 2,421 acres of critical habitat for Shivwits milkvetch; with almost half of those acres, 1,201 acres, within the park (USDI, USFWS, 2006).

The identification of critical habitat is based on data available at the time of designation. The focus for critical habitat is on the physical and biological features essential to the conservation of the species, which are referred to as the primary constituent elements, that are within areas occupied by the species at the time of listing, and that may require special management considerations and protection. The primary constituent elements for Shivwits milkvetch are: outcroppings of soft clay soil within the Chinle and less commonly the Moenave Formations at elevations from 3,018 to 4,367 feet; topographic features/relief including alluvial fans and fan terraces and gently rolling to steep swales with little to moderate slope that are often markedly dissected by water flow pathways from seasonal precipitation; and the presence of insect visitors or pollinators.

Holmgren milkvetch (*Astragalus holmgreniorum*), **dwarf bear-poppy** (*Arctomecon humilis*), and **Siler pincushion cactus** (*Pediocactus sileri*) are not known to occur in ZION. The habitats that support these plants are not known to occur in the park.

ZION also hosts 22 plant species considered “sensitive” by the park and the state of Utah because of their limited distribution (endemism) or are disjunct from more abundant population centers. Many of these species are specialized to sandstone crevices and derived soils or hanging gardens. Table 19 lists ZION’s sensitive plants according to habitat (Atwood et. al 1991, Welsh et. al 1993 and 1975, Welsh 1988).

Common Name	Scientific Name	Habitat
Clark’s lomatium	<i>Lomatium graveolens</i> var. <i>clarkii</i>	Ponderosa pine forest understory or pinyon pine understory
Zion penstemon	<i>Penstemon humilus</i> var. <i>obtusifolia</i>	
Higgin’s penstemon	<i>Penstemon leonardii</i> var. <i>higginsii</i>	
Charleston’s violet	<i>Viola charlestonensis</i>	
Bog violet	<i>Viola clauseniana</i>	
Religious daisy	<i>Erigeron religiosus</i>	Dry meadows

Table 19: Sensitive Plant Species by Habitat			
Common Name	Scientific Name	Habitat	
Panguitch buckwheat	<i>Eriogonum panguinense</i>	Exposed limestone	
Charleston's violet	<i>Viola charlestonensis</i>		
Shivwits milkvetch	<i>Astragalus ampullarioides</i> (federally endangered)	Chinle and Moenkopi Formations (barren badlands)	
Springdale buckwheat	<i>Eriogonum corymbosum</i> var. <i>matthewsiae</i>		
Chia	<i>Salvia columbariae</i> var. <i>argentea</i>		
Zion draba	<i>Draba asperella</i>	Sandstone soils and crevices	
Canaan daisy	<i>Erigeron canaani</i>		
James' buckwheat	<i>Eriogonum jamesii</i>		
Zion buckwheat	<i>Eriogonum racemosum</i> var. <i>zionis</i>		
Jones' goldenaster	<i>Heterotheca jonesii</i>		
Zion penstemon	<i>Penstemon humilis</i> var. <i>obtusifolia</i>		
Utah spikemoss	<i>Selaginella utahensis</i>		
Ruth's sphaeromeria	<i>Sphaeromeria ruthiae</i>		
Foster's columbine	<i>Aquilegia formosa</i> var. <i>fosteri</i>		Hanging garden or wetland
Black spleenwort	<i>Asplenium adiantum-nigrum</i>		
Hays' sedge	<i>Carex haysii</i>		
Zion daisy	<i>Erigeron sionis</i>		
Cliff jamesia	<i>Jamesia americana</i>		

Vegetation

An elevation range from 3,666 feet to 8,726 feet, coupled with topographic complexity and unique geologic substrates creates a diverse flora in ZION; all of which are present in the backcountry. The park includes four life zones: Lower Sonoran, Upper Sonoran, Transition, and Canadian. These life zones consist of low elevation desert shrubland communities with Mojave Desert elements, mid-elevation shrublands and pinyon-juniper woodlands typical of the Colorado Plateau and Great Basin, and montane forests and oak brush shrublands at the park's highest elevations.

Canyons in the park are an important desert oasis, with streams, seeps, wetlands, and hanging gardens. Perennial and ephemeral streams converge into the East and North Forks of the Virgin River, hosting riparian tree species such as the Fremont cottonwood (*Populus fremontii*), Goodings willow (*Salix goodingii*), boxelder (*Acer negundo*), and velvet ash (*Fraxinus velutina*). Seepwillow (*Baccharis emoryi*) and coyote willow (*Salix exigua*) are common riparian shrubs.

Vegetation in the lower to mid-elevations is generally sparse and low in stature due to lack of moisture. Semi-arid desert species, such as blackbrush (*Coleogyne ramosissima*), four-wing saltbush (*Atriplex canescens*) and pockets of mesquite (*Prosopis glandulosa*) are common. Sandy slopes upland from waterways support mostly pinyon pines (*Pinus edulis*, *P. monophylla*), one-seed juniper (*Juniperus osteosperma*), sand and big sagebrush (*Artemisia filifolia* & *A. tridentata*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). Interspersed within these species are pockets of grasses, mainly sand dropseed (*Sporobolus cryptandrus*), mutton grass (*Poa fendleriana*), and the invading non-native red brome (*Bromus rubens*). Red brome is becoming a substantial concern at lower elevations because of its abundance and flammability.

Steep, rocky talus slopes form transitions between floodplains and Navajo sandstone cliffs throughout much of the park. On these sites live oak (*Quercus turbinella*) and silver buffaloberry (*Shepherdia rotundifolia*) are prevalent, along with pinyon and juniper. In the center of the park and extending east are large expanses of Navajo sandstone slickrock and its derived soils. Here, ponderosa pine (*Pinus ponderosa*) becomes more common, along with opportunistic shrubs, such

as greenleaf manzanita (*Arctostaphylos patula*) and littleleaf mahogany (*Cercocarpus intricatus*). In mesic canyons and north facing benches, Douglas fir (*Pseudotsuga menziesii*) occurs.

As the elevation increases, semi-arid shrublands transition to more mesic montane vegetation. Ponderosa pine, aspen (*Populus tremuloides*), and white fir (*Abies concolor*) dominate. Tall shrubs consist of gambel oak (*Quercus gambelii*), serviceberry (*Amelanchier utahensis*, *A. alnifolia*), and bigtooth maple (*Acer grandidentatum*).

The vegetation of ZION and the surrounding area was mapped through a project with the U.S. Bureau of Reclamation, The Nature Conservancy (Nature Serve), and the NPS. Table 20 and Map G (North & South) display the major vegetation complexes within ZION delineated by vegetation community.

Table 20: Major Vegetation Complexes in the Backcountry		
Vegetation Communities	Native/Non-Native	Acreage
Exotic Grasses	Non-Native	1,093
Grass/Herbaceous Lands	Native	854
Wetland/Riparian	Native	2,368
Exotic Riparian	Non-Native	4
Desert Shrublands	Native	1,851
Shrublands	Native	5,090
Slickrock	Native	8,614
Mountain Shrub	Native	28,235
Aspen	Native	280
Juniper/Pinyon - Juniper	Native	42,882
Ponderosa Pine	Native	25,291
Douglas Fir	Native	1,714
White Fir	Native	2,766
Bare Soil/Stone Formations	N/A	24,018
TOTAL ACRES WITHIN THE BACKCOUNTRY		145,060

Invasive Exotic Plant Species

Over 100 non-native plant species occur in ZION. Tamarisk (*Tamarix ramosissima*) and Russian olive (*Eleagnus angustifolia*) are the primary invasive species along riparian areas. Both non-native tree species are increasing throughout the West and are able to effectively displace native riparian communities, creating monocultures in formerly biologically diverse habitats. ZION has actively controlled these species for the past two decades.

In disturbed areas, Scotch thistle (*Onopordum acanthium*), bull thistle (*Cirsium vulgare*), and white top (*Cardaria draba*) are most commonly seen along trails in the front and backcountry. ZION staff work diligently with hundreds of volunteers to control these invasive weeds. Currently, knapweed (*Centaurea* spp.) and yellow starthistle (*Centaurea solstitialis*) occur in only small infestations, but are of great potential threat. Known occurrences of non-native species will be controlled each growing season and new populations will be detected as early as possible.

Covering immense areas throughout the Intermountain West, cheatgrass (*Bromus tectorum*) and rigput brome (*Bromus diandrus*) have also succeeded in ZION, infesting over 8,000 acres mainly in the frontcountry. Because these exotic annuals germinate in the fall or winter, they effectively outpace native bunch grasses that emerge weeks or months later.

Soils

With very few exceptions, soils in the park are young, very well drained, easily eroded, and low in fertility (USDA, SCS, 1977). Rock and stony rock lands make up half of the 36 soil complexes that occur in the park. Over 80 percent of the soils have low productivity or high erosion potential. Exposures of slickrock, where little soil exists at all or exists only in small pockets, cover large areas of the park. Vegetation in these areas is typically sparse, though the variety of plant species is often great and includes a number of endemic species. Some plants also take advantage of the additional water running off the slickrock to grow at lower elevations than would otherwise be expected.

Shallow soils are more extensive on mesa tops, slopes, and terraces. These areas are often very gravelly or rocky. Some development of soil horizons and structure may occur on flatter slopes. Though soils on steep slopes are often little more than ground bedrock with very little soil development and a large proportion of gravel and boulders, they can still support a moderate density and diversity of plants.

Deep soils are typically confined to river terraces and floodplains, as well as isolated pockets on some of the flatter upland terraces. These are some of the park's most productive soils, particularly where watered by rivers and streams. Older and higher river terraces are more arid and prone to erosion from natural incision and human causes.

Very few small, isolated pockets of poorly drained, or organic rich soils exist in natural wetlands, artificial impoundments, and areas where large landslides have impounded natural streams. These areas are widely scattered and are generally less than 1 acre in size.

The degree of litter and plant cover varies directly with available moisture from precipitation, which is closely tied to elevation and aspect. Soils at high elevations, which receive more precipitation, tend to have better litter cover and are therefore more resistant to erosion. At drier low elevations, the amount of soil surface unprotected by litter or plant cover will often exceed 50 percent. Similarly, soils on north exposures are cooler, moister and maintain greater vegetative and litter cover than those on south exposures. This characteristic common to all environments is exaggerated in ZION due to the deep narrow canyons. In soils with a high quantity of coarse rock fragments, gravel and rock on the soil surface provide some protection from raindrop impact and resistance to wind and water erosion.

ZION also contains notable amounts of biological soil crusts where the soil surface is bound together by a community of algae, fungi, lichen, and other microorganisms. This soft crust greatly increases the soil's ability to capture and hold water, fix nitrogen from the atmosphere, and resist erosion from wind, raindrop impact and flowing water (Belnap et. al., 2001). These soils are sensitive to compression, especially when the crusts are dry and brittle. The time necessary for recovery depends on the magnitude and frequency of disturbance and the weather conditions. Minor disturbances can recover function within a few storm cycles, while areas of extensive disturbance can take several decades to fully recover. Where crusts are impacted by footsteps such as those caused by walking off-trail in the backcountry, the function of the crust may recover relatively quickly, but the altered appearance can remain years longer and can remain an attractive nuisance for subsequent hikers. ZION does not have detailed field surveys to determine the distribution of biological soil crusts. However, these crusts are typically associated with open canopies and sandy soil usually found in pinyon/juniper woodlands and desert-shrub communities.

Map G North - Front

Map G North - Back

Map G South - Front

Map G South - Back

Floodplains

All of the river channels in ZION have floodplain terraces associated with the wetted channels, though these are generally narrow and often intermittent along channels due to the steep terrain and narrow canyons. These floodplains are considered part of the river's active channel in that it is normal for rivers to repeatedly inundate, scour and deposit sediment on these lands.

Floodplains are essential to natural streams because they are the means by which large flood flows move through the river system. They are also some of the most biologically productive lands due to the availability of water, and the frequency of natural disturbance. The species diversity is typically much greater than on adjacent uplands that are much more arid.

Floodplains in ZION's backcountry have not been delineated because no permanent structures exist or are planned in this area. As a result, a measure of the acreage of floodplains in ZION is not available. It can be said that campsites on the floodplains are consistently located above the bankfull channel (which could flood every 1.5 to 2 years) and are generally above the level of larger floods with recurrence intervals of 20-50 years.

Floodplain terraces are often selected for campsites due to the proximity to water, availability of shade from riparian trees and level land. In many parts of the park they are the only lands that most campers would consider desirable for camping. Twenty nine designated campsites currently exist in floodplains in the park. The risks associated with designated campsites in flood hazard areas and actions to mitigate risks are identified in the Floodplains Statement of Finding Appendix F. The number of campsites in floodplains where at-large camping is permitted is not known.

Chapter 4

List of Preparers

Name	Title	Plan Contribution
Jock Whitworth	Superintendent	Review and Approval
Raymond O'Neil	Plateau District Ranger	Team Leader
Cody Cole	Plateau Law Enforcement Ranger	Review
Annette Werederich	Backcountry Permit Supervisor	Review
Fred Hoeger	Kolob District Ranger	Review
Kevin Killian	Canyon District Law Enforcement Ranger	Review
Tom Haraden	Assistant Chief Naturalist	Visitor Services
Sarah Horton	Archeologist	Cultural Resources
Cheryl Decker	Vegetation Specialist	Vegetation
David Sharrow	Hydrologist	Water, Soils, Floodplains
Claire Crow	Wildlife Biologist	Wildlife
Kelly Fuhrmann	Fire Ecologist	Fire Management
Kezia Nielsen	Environmental Protection Specialist	Planning, NEPA
Jack Burns	Concession Management Specialist	Review

References

- Atwood, D., J. Holland, R. Bolander, B. Franklin, D. House, L. Armstrong, K. Thorne and L. England. 1991. Utah: Threatened, Endangered, and Sensitive Plant Field Guide.
- Belnap, Jayne, Julie H. Kaltenecker, Roger Rosentreter, John Williams, Steve Leonard and David Eldridge. 2001. Biological Soil Crusts: Ecology and Management. U. S. Bureau of Land Management, National Science and Technology Center, Technical Reference 1730-2, Denver, Colorado.
- Manning, Robert E., Freimund, Wayne A., Marion, Jeffery L. 2004. Research to Support Application of the Visitor Experience and Resource Protection Framework to Backcountry Planning at Zion National Park – Final Report. June 30, 2004.
- Marion, Jeffery L. 2003. Trail Monitoring Manual Zion National Park version 4/03. USDI, U.S. Geological Survey, Patuxent Wildlife Research Center, Virginia Tech/Department of Forestry, Blacksburg, Virginia.
- Marion, Jeffery L. 2002. Campsite Monitoring Manual Zion National Park version 11/1/02. USDI, U.S. Geological Survey, Patuxent Wildlife Research Center, Virginia Tech/Department of Forestry, Blacksburg, Virginia.
- United States Department of Agriculture (USDA). Soil Conservation Service. 1977. Soil Survey of Washington County Area, Utah.
- United States Department of the Interior (USDI), Fish and Wildlife Service (USFWS). 1994. Desert Tortoise (Mojave population) Recovery Plan. USFWS, Portland, Oregon.
- USDI, USFWS. 1995a. Recovery Plan for the Mexican Spotted Owl: Vol. 1. Albuquerque, New Mexico.
- USDI, USFWS. 1995b. Recovery Plan for the Virgin River Fishes. USFWS, Region 6, Denver Colorado.
- USDI, USFWS. 1996. Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of California Condors in Northern Arizona; Final Rule; 50 CFR Part 17, October 16, 1996.
- USDI, USFWS. 2001. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Astragalus holmgreniorum* (Holmgren milk-vetch) and *Astragalus ampullarioides* (Shivwits milk-vetch) Final Rule. Federal Register, Volume 66, No. 189, pages 49560-49567.
- USDI, USFWS. 2004. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Mexican Spotted Owl; Final Rule; 50 CFR Part 17, August 31, 2004.
- USDI, USFWS. 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus ampullarioides* (Shivwits milk-vetch) and *Astragalus holmgreniorum* (Holmgren milk-vetch); Final Rule; 50 CFR Part 17, December 27, 2006.

USDI, USFWS. 2007. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife; Final Rule; endangered and Threatened Wildlife and Plants; Draft Post-Delisting and Monitoring Plan for the Bald Eagle (*Haliaeetus leucocephalus*) and Proposed Information Collection; Notice; 50 CFR Part 17. Federal Register, Vol. 72, No. 130, July 9, 2007.

United States Department of the Interior (USDI), National Park Service (NPS). 1987. Trail Standards Guide for Zion National Park.

USDI, NPS. 1999. Zion National Park. Wildlife monitoring reports.

USDI, NPS. 2001a. Zion National Park. Peregrine falcon management and monitoring information.

USDI, NPS. 2001b. Zion National Park. General Management Plan.

USDI, NPS. 2002. Zion National Park. Statement for Management.

USDI, NPS. 2005. Zion National Park. Fire Management Plan.

USDI, NPS. 2006. Management Policies 2006. Washington, D.C.

USDI, NPS. 2006. 1998-2006 Zion National Park Backcountry Statistics.

Utah Division of Wildlife Resources (UDWR). 2000. Desert Tortoise (*Gopherus agassizii*) Distribution Survey, Zion National Park. Publication Number 00-36.

UDWR. 2003. Baseline Virgin Spinedace (*Lepidomeda mollispinis mollispinis*) Population Demographics in an Area Proposed for Floodplain Restoration and a Reference Reach, North Fork of the Virgin River, Zion National Park, Fall 2002.

Wauer, Roland. 1997. Birds of Zion National Park and Vicinity. Utah State University. Logan, Utah.

Welsh, Stanley L. 1988. Zion National Park threatened and endangered and exotic plant surveys; final report 1987-1988. Endangered Plant Studies, Inc. Orem, Utah.

Welsh, S.L., D.N. Atwood, S. Goodrich and L. Higgins. 1993. A Utah Flora. Brigham Young University. Provo, Utah.

Welsh, S.L., D.N. Atwood, and J.L. Reveal. 1975. Endangered, threatened, extinct, endemic, and rare or restricted Utah vascular plants. Great Basin Naturalist. Volume: 35, Issue: 4.

Glossary

Anchor – Point where rope is fixed to the rock.

Annual Plant – A plant growing from seed, producing flowers and seeds, and dying the same year.

At-Large-Camping – Visitors can camp anywhere they choose in the backcountry with the exception of: within 1-mile of any road, within ¼-mile of a spring, within ¼-mile of the park boundary, within site of trails, under rock overhangs, or on private inholdings.

Backcountry – Zion backcountry constitutes most of the undeveloped area of the park, where no roads or substantial human-made structures exist. Much of Zion's backcountry, however, does contain maintained trails. Primary backcountry travel is by foot, and on specified trails, by horseback. Camping is regulated in the backcountry: in some areas camping is allowed nearly anywhere, while in other areas camping is only permitted in designated campsites. In the backcountry visitors have opportunities to experience a natural landscape, solitude, and natural quiet.

Biological Soil Crusts – Where the soil surface is bound together by a community of organisms that can include cyanobacteria, algae, fungi, mosses and lichens. These create a soft crust at the soil surface that is resistant to raindrop impact, erosion from wind and water, and its roughness greatly increase the soil's ability to capture and hold water.

Bivouac – A sleeping place in the middle of a climbing route.

Bolts – Stout metal pin drilled in the rock of steep routes to provide permanent protection for climbers and canyoneers.

Cairn – A pile of stones set up as a landmark or to mark a route, trail or boundary.

Campsite – An area where visitors camp. The area is obvious as a campsite; the vegetative cover is lost and/or the organic letter is pulverized in the primary use area.

Canadian Life Zone – The fir forest of this life zone is dominated by Douglas fir. White fir is also characteristic. In some places pines (other than ponderosa) are also common. Deciduous broadleaf trees such as Gambel oak, and quaking aspen can also be found here. The elevation of the zone ranges from 7,500 to 9,500 feet; and precipitation from 25 to 30 inches.

Candidate Species – A plant or animal species for which the U.S. Fish and Wildlife Service or National Oceanic and Atmospheric Administration Fisheries has on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened.

Canyoneering – Similar to mountaineering in that it is much more difficult than mere backpacking or hiking. Canyoneering requires hiking, repelling, climbing, and swimming with your gear through remote generally hard to access canyons. In ZION, permits are issued for canyoneering routes requiring the use of rappelling equipment.

Chalk – Powdered carbonate of magnesia used by climbers to help hands adhere to the rock.

Colorado Plateau – Region encompassing the much of the eastern half of Utah. The area is characterized by a thick sequence of largely nearly flat-lying sedimentary rocks that are eroded into picturesque buttes, mesas, and deep, narrow canyons.

Commercial Use – In the backcountry these activities include guide services for hiking, outfitted horseback use, mountain climbing, canyoneering and other similar activities. Where allowed, a permit is required to perform such services.

Critical Habitat – Specific geographic areas, whether occupied by a listed species or not, that are essential for its conservation and that have been formally designated by rule published in the Federal Register.

Day Use – Frontcountry or backcountry use that does not require an overnight stay. Activities could include hiking, canyoneering, climbing, sightseeing, wildlife viewing, cross country skiing.

Endangered Species – An animal or plant species in danger of extinction throughout all or a significant portion of its range.

Endemic Species – A species native and confined to a certain region; generally used for species with comparatively restricted distribution.

Ephemeral Streams – A waterbody that only exists for a very short time following precipitation or snowmelt.

Erosion – The group of natural or human caused processes by which material is worn away from the earth's surface.

Eyrie – The lofty nest of a bird of prey (such as a hawk or eagle).

Fire Management Plan (FMP) – A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire Management Unit (FMU) – Any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or substantial fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in FMP. These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Flash Flood – A flood that arrives with such rapidity that escape is difficult or impossible.

Floodplain – Part of a river channel that is inundated only during time of high flow. A 100-year floodplain is the area inundated by a flood that has a 1% chance of occurring in any given year, or occurs on average once every 100 years. Floods of this magnitude occur frequently enough to pose a serious threat to facilities and people.

Frontcountry – Areas within ZION where visitors have structured opportunities to enjoy and learn about the park, usually by means of motorized transport on roads. The frontcountry also includes campgrounds, picnic areas, popular trails, the Visitor Center and Museum.

Great Basin – Region encompassing the much of the western half of Utah. Characterized by steep, narrow, north-trending mountain ranges separated by wide, flat sediment filled valleys.

Habitat – The place or environment where a plant or animal naturally lives and grows (a group of particular environmental conditions).

Hanging Gardens – Usually found along rock walls where water seeps through cracks in the rock. The water creates an alcove and deposits sediment on or below the wall. Some plants use these sediment deposits and water to grow.

Herbicide – Any chemical substance used to control plant growth.

Inholding – Tracts of land in private ownership within the boundary of the park. These were in private ownership before designation of park lands in that area, and retain preexisting property rights and land uses.

Litter – Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Lower Sonoran Life Zone – The vegetation of this life zone corresponds with hot deserts of the southwestern United States. Desert shrubs and succulents occur at elevations from 100 to 4000 feet above sea level. Total annual precipitation averages 10 inches or less.

Management Zones – Identify how different areas of the park will be managed to achieve a combination of desired conditions. Each zone represents a unique combination of physical, biological, social, and managerial conditions.

Mesa – A flat-topped mountain or plateau bounded on at least one side by a steep cliff.

Mesic – Pertaining to, or adapted to an environment having a balanced supply of moisture.

Mitigation – A modification of the proposal or alternative that lessens the intensity of its impact on a particular resource.

Montane – Pertaining to, growing in, or inhabiting mountainous regions.

Non-native Plant – A plant that is not native to the area, exotic, noxious.

Perennial Plant – Plants living more than two years.

Perennial Stream – A stream that is active the entire year – has water year-round.

Permit – Is issued by the Superintendent to authorize an otherwise prohibited or restricted activity or impose a public use limit.

Plateau – An elevated, relatively flat region commonly limited on at least one side by an abrupt descent to lower land.

Potential Wilderness – A wilderness study may identify lands that are surrounded by or adjacent to lands proposed for wilderness designation but that do not themselves qualify for immediate designation due to temporary nonconforming or incompatible conditions. The wilderness recommendation forwarded to the Congress by the President may identify these lands as “potential” wilderness for future designation as wilderness when the nonconforming use has been removed or eliminated.

Prescribed Fire – Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition. This term replaces management ignited prescribed fire.

Primitive – Of or existing in the beginning or the earliest times or ages; ancient; original; crude; simple; rough; uncivilized.

Recommended Wilderness – Lands that have been identified, through a wilderness study, as suitable for inclusion in the national wilderness preservation system. The NPS has recommended these lands as suitable for inclusion to the Secretary of the Interior, who forwarded the recommendation to the President, who then forwarded the recommendation to Congress.

Recovery Plan – A document drafted for the U. S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration Fisheries, or other knowledgeable individual or group that serves as a guide for activities to be undertaken by federal, state or private entities in helping to recover and conserve endangered and threatened species.

Research Natural Areas – Field ecological areas designated primarily for research and education and/or to maintain biological diversity.

Riparian – Adjacent to, or living on, the bank of a river, or sometimes a lake or pond.

Route – A path made by people (or wildlife) walking over the area repeatedly. A route is not constructed, is usually not marked, and is usually not maintained.

Cross Sectional Area – Measurement of a cross section of trail or route used to determine the tread incision (how much of the trail has eroded away, etc.) and the tread width as part of the *Trail Monitoring Manual* developed by Dr. Jeffery Marion.

Seasonal Closure – Closure of an area for a specific reason during a specific season, often to protect wildlife (i.e., closing a climbing route during peregrine falcon nesting March 1 through August 31).

Seep – A place where water oozes from the ground to form a pool.

Semi-arid – A climatic region that receives low annual rainfall.

Slickrock – Flat areas or, more commonly, slopes with large exposures of bare rock. This is typically on exposures of Navajo sandstone in ZION.

Sling – A length of nylon webbing which is either sewn or tied into a loop and is used in conjunction with the rope and anchors to provide protection while rock climbing or canyoneering.

Slot Canyon – Narrow and usually deep canyons formed by water. In ZION they are popular hiking routes that require a level of skill and equipment to navigate.

Social Trail – Trails or routes that are non-designated and undesirable. They are usually made by visitors' short cutting to campsites, water sources, etc.

Solitude – The state of being solitary, or alone; seclusion, isolation, or remoteness.

Talus – A sloping mass of rocky fragments at the base of a cliff.

Technical Canyon – Refer to Slot Canyon.

Threatened Species – An animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Trails – Designated, mapped, and maintained route used by visitors on foot and sometimes horseback.

Transition Life Zone – An open ponderosa pine forest is characteristic at elevations from 6,000 to 9,000 feet. Total annual precipitation ranges from 18 to 26 inches.

Upper Sonoran Life Zone – A number of communities are characteristic of this zone that ranges from 3,500 to about 7,000 feet in elevation. These include a woodlands of oaks, pinyon pine, and/or juniper; chaparral of scrub oaks, manzanita, and mountain mahogany; grassland; and Great Basin desert-scrub with its dominant sagebrush. Total annual precipitation varies from 8 to slightly more than 20 inches.

Visitor Experience and Resource Protection (VERP) – A planning and management framework that focuses on visitor use impacts on the visitor experience and the park resources. These impacts are primarily attributed to visitor behavior, use levels, types of use, timing of use, and location of use.

Watershed – The area drained by a river or river system.

Wetlands – Lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities in the soil and on the surface. Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance.

Wilderness – (Definition from the Wilderness Act) A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Wildland – Any natural landscape not maintained for buildings, road, fence or other human development.

Wildland Fire – Any non-structural fire, other than a prescribed fire, that occurs in wildland. This term encompasses fire previously called both wildland fire and prescribed natural fire.