Crater Lake National Park
Oregon

National Park Service
U.S. Department of the Interior

Trail Management Plan / Environmental Assessment

September 2021

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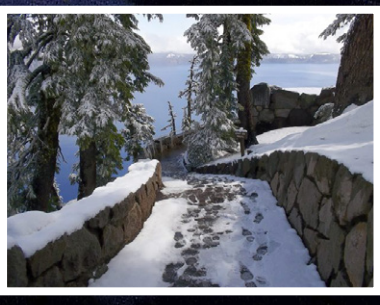
CHAPTER

1

Purpose and Need



CHAPTER 1: PURPOSE AND NEED

BACKGROUND

The Crater Lake trail system comprises 95 miles of trail. The most popular trails follow the rim of the lake. Other trails wind through lower elevation forests, including a 35-mile segment of the Pacific Crest National Scenic Trail. As a whole, the Crater Lake trail system provides visitors with numerous opportunities, including but not limited to: immersion in the landscape, beautiful views, solitude and self-reliance, a chance to get some fresh air and exercise, and an enhanced understanding of the park's significance.

Park visitation has increased over the last few decades and will likely continue to rise. Trends since the turn of the century best illustrate this pattern. In 2000, there were 426,883 visitors to Crater Lake. By 2015, this number had risen to 614,712. In 2016, annual visitation had risen sharply to 756,344, an increase of more than 100,000 in one year and nearly double the visitation from the year 2000 (see figure 5). With increased visitation comes increased crowding, congestion, and resource impacts. The trail system is one tool to help ease congestion, minimize resource impacts, and better disperse visitors in the park.

The 2005 Crater Lake General Management Plan / Environmental Impact Statement (2005 GMP/EIS), called for increased recreational opportunities in the park, more nonmotorized opportunities along the rim, short trails along roadways, and for transitional experiences between developed areas and the backcountry.

PURPOSE, NEED, AND OBJECTIVES

Purpose

The purpose of the trail management plan is to provide high-quality nonmotorized recreational opportunities while preserving park resources. The plan is intended to guide trail management and investment in trail infrastructure over the next 25 years.

Need

- visitor experience is being diminished by increased crowding and congestion;
- impacts to resources are increasing in number and severity;
- existing trails and trail use are concentrated in localized areas of the park, which places stress on those resources and limits recreational in other areas of the park; and
- the park lacks comprehensive, consolidated guidance for trail management.

Objectives

The plan aims to ensure that the trail system at Crater Lake National Park

- is sustainable, meaning each trail lies lightly on the land, will endure, and requires little maintenance;
- offers high-quality recreational experiences for a wide range of visitors and abilities during all seasons of the year;

- provides opportunities for visitors to experience the resources and values that contribute to the park's significance;
- offers expanded and diverse nonmotorized recreational experiences (e.g., opportunities for short- and longer-distance loops, new trails in areas where few currently exist, and expanded access for bikes and equestrians);
- provides greater trail access and connectivity between features of interest within the park and between trails;
- protects park resources and limits impacts from trail use;
- balances development with natural and cultural resource conservation by proposing new trails while reducing or eliminating redundant and underutilized trails;
- minimizes the potential for conflict among visitors using different modes of recreation (e.g., hiking, horseback riding, and biking);
- improves pedestrian circulation and offers alternatives to a vehicle-based visit;
- is integrated with trail networks outside the park; and
- is managed in collaboration with partners.

This plan/environmental assessment (plan/EA)presents different alternatives for addressing the purpose and need, including the preferred alternative. It does not rule out consideration of future trail proposals. New trail proposals would be considered based on need, including whether changes have occurred with visitation, park operations, and resource conditions since completion of this plan.

This plan/EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality regulations for the implementation of NEPA (40 CFR § 1500-1508), DOI regulations for the implementation of NEPA, (43 CFR §46), and the NPS Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*).

RELATIONSHIP TO OTHER PLANNING

This document is part of Crater Lake National Park's planning portfolio. Together, all of the documents in a park's planning portfolio comprise the park management philosophy and create a logical, trackable guide for future park management actions. This trail management plan addresses the park's trails to ensure they are sustainable, offer high-quality recreational experiences, and protect park resources.

The National Parks and Recreation Act of 1978 (54 USC 100502) requires the preparation and timely revision of general management plans for each unit of the national park system. At a minimum, each park must have a plan or series of plans that include the four statutory requirements identified in 54 USC 100502:

1. measures for the preservation of the area's resources;
2. indications of types and general intensities of development (including visitor circulation and transportation patterns, systems, and modes) associated with public enjoyment and use of the area, including general locations, timing of implementation, and anticipated costs;
3. identification of an implementation commitment for visitor carrying capacities for all areas of the unit; and
4. indications of potential modifications to the external boundaries of the unit and the reasons therefore.

This trail management plan addresses the statutory requirement for indications of types and general intensities of development associated with public enjoyment and use of the area. This plan also addresses the identification of an implementation commitment for visitor carrying capacities at some areas of the unit, namely along the trail corridors.

As substantial new issues or significant changes arise, the National Park Service (NPS) may amend general management plans. This plan serves as an amendment to the 2005 GMP EIS. Specifically, this plan would amend the management zoning identified for the Cleetwood Cove and Discovery Point areas. These trail corridors would be rezoned from the backcountry zone to the frontcountry zone during the summer. All other zoning, including winter zoning for these trail corridors, would remain the same.

IMPACT TOPICS RETAINED FOR FURTHER ANALYSIS

Impact topics identify resources that could be affected, either beneficially or adversely, by implementing any of the proposed alternatives. The National Park Service used an interdisciplinary review process, existing studies and data, and public comments to determine which resources would likely be affected by this project. Issues were retained for detailed analysis in this environmental assessment if they met one or more of the following criteria:

- the environmental impacts associated with the issue are central to the proposal or of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue.

The following topics are carried forward for further analysis in this trail management plan/environmental assessment:

- Soils
- Vegetation
- Wetlands and Riparian Areas
- Northern Spotted Owl
- Whitebark Pine
- Wilderness Character
- Visitor Use and Experience
- Historic Structures and Cultural Landscapes

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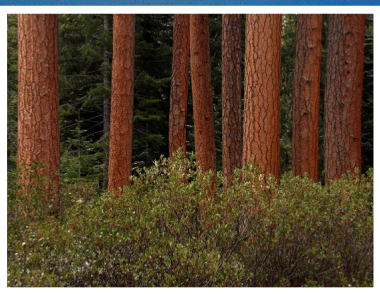
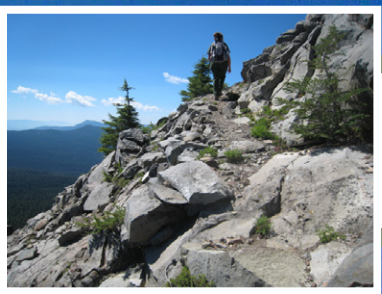
CHAPTER

2

Alternatives





CHAPTER 2: ALTERNATIVES

INTRODUCTION

This plan/EA analyzes a no-action alternative and two action alternatives for trail management. The elements of these alternatives are described in detail in this chapter. The no-action alternative would continue current management and provides a basis for comparing the other alternatives. The action alternatives present different approaches to address the plan's purpose and need as described in chapter 1. The alternatives presented in this section were created based on recommendations of an interdisciplinary planning team and public feedback. This chapter also includes alternatives considered but dismissed from further consideration and actions common to all action alternatives.

The following sections describe the alternatives through a series of brief narratives and tables capturing key characteristics, mileage, and allowed uses of new trails. This chapter also includes a brief summary of indicators and thresholds, visitor capacity, and cost estimates.

Table 1 compares the no-action and both action alternatives based on the number of miles of new trail construction, miles of existing road designated as trail, miles of existing trail that are subject to changes in allowed use types, and the total estimated costs of construction. Calculation of costs and mileages for the action alternatives in table 1 incorporates actions that are common to all action alternatives.

Table 1. Comparison of Alternatives by Cost and Mileage

Mileage/Costs	No-Action Alternative	Alternative 1 – Preferred Alternative	Alternative 2
Miles of new trail construction	0	20.63 mi	23.20 mi
Miles of existing road to be designated as trail	0	4.95 mi	4.95 mi
Miles of existing trail with changes in allowed use types		4.00 mi	0 mi
Estimated costs of construction	0	$8.5 M	$4.2 M

Several trails proposed in alternative 1 would feature paved or improved surfaces, which contributes to the difference in estimated costs between alternatives. Alternative 2 has a greater total mileage proposed than alternative 1 with 13.30 miles of new trail proposed that would contribute to a continuous Rim Trail.

NO-ACTION ALTERNATIVE

The no-action alternative would continue management of the park's existing 95-mile summer and winter trail systems as outlined in its 2005 GMP/EIS (figure 1). No new trails are proposed in this alternative, but future proposals would be evaluated on a case-by-case basis. All trails would be marked and maintained according to their assigned trail class and allowable uses. For more information on trail classes, see appendix E for an overview of trail classes and

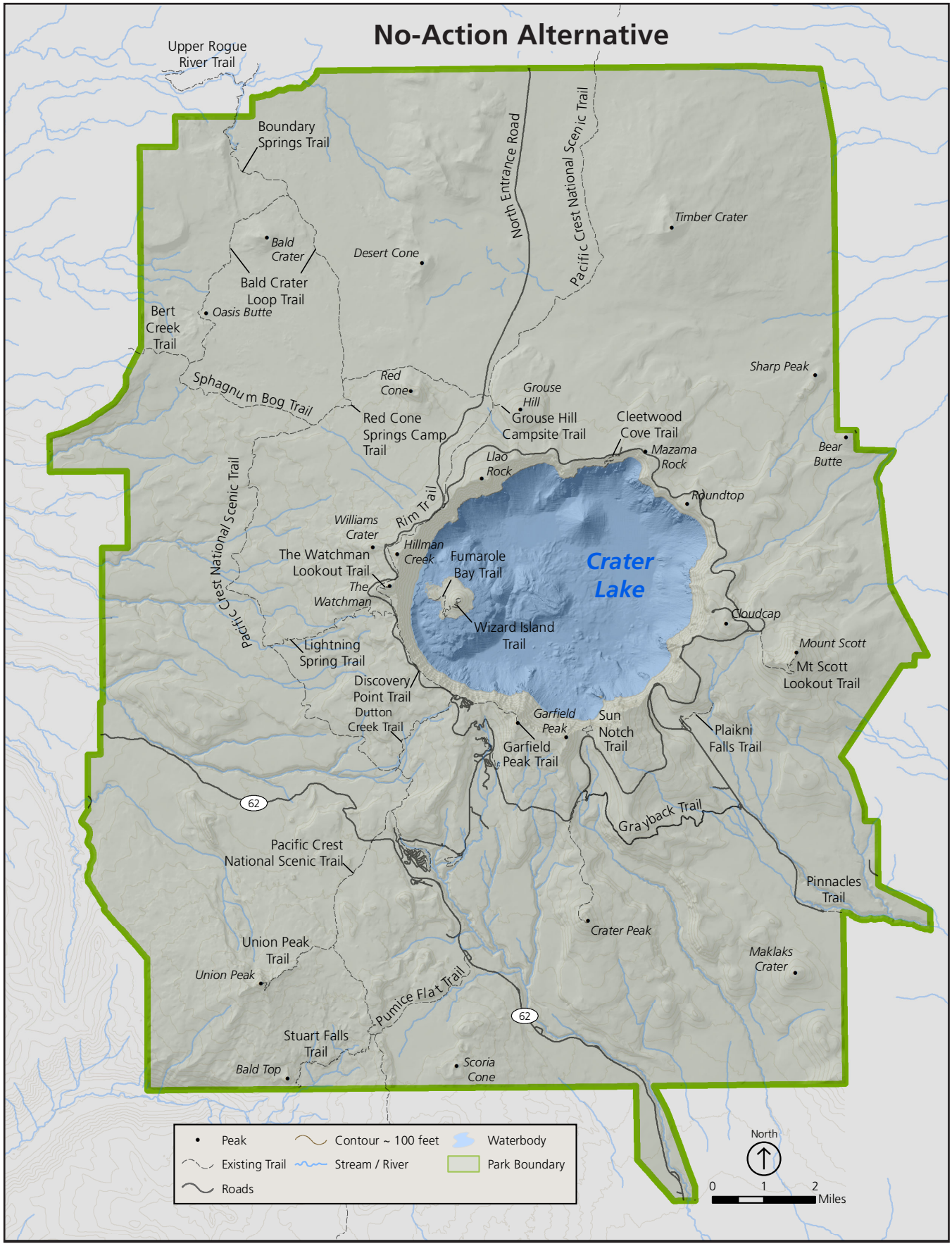


FIGURE 1. MAP SHOWING TRAIL SYSTEMS UNDER THE NO-ACTION ALTERNATIVE

current trail management objectives. No existing trails would be closed unless warranted by resource concerns or safety reasons.

Summer trail uses generally include hiking/pedestrian use on all trails, as well as bicycles, pack and saddle use, and dogs (on-leash) on some trails. Winter uses include hiking/snowshoeing, cross-country skiing, and snowmobile use. Management for winter use involves marking and grooming of some trails.

Table 2 lists existing Crater Lake trails based on trail mileage, trail class, whether the trail has frontcountry or backcountry "trail characteristics," and allowed summer and winter uses based on current management. It should be noted that the frontcountry and backcountry "trail characteristics" defined here are distinct and different from the frontcountry and backcountry management zones that are defined in the 2005 GMP/EIS. These trail characteristics describe how park staff generally manage and maintain the trails and define desired conditions for the trails. Absent from the table is Grayback Road, which is currently classified and maintained as an administrative road but is open to hiking, biking, stock use, and dog walking.

Table 2. Existing Trails in the No-Action Alternative

Trail Name	Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Summer Uses: Stock	Allowed Summer Uses: Bikes	Allowed Summer Uses: Dogs
Annie Creek Canyon Trail	1.80 mi	3	Frontcountry			
Annie Creek Spur Trail	0.44 mi	3	Frontcountry			
Annie Spring Trail	0.75 mi	3	Backcountry			X
Bald Crater Loop Trail	13.63 mi	2	Backcountry	X		
Bert Creek Trail	1.31 mi	2	Backcountry	X		
Boundary Springs Trail	2.62 mi	3	Backcountry			
Boundary Springs Spur Trail	0.5 mi	3	Backcountry			
Bybee Creek Horse Camp Trail	0.32 mi	3	Backcountry	X		
Castle Crest Wildflower Trail	0.42 mi	3	Frontcountry			
Castle Crest Wildflower Spur Trail	0.38 mi	3	Frontcountry			
Cleetwood Cove Trail	1.10 mi	4	Frontcountry			
Crater Peak Trail	3.24 mi	3	Frontcountry			
Discovery Point Trail	0.95 mi	3	Frontcountry			
Dutton Creek Trail	2.37 mi	3	Backcountry			
Dutton Creek Camp Trail	0.20 mi	3	Backcountry			X
Fumarole Bay Trail	0.40 mi	3	Frontcountry			
Garfield Peak Trail	1.54 mi	3	Frontcountry			
Godfrey Glen Trail	1.10 mi	4	Frontcountry			X

Trail Name	Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Summer Uses: Stock	Allowed Summer Uses: Bikes	Allowed Summer Uses: Dogs
Grouse Hill Camp Trail	0.20 mi	3	Backcountry			
Lady of the Woods Historic Trail	0.68 mi	3	Frontcountry			X
Lightning Spring Trail	4.30 mi	2	Backcountry	X		
Lightning Spring Camp Trail	0.20 mi	3	Backcountry			
Mount Scott Trail	2.18 mi	3	Frontcountry			
North Junction Trail	0.1 mi	3	Frontcountry			X
Pacific Crest National Scenic Trail (PCT)	34.85 mi	3	Backcountry	X		X
Pinnacles Trail	0.38 mi	4	Frontcountry			
Plaikni Falls Trail	1.0 mi	4	Frontcountry			
Pumice Flat Trail	2.86 mi	2	Backcountry			
Red Cone Spring Camp Trail	0.20 mi	3	Backcountry			X
Rim Trail Section 1 – Discovery Point to North Junction	4.61 mi	3	Frontcountry			
Rim Trail Section 2 – North Junction to PCT	2.97 mi	3	Backcountry			
Stuart Falls Trail	2.77 mi	3	Backcountry	X		
Sun Notch Trail	0.65 mi	4	Frontcountry			
Union Peak Trail	2.54 mi	3	Backcountry			
Watchman Lookout Trail	0.83 mi	3	Frontcountry			
Wizard Island Trail	1.03 mi	3	Frontcountry			
Total Mileage	**95.42 mi**	**–**	**–**	**–**	**–**	**–**

ALTERNATIVE 1 – NPS PROPOSED ACTION AND PREFERRED ALTERNATIVE

Alternative 1 introduces approximately 20 miles of new summer trails and changes of use or designation to approximately 9 miles of trails by balancing new trail development with the protection of natural and cultural resources in the park (table 3, table 4). New trail development is primarily focused on the southern and western portions of the park to disperse visitors to areas where few trails currently exist. This dispersal would have the benefit of providing visitors opportunities to experience more areas and features of interest in the park. Providing new trail opportunities in these areas would also help relieve some of the visitor crowding along Rim Drive during the summer months. New trails would also be added at the lower elevations of the park to improve year-round visitor access to areas that receive less snowfall and therefore have a longer summer season.

Table 3. New Trails Proposed in Alternative 1

Trail Name	Trail Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Uses: Stock	Allowed Uses: Bikes	Allowed Uses: Dogs	Allowed Uses: Snowshoe	Allowed Uses: Ski	Allowed Uses: Snowmobile
Castle Creek Canyon Overlook	0.25 mi	5	Frontcountry						
Castle Creek Canyon Trail	0.70 mi	3	Frontcountry						
Falls to Flowers Trail	2.58 mi	3	Frontcountry						
Mazama Campground Loop Trail	1.41 mi	5	Frontcountry	–	X	X	–	X	–
Mazama Rock Trail	1.35 mi	3	Frontcountry						
Munson Valley Roadside Trail	3.48 mi	5	Frontcountry	–	X	X	X	X	–
Munson Valley Spur	0.53 mi	3	Frontcountry						
Panhandle Trail	3.09 mi	3	Frontcountry	–	–	–	–	–	–
Ponderosa Pine Trail	0.45 mi	3	Frontcountry						
Raven Trail	1.54 mi	3	Frontcountry						
Union Peak to Stuart Falls Connector Trail	5.00 mi	3	Backcountry	X					
Total Mileage	**20.38 mi**								

Nonmotorized connectivity would be improved between Mazama Campground, Park Headquarters, and Rim Village—three critical nodes for visitors. New trails would improve user circulation and safety between these heavily used areas. They would also protect adjacent resources by replacing user-created trails with formalized trails that would direct users away from fragile natural and cultural resources.

Existing and new trails would be developed to expand opportunities for a wide range of visitors and for recreational modes within the park (figure 2). Accessibility would be improved with several new trails having firm and stable surfaces on gentle grades, including the Munson Valley Roadside Trail and the Mazama Campground Loop Trail. Equestrians would gain additional trail access on the Pumice Flat Trail, Union Peak to Stuart Falls Connector Trail, and lower portion of the Union Peak Trail. Cyclists would also gain opportunities on more trails, including the Munson Valley Roadside Trail and Mazama Campground Loop Trail.

The following new summer trails would be established and opened for visitor use:

- **Castle Creek Canyon Overlook** – Near the existing Old West pullout, this approach would provide a short route to a viewpoint for visitors seeking a more vehicle-based experience at the park. Near the existing Old West pullout, a separate hardened trail would be built on the north side of Highway 62 leading to a new overlook of Castle Creek Canyon. A crosswalk would potentially be built across Highway 62 for pedestrian safety, though other design solutions may be considered during implementation.

- **Castle Creek Canyon Trail** – This trail would provide visitors with a short, 0.7-mile, out-and-back hike on gentle terrain shortly after entering the park's western entrance. The hike would offer scenic views into Castle Creek Canyon and provide opportunities for interpretive exhibits relating to the formation of the canyon. The trail's location, away from dense visitor use along the rim, aligns with the plan's need to disperse visitor use at the park. To support visitor use of the Castle Creek Canyon trail, a pullout parking area with capacity for up to 10 cars would be established on the north side of Highway 62.

- **Falls to Flowers Trail** – This 2.5-mile trail would connect the Grayback Trail with several trails to the west. The trail would traverse moderate terrain, while avoiding sensitive vegetation along the rim. This hiking trail would serve primarily as a connector, but ultimately would lead visitors to Vidae Falls near the trail's eastern terminus.

- **Mazama Campground Loop Trail** – This short, 1.4-mile paved trail on gentle terrain would offer a variety of accessible recreational opportunities for campers and families as well as dog walkers. The trail would loop through the campground with views of Annie Creek Canyon and old growth hemlock trees. This trail would be marked for winter use and open to skiers. The trail would be open to pets in summer and closed to pets in winter. The trail would tie into an existing trail to create a loop experience. The trail would also link to other trails, providing longer excursions to the park headquarters and Rim Village. In developing this trail, the park may wish to consider interpretive opportunities for campers.

- **Mazama Rock Trail** – This 1.3-mile trail would offer visitors a loop experience away from the lake in an area featuring geologic spires. The hike would offer a challenging hiking experience in the northeastern portion of the park, where fewer recreational opportunities are currently provided. The existing pullout at Mazama Rock would serve as the trailhead for the Mazama Rock Trail.

- **Munson Valley Roadside Trail** – This trail would provide family and multiuse access from the Mazama campground area to the Steel Visitor Center and connect beyond to the Rim Village Visitor Center via the Munson Valley Spur Trail and the Raven Trail. This out-and-back trail would feature gentle terrain and offer a variety of experiences based on mode of transportation, ranging from short rides for cyclists to longer experiences for those walking to Rim Village. As one of the few paved trails proposed in the plan, it would offer a unique experience for a wide variety of users. For the safety of pedestrians, a crosswalk would be built, allowing trail users to move from the Mazama campground area to the start of the trail. To minimize environmental impacts, the trail would use the existing vehicular bridge at Annie Spring. Beyond that point, the trail would be offset from the roadway and follow an old road corridor to the maximum extent practical. In winter months, the trail would be ungroomed, marked for winter use, and open to snowshoeing/hiking and skiing.

- **The Munson Valley Spur** – This hiking trail would connect the park headquarters area to the major visitor attractions at Rim Village and offer spectacular rim views. This short, 1.5-mile route would traverse moderate terrain, utilizing the route of an old horse trail.

- **Panhandle Trail –** This trail would provide visitors with a 3-mile loop experience along easy terrain through stands of old-growth trees. The trail's proposed location in the southernmost part of the park would disperse visitor use into an area currently lacking recreational experiences. To support visitor use of this new trail, a pullout parking area with capacity for approximately 10 cars and a trailhead would potentially be established on the west side of Highway 62, though other design solutions may be considered during implementation.

- **Ponderosa Pine Trail –** This trail would offer visitors a relatively short, half-mile hike, shortly after entering the park from the south. Unique interpretive opportunities at the site would showcase rare stands of old-growth trees within the park boundary and discuss aquatic habitat in Annie Creek. This low elevation trail would follow easy terrain along the creek.

- **Raven Trail –** The 1.5-mile Raven Trail would connect the park headquarters to Rim Village and Crater Lake Lodge on steeper terrain. The northern destination would offer visitors excellent views of the lake. The proposed alignment would offer visitors an alternative nonmotorized route to connect major points of interest in this area of the park. With establishment of the Raven Trail, trail connectivity is significantly increased to the south, east, and northwest areas of the park.

- **Union Peak to Stuart Falls Connector Trail –** This 5-mile connector trail would create a loop experience for both hikers and equestrians by connecting the Union Peak Trail and the Stuart Falls Trail along steeper terrain. Together with a segment of the Pacific Crest National Scenic Trail (PCT), this would create a loop of approximately 11.5 miles. Users could incorporate this loop into a multiday backcountry experience by connecting to it via the Pumice Flat Trail and/or the Pacific Crest National Scenic Trail from Highway 62. The trail's location in the southwest portion of the park would fall within recommended wilderness and offer a higher degree of solitude than other trail locations in the park. This connector trail would link key points of interest in this part of the park: Union Peak, Bald Top, and Stuart Falls.

Uses or designation would change on the following road and trails:

- **Grayback Trail** – This 4.95-mile trail would repurpose the existing Grayback Road to allow for hikers, bikes, dogs, and equestrians, while retaining vehicular access for administrative use. (Note that this change would categorize the Grayback Road as a trail for the purposes of defining visitor use; Grayback Road would continue to be maintained as a road, however, and there would be little to no change in alignment, configuration, materials, or design.)

- **Pumice Flat Trail –** This is currently a hiker-only trail, and the alignment and signage has recently been updated. Allowed uses would be expanded to include equestrians. With construction of the Union Peak to Stuart Falls Connector Trail, a 17-mile backcountry loop experience would be possible for hikers and equestrians from the Pumice Flat trailhead. At the crossing of Highway 62, a crosswalk may be added to better accommodate equestrian use.

- **Union Peak Trail** – This is currently a hiker-only trail. Allowed uses on the lower portion of the trail, east of the junction with the proposed Union Peak to Stuart Falls Connector Trail, would be expanded to allow equestrians. When combined with construction of the Union Peak to Stuart Falls Connector Trail, this change would make possible a backcountry loop experience that is open to equestrians and hikers from either the Pumice Flat Trail or the Pacific Crest National Scenic Trail.

Table 4. Trails with Changes in Use or Designation Proposed in Alternative 1

Trail Name	Trail Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Uses: Stock	Allowed Uses: Bikes	Allowed Uses: Dogs	Allowed Uses: Snowshoe	Allowed Uses: Ski	Allowed Uses: Snowmobile
Grayback Trail	4.95 mi	4	Frontcountry	X	X	X			
Pumice Flat Trail	2.86 mi	3	Frontcountry	X					
Union Peak Trail (eastern portion, between Union Peak to Stuart Falls Connector Trail and the PCT)	1.14 mi	3	Backcountry						
Total Mileage	**8.95 mi**								

The following supporting infrastructure would be expanded to support visitor use:

- **Pinnacles Parking Area** – This existing parking area would be expanded to accommodate up to 20 vehicles. A vault toilet and picnic area would also be added near the parking area.

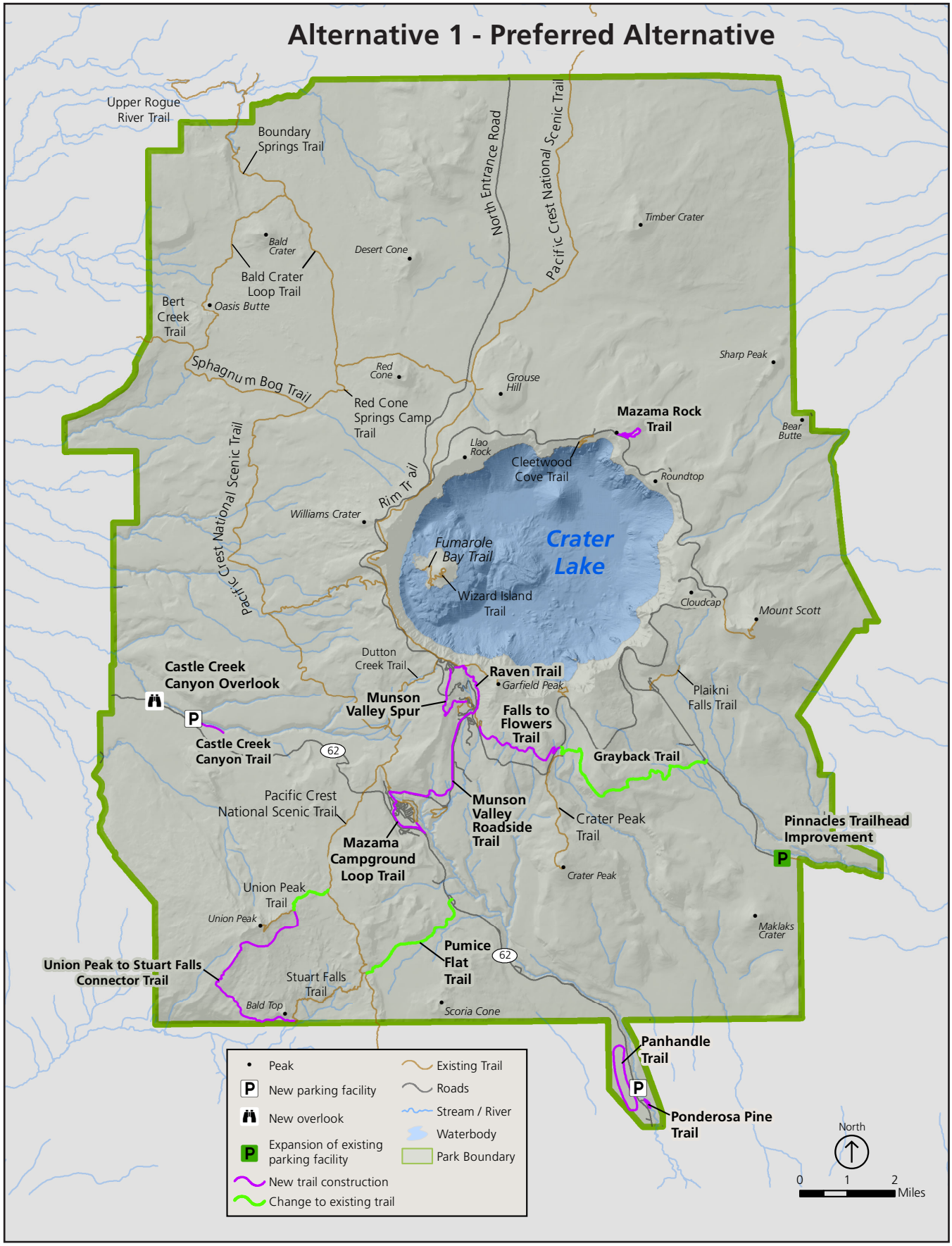


FIGURE 2. MAP SHOWING TRAIL SYSTEMS UNDER ALTERNATIVE 1 – NPS PREFERRED ALTERNATIVE

ALTERNATIVE 2

Alternative 2 introduces almost 23 miles of new summer trails with a focus on trail development in the eastern portion of the park (table 5, figure 3).

The development of the Vidae Ridge Trail and a Rim Trail segment around the northern, eastern and southeastern edges of the lake would improve nonmotorized connectivity in some of the park's most popular areas near the rim of the caldera. The complete Rim Trail would provide an additional way for visitors to circumnavigate around the lake and through the park.

One additional loop trail, the Maklaks Crater Loop, would be constructed on the east side of the lake. An underutilized trail, the East Bald Crater Loop would be removed from the trail system. Existing infrastructure and areas of disturbance would be used on these new trail routes where practicable.

The following new summer trails would be established and opened for visitor use:

- **Vidae Ridge Trail** – This 2.85-mile trail would connect the proposed east side Rim Trail with the Garfield Peak Trail to the west, creating a continuous, 30-mile network. The trail would traverse moderate terrain, while avoiding sensitive vegetation along the rim. This hiking trail would serve primarily as a connector but ultimately would lead visitors to Vidae Falls near the trail's eastern terminus.

- **Maklaks Crater Loop** – This 6.8-mile loop would start at the existing Pinnacles Trailhead and circumnavigate the area surrounding Maklaks Crater near the southeastern border of the park on mild terrain, providing a less difficult experience for hikers and pack and saddle use.

- **Rim Trail (East Side)** –This section of trail would connect 18 miles of trail on the south, east, and north side of Crater Lake with the existing 9-mile portion of Rim Trail on the western side of the lake and the Vidae Ridge Trail to create a continuous, 30-mile network. The 18 miles on the south, east, and north sides would include 13 miles of new trail construction and approximately 5 miles that would utilize the existing Grayback Road. Overnight use would be allowed by permit only, with those hiking the entire trail using four camps: Grouse Hill Camp, Palisades Camp, Lost Creek Campground, and Lightning Springs Camp. Up to 15 hikers would be allowed at each camp per night. The Palisades camp would be new construction, and the existing camps at Grouse Hill, Lightning Springs, and Lost Creek would be expanded to accommodate additional users.

The following existing summer trails would be removed from the trail system:

- **East Bald Crater Loop Trail** – This trail would be removed because of low use and high-maintenance requirements.

Designation would change on the following road:

- **Grayback Road** – This 4.95-mile section of the Rim Trail would repurpose the existing Grayback Road to allow for hikers, bikes, dogs, and equestrians, while retaining vehicular access for administrative use. (Note that this change would categorize the Grayback Road as a trail for the purposes of defining visitor use. Grayback Road would continue to be maintained as a road, however, and there would be little to no change in alignment, configuration, materials, or design.)

Table 5. New Summer Trails in Alternative 2

Trail Name	Trail Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Summer Uses: Stock	Allowed Summer Uses: Bikes	Allowed Summer Uses: Dogs
Vidae Ridge Trail	2.85 mi	3	Frontcountry			
Maklaks Crater Loop	6.80 mi	2	Backcountry	X		
Rim Trail (East Side) (not including that portion that utilizes Grayback Road)	13.30	3	Frontcountry	*	*	*
Total Mileage	**22.95 mi**	–	–	–	–	–

*On the Rim Trail (East Side)—stock, bikes, and dogs would continue to be allowed summer uses on the portion of the trail that aligns with the existing Grayback Road. These uses would not be allowed on the remainder of the trail.

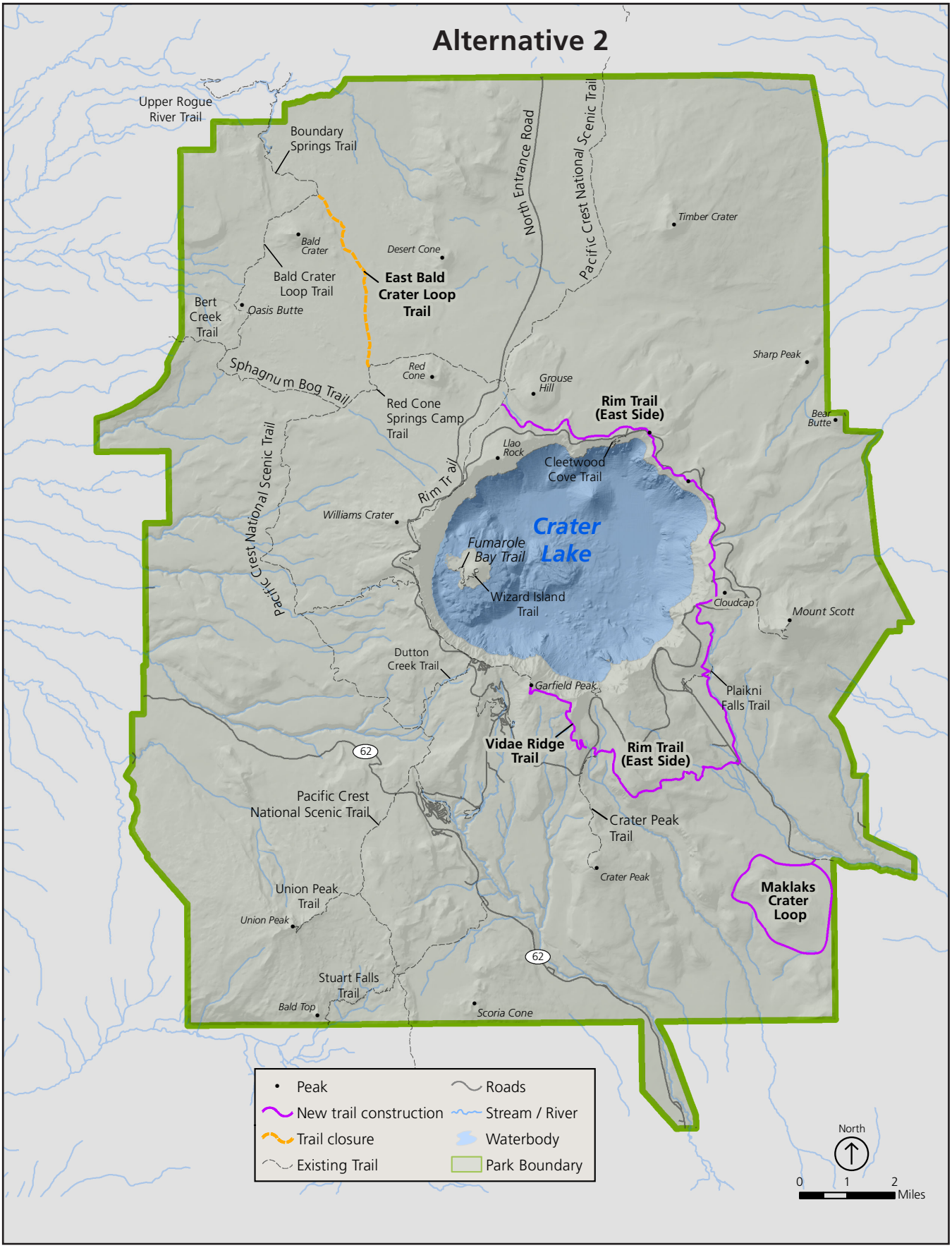


FIGURE 3. MAP SHOWING TRAIL SYSTEMS UNDER ALTERNATIVE 2

COMMON TO ALL ACTION ALTERNATIVES – SUMMER AND WINTER USE

The following actions are proposals found in both action alternatives. Items addressed include the addition of new winter trails and a summer trail for administrative use (table 6), modifications to parking lots, management and maintenance practices, and implementation standards. A map showing trail systems common to all action alternatives is provided as figure 4.

Table 6. Summary of New Trails Common to All Action Alternatives

Trail Name	Trail Mileage	Trail Class	Trail Characteristics: Front / Backcountry	Allowed Uses: Stock	Allowed Uses: Bikes	Allowed Uses: Dogs	Allowed Uses: Snowshoe	Allowed Uses: Ski	Allowed Uses: Snowmobile
Chevron Trail (Summer)	0.25 mi	2	Frontcountry			X			
Lady of the Woods Trail (Winter)	1.30 mi	N/A	Frontcountry	–	–	X	X	X	–
North Entrance Road (Winter)	9.13 mi	N/A	Backcountry		X	X	X	X	X
Total Mileage	**10.68 mi**								

The following new winter trails would be established and opened for visitor use:

- **Lady of the Woods Trail** – This existing 1.3-mile trail would be ungroomed, marked for winter use, and open to snowshoeing/hiking, skiing, and dog walking. Cultural resources and values found in this area would be interpreted via publications and/or digital media.
- **North Entrance Road** – In winter, the existing 9-mile North Entrance Road would continue to be open to snowmobiles, skiing, and hiking. The superintendent's compendium would be clarified so that pets, dog-sledding, skijoring, and snow bikes are allowed. Increased information regarding the availability of these winter recreational opportunities on the road would be provided. Snowmobile-use route monitoring and law enforcement patrols of the road would continue to inform future management.

The following new summer trail would be established and opened for administrative use:

- **Chevron Trail** – This quarter-mile trail on mild terrain would connect existing employee areas and be open to hiking and dog walking.

Modifications to Parking and Infrastructure

- Additional horse trailer parking, with up to four oversized-vehicle parking spaces, would be available at the Red Cone Trailhead (North PCT Lot).

- Additional modifications to parking, crosswalks, and supporting infrastructure would be handled on a case-by-case basis. In areas where additional improvements to infrastructure are necessary, existing parking areas, trailheads, and previously disturbed areas would be used where practicable to avoid or minimize new impacts to natural and cultural resources in the park. In areas where crosswalks are proposed, the park would work with the Federal Highway Administration to evaluate safety concerns and appropriate design solutions.

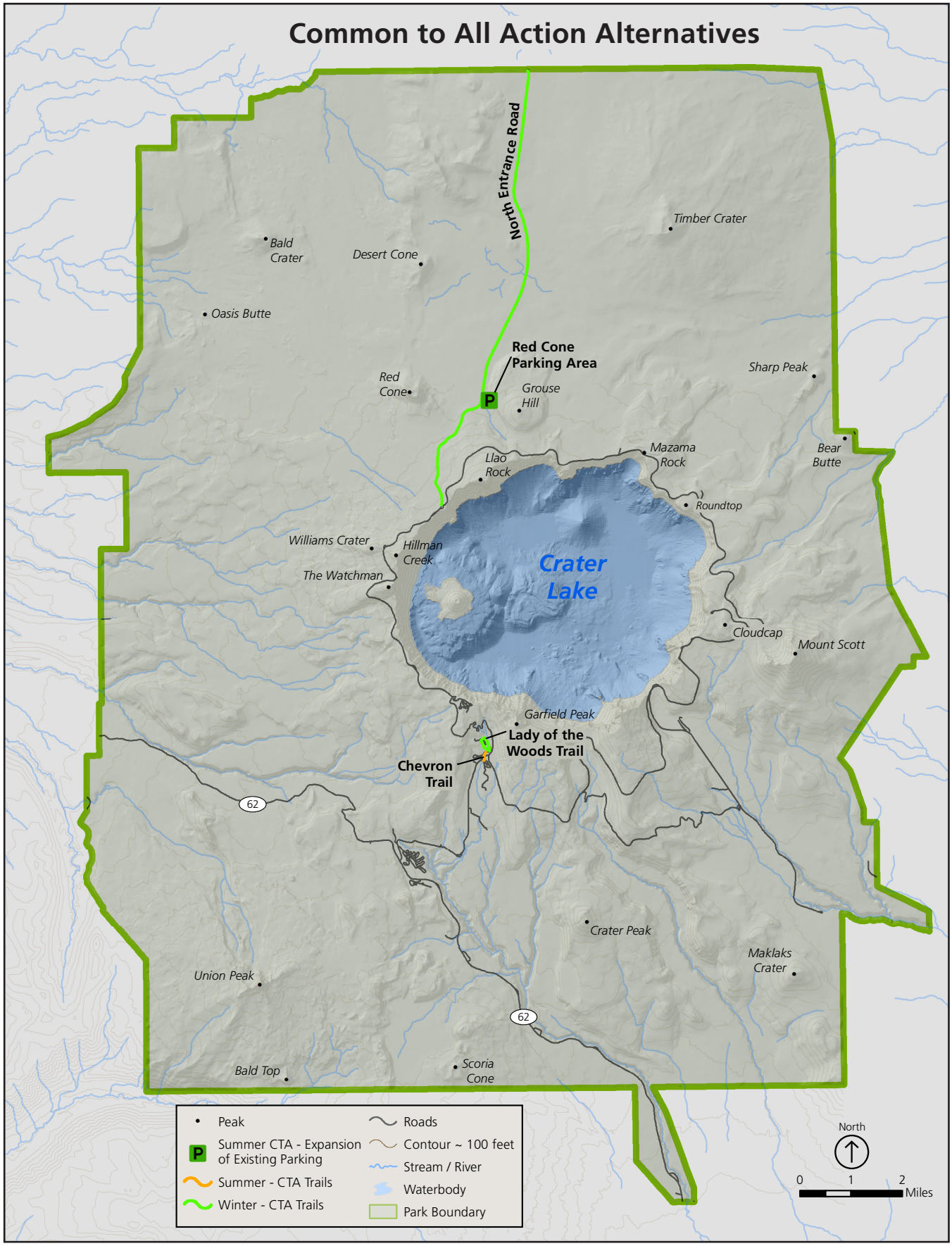


FIGURE 4. MAP SHOWING TRAIL SYSTEMS COMMON TO ALL ACTION ALTERNATIVES

Trail Alignments

The new trail alignments shown on the alternative maps and mileages included in tables 2–7 are based on GIS analysis and limited field surveys. Final alignments would be determined on the ground that could result in minor adjustments to the trail locations shown on the alternative maps. Before construction activities begin, the final alignments would be reviewed by the park's natural and cultural resources experts to ensure impacts to sensitive resources are avoided or minimized.

Trail Restoration

Trails to be removed from the trail system would be obscured and blocked from public access to avoid continued use on a trail-by-trail basis as funding allows. Temporary educational signs may also be placed to discourage use. Once removed from the system, trails would be revegetated as necessary. The extent of revegetation efforts would depend on the specific conditions for each route. Natural recovery by native plant species is preferable to planting or seeding; however, planting or seeding would be used as necessary to prevent unacceptable erosion or resist competition from nonnative invasive species.

MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES COMMON TO ALL ACTION ALTERNATIVES

Congress has charged the National Park Service with managing the lands under its stewardship *"in such manner and by such means as will leave them unimpaired for the enjoyment of future generations"* (NPS Organic Act, 16 USC 1). As a result, the National Park Service routinely evaluates and implements mitigation measures whenever conditions occur that could adversely affect the sustainability of national park system resources.

To ensure that implementation of the trail management plan protects natural and cultural resources unimpaired for future generations and provides for a high-quality visitor experience, a consistent set of mitigation measures and best management practices that align with federal regulations and NPS *Management Polices* (2006) would be applied to all management actions associated with the proposed action. The following measures are considered common to all action alternatives:

Trail Development

- Per NPS standards, NPS trail crews would coordinate and supervise any trail construction or maintenance. Specifically, the National Park Service would monitor and/or direct water bar placement, drainage placement, brushing and clearing, revegetation, where to obtain fill and other materials for trails, and how to apply fill materials such as soil, gravel, and rocks. Park staff would be responsible for ensuring that crews perform the necessary work in accordance with NPS instructions and standards.

  According to NPS *Management Policies 2006*, the National Park Service would construct the proposed trail system with a sustainable design to minimize potential environmental impacts. Development would not compete with or dominate park features or interfere with natural processes, such as the seasonal migration of wildlife, forest regeneration, hydrologic activity, and geological processes. To the extent possible, the design and management of the proposed trail system would emphasize environmentally sensitive construction, use of

nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings.

- The National Park Service would implement timely and accurate communication with visitors such as changes to programs, services, sites, or permitted activities via news releases, visitor contacts, web, and social media, as well as signage.
- All crew members and volunteers assisting in the trail work efforts would be educated about the importance of avoiding impacts on sensitive resources that have been flagged for avoidance, which may include natural and cultural resources.
- The National Park Service would implement measures to reduce adverse effects of construction on visitor safety and experiences. Measures may include, but are not limited to, noise abatement, visual screening, and directional signs that aid visitors in avoiding construction activities.
- Construction activities would be scheduled to minimize construction-related impacts on visitation and wildlife behavior (e.g., nesting seasons, etc.). Areas not under construction would remain accessible to visitors as much as is safely possible.
- To minimize new ground disturbance, staging areas would be located in previously disturbed areas, away from visitor use areas to the extent possible. All staging areas would be returned to preconstruction conditions and/or revegetated following construction. Parking areas for construction vehicles would be limited to these staging areas, existing roads, and previously disturbed areas.
- A construction zone for installation of the proposed trail system, as well as staging areas and work zones, would be identified and demarcated with construction tape or some similar material prior to any construction activities. The tape would define the zone and confine the activity to the minimum area needed for implementing the project.

Natural Resources (General)

- Removal of or impact on native vegetation adjacent to trails would be minimized as much as possible to protect native plants and to prevent the spread of nonnative species. Noxious weed and invasive plant monitoring and treatment would be conducted prior to and following construction, and native topsoil and plant materials would be salvaged and reused during construction.
- To avoid introduction of nonnative plant species, only certified weed-free materials would be used for erosion control. No foreign materials with the potential to introduce invasive plant species would be brought into the area. Any proposed materials would be reviewed on a case-by-case basis; allowable materials for erosion control may include materials determined by NPS staff to be weed-free purchased from a certified source, , such as coir logs and wood excelsior bales.
- Construction equipment and gear would be cleaned prior to its use to prevent the introduction and spread of invasive vegetation. A weed wash would be used if deemed necessary by resource staff.
- Park staff would stage facility and trail construction equipment away from known invasive plant infestations and would construct trails away from known invasive plant populations.

- Soil erosion would be minimized by limiting the time soil is left exposed and by applying other erosion control measures such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies.
- Topsoil would be re-spread in as near to the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. Conserving native topsoil would minimize vegetation impacts and potential compaction and erosion of bare soils. The use of conserved topsoil would help preserve microorganisms and seeds of native plants.
- Revegetation efforts would reconstruct the natural spacing, abundance, and diversity of native plant species in the trail corridor to the extent feasible. Monitoring of revegetated areas following construction would be conducted to ensure successful revegetation, maintain plantings, and replace plants that do not survive.
- Studies by qualified biologists to determine if rare, threatened, or endangered state or federally listed plant species are present would be conducted before ground disturbance to avoid adverse impacts and ensure appropriate locations and design of facilities. The US Fish and Wildlife Service would be consulted when required for surveys prior to the commencement of construction activities. A buffer surrounding the plants would be imposed that prohibits physical damage to the identified population during construction activities. The Resource Management Division (Botanist or Division Chief) would be consulted when determining the appropriate buffer. If avoidance is infeasible, adverse effects on rare, threatened, and endangered species would be minimized and compensated as appropriate and in consultation with the appropriate resource agencies.
- Efforts would be made to avoid cutting five-needle pines, aspen and oak species and avoid constructing trails near old legacy trees or healthy five-needle pine trees to minimize damage to root systems.
- Footbridges, if necessary, would be designed in such a way as to completely span the channel and associated wetland habitat (i.e., no pilings, fill, or other support structures in the wetland/stream habitat). If footbridges could not be designed in such a way as to avoid wetlands, then additional compliance (e.g., a Wetland Statement of Findings) would be done to assess impacts to wetlands and ensure no net loss of wetland area.

Wildlife (General)

- Plant surveys by qualified biologists to determine if rare, threatened, or endangered state or federally listed plant species are present would be conducted before ground disturbance to avoid adverse impacts and ensure appropriate locations and design of facilities. The US Fish and Wildlife Service would be consulted when required for surveys prior to the commencement of construction activities. A buffer surrounding the plants would be imposed that prohibits physical damage to the identified population during construction activities. The Resource Management Division (Botanist or Division Chief) would be consulted when determining the appropriate buffer. If avoidance is infeasible, adverse effects on rare, threatened, and endangered species would be minimized and compensated as appropriate and in consultation with the appropriate resource agencies.

- Care would be taken not to disturb any sensitive wildlife species (raptors, migratory birds, bats) found nesting, hibernating, foraging, or otherwise living in or immediately nearby the worksites. To reduce noise disturbance and limit impacts on breeding avian and mammalian species, all vegetation clearing and trail construction would be conducted from August 10 to March 1, as feasible. If clearing/construction needed to occur outside of this time frame (i.e., during nesting season), those sections of trail would be surveyed by a qualified biologist for nesting or roosting use. If nesting or roosting is found, resource management personnel would be consulted, and measures would be identified to avoid impacts. Timing of construction activities outside of nesting season, for example, could mitigate impacts and may eliminate the need for nesting bird surveys. Resource management personnel would be notified/consulted when wildlife would be disturbed by proposed trail construction or maintenance activities.
- Where possible, natural features with obvious high value to wildlife would be preserved (e.g., tree snags).
- The National Park Service would employ various visitor education techniques and media to reduce visitor use impacts on wildlife habitat and plant communities near existing and proposed trails.
- The National Park Service would use temporary or seasonal visitor use restrictions or area closures to protect sensitive wildlife habitat and sensitive wildlife behavior or life stages from trail use.
- If sensitive natural resources are discovered during trail construction, construction would cease and the area would be surveyed in more detail so that impacts could be avoided or minimized and/or an alternate route established.

Northern Spotted Owl

Habitat Removal.

- All projects will be reviewed by the terrestrial ecologist to determine potential impacts to northern spotted owls. Any trail construction project or other project with significant amount of vegetation removal (e.g., clearing out snags in backcountry campsites) occurring within 1.2 miles of northern spotted owl habitat will require surveys for northern spotted owl if northern spotted owl habitat will be altered. A minimum of two summers will be needed for habitat disturbance projects (six surveys/year for two years).
- If vegetation removal occurs within 100 meters of an identified spotted owl nest tree or nesting area (regardless of status – active/inactive), then within that 100 meter buffer efforts would be made to protect the trees that contribute to the microclimate features of the nest tree stand (i.e., contribute to shading of nest tree, leaners that are ramps for young owls looking to get off the ground, etc.) and to ultimately protect the nest tree from damage.
- Within 0.5 miles of any known spotted owl nest site or activity center (regardless of status – active/inactive), 50% of the area would be protected from extensive vegetation removal.
- Activities in occupied habitats or unsurveyed habitats for the northern spotted owl would not result in: (a) changing suitable habitat to unsuitable; (b) changing spotted owl dispersal habitat to non-dispersal; and (c) the significant degradation of habitat for the spotted owl

(activities may modify some components of owl habitat such as potential nest trees, logs, snags, mistletoe structure, etc., but not to a degree that would change the habitat classification or function of the stand).

Individual Trees.

- Known occupied or unoccupied spotted owl nest trees would not be removed.
- If 'potential nest tree' removal is to be done within suitable owl habitat during the spotted owl early breeding season (March 1 to August 15), review by a CRLA terrestrial ecologist and consultation would be required.
- Within 0.5 miles of any known spotted owl nest site or activity center, snags greater than 30" diameter at breast height (dbh) would be left standing.
- When feasible, the National Park Service would minimize the number of large conifers (21" dbh or larger) removed and would fall trees in a manner to minimize impacts to surrounding trees—away from suitable habitat if it is possible and safe to do so.
- Any proposed removal of any tree larger than 30" dbh within suitable spotted owl habitat would require CRLA terrestrial ecologist review.

Active Nest.

- If an active spotted owl nest is found, a CRLA terrestrial ecologist would be notified immediately.
- If an active nest is found with 0.25 miles of a trail during the spotted owl breeding season (March 1 – August 10), the park would assess the potential impacts of trail maintenance and/or visitor use and then determine if the trail would need to be temporarily closed.

Ground-Level Disturbance.

- During the spotted owl breeding season (March 1 – August 10), trail or parking lot construction projects with potential noise disturbance (e.g., chain saw, compaction devices, field crews > 3 people) but very limited or no vegetation removal (live trees or standing snags) would not be conducted in those portions of treatment units that are within 0.25 miles of an active spotted owl nest site or activity center. Active / inactive nesting status would be determined via standard protocol surveys (USFWS 2011). A minimum of two months will be needed to complete noise disturbance surveys (six surveys, each a week apart). In addition, no vegetation removal will occur within potential spotted owl habitat before protocol surveys are completed.
- When feasible, the National Park Service would begin activities in the area farthest from spotted owl suitable habitat when conducting activities that must occur during the breeding season.
- When feasible, the National Park Service would adjust the location of activities to utilize topographic and vegetative buffers, where it is necessary to conduct activities that would increase noise levels within the adverse-effect threshold distance of suitable habitat during the nesting season. Consultation with the terrestrial ecologist should occur to determine feasibility of such actions. For example, location of activity upslope of suitable habitat is likely to be less severe than locating the activity downslope of suitable habitat.

Aircraft Use.

- When fixed wing or rotary aircraft are used, the Terrestrial Branch (terrestrial ecologist) would be consulted to identify known active spotted owl nest sites/activity centers (ACs). No direct overflights of the identified nest sites/ACs would be allowed below 1,500 feet above ground level during the spotted owl breeding season (March 1 – August 10).
- The National Park Service would minimize the number of overflights over suitable habitat and minimize the use of the same flight paths or the amount of time hovering over the same suitable habitat during the breeding season.
- The National Park Service would use the smallest, quietest helicopters that can accomplish the task efficiently and safely.

Bull Trout

- If vegetation removal occurs within 100 feet of designated bull trout critical habitat, efforts would be made to preserve standing live and dead trees that might ultimately fall in the creek to maintain in-stream habitat quality. If hazard trees need to be removed for public safety, those trees would be felled toward the creek, or into it if possible.
- If vegetation removal occurs within 100 feet of designated critical habitat, efforts would be made to maintain riparian vegetation community and stream shading.

Cultural Resources

- Because this plan involves phased implementation of actions not yet designed to allow full impact analysis, the National Park Service would pursue phased compliance with the Oregon State Historic Preservation Officer and other consulting parties in accordance with Section 106 of the National Historic Preservation Act. Phased implementation activities concerning cultural resources would include the following best management practices:
    - All construction projects and infrastructure associated with trail development would be designed to avoid known cultural resources and areas with high potential for archeological or ethnographic resources as much as possible.
    - Before any ground-disturbing action by the National Park Service, pedestrian surveys and/or remote sensing of the areas planned for construction or other ground-disturbing development would be conducted in compliance with Archaeological Resources Protection Act of 1979, as amended, and the National Historic Preservation Act. The survey would help determine the presence or absence of archeological deposits in the footprint of disturbance. Any archeological resources discovered during these investigations would be evaluated for significance and potential effects and in consultation with the Oregon State Historic Preservation Officer. The National Park Service would adjust project locations, designs, and/or construction activities to avoid NRHP-eligible archeological resources discovered during preconstruction survey as much as possible. If cultural resources or adverse effects to those resources could not be avoided, additional consultation would occur to identify how to resolve concerns and mitigate impacts.
    - Known archeological sites would be monitored to assess and document the effects of natural processes and human activities on the resources. Archeological resources would

be left undisturbed and preserved in a stable condition to prevent degradation and loss of research values unless intervention could be justified based on compelling research, interpretation, site protection, or park development needs. Recovered archeological materials and associated records would be treated in accordance with NPS *Management Policies 2006*, NPS Museum Handbook, and 36 CFR Part 79.

- The National Park Service would consult with associated American Indian tribes to ensure that project actions are conducted in a way that respects the beliefs, traditions, and other cultural values of the tribes who have ancestral ties to park lands. Sensitive, sacred, or traditional use areas would be protected to the greatest extent possible by avoiding areas with ritual features, mitigating adverse impacts to ethnographic resources through resource protection efforts, retaining site confidentiality as appropriate, and continuing to provide tribal access to resources and places of cultural importance.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of discovery and a qualified archeologist would be contacted to assess the artifacts and/or site. The National Park Service would consult with the state historic preservation officer and the Advisory Council on Historic Preservation, as necessary, according to 36 CFR 800.13. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.
- Cultural landscape inventories and cultural landscape reports would be completed as necessary to inform any alterations to cultural landscapes that may impact contributing features.
- NPS staff would continue to inform visitors and others of the importance of protecting and not disturbing archeological resources and historic resources. Visitors would be informed (through NPS educational and interpretive programs and/or interpretive media products, and ranger contacts) of the penalties for illegally collecting artifacts or otherwise causing resource damage.

Additional mitigation measures and best practices for trail maintenance can be found in appendix E.

VISITOR USE MANAGEMENT ACTIONS COMMON TO ALL ACTION ALTERNATIVES

This plan incorporates aspects of the Visitor Use Management Framework to develop long-term strategies for monitoring and managing visitor use within the park (IVUMC, www.visitorusemanagement.nps.gov). Key aspects of visitor use management incorporated into the action alternatives include the identification of indicators and thresholds and visitor capacity.

Indicators and Thresholds

Monitoring in this plan is accomplished through establishment of 'indicators' and 'thresholds.' 'Indicators' are specific resource or experiential attributes that can be measured to track changes in conditions so that progress toward achieving and maintaining desired conditions can be assessed. 'Thresholds' are the minimum acceptable conditions associated with each indicator. Indicators and thresholds provide park managers with monitoring protocols to ensure desired conditions for resources and visitor experiences are achieved and maintained over time.

The planning team considered many potential indicators related to visitor use-related impacts but ultimately identified four that are the most important to monitor the effectiveness of the plan's management strategies. The four indicator topics include Visitor-Created Trails, Percent Change in Trail Width, Presence of Waste, and Mechanized Winter Recreation. These indicators and the associated thresholds are considered common to all action alternatives.

The planning team also identified management strategies associated with each indicator. The impacts of these management strategies are analyzed in chapter 4. Several of these strategies are currently in use and may be increased in response to changing conditions. Other strategies would be implemented upon completion of the plan to ensure conditions do not approach thresholds. Some management strategies would be implemented if and when monitoring indicates that conditions are changing and thresholds are being approached or exceeded. See appendix A for detailed descriptions of the indicators and thresholds, associated rationales and monitoring protocols, and descriptions of the management strategies.

Visitor Capacity

Visitor capacity is defined as the maximum amount and types of visitor use that an area can accommodate while sustaining desired resource conditions and visitor experiences consistent with the purpose for which the area was established. By establishing visitor capacities and implementing them with appropriate management strategies, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. The management strategies to implement the visitor capacities for the five analysis areas in the planning area are analyzed in chapter 4.

Under the new (2012) NPS planning portfolio, trail management plans are considered to be implementation level plans that meet the legal requirements for general management plans (1978 NPRA, 54 U.S.C. 100502) to identify and implement visitor capacities for all areas of a system unit. Crater Lake National Park's trails have no prior identification of visitor capacity. See appendix B for the identification of visitor capacities for trails included in this plan and associated implementation strategies.

Adaptive Visitor Use Management

Visitor use management is an iterative process in which management decisions are continuously informed and improved through monitoring to determine the most effective way to manage visitor use. Assessing the outcome of management actions is necessary to ensure management actions are having their intended effects and desired conditions are maintained.

As monitoring of conditions continues, managers may decide to modify or add indicators and/or thresholds if better ways are found to measure important changes in resource and experiential conditions. Likewise, visitor capacities may need to be adjusted over time in response to improved understanding of the relationship between visitor use and impacts to desired conditions. The rationales to adapt any indicators, thresholds, visitor capacities, or their associated management strategies would be documented appropriately, undergo any necessary additional compliance reviews, and be made available to the public.

ACTIONS CONSIDERED BUT DISMISSED

- **Closure of East Rim Drive to vehicles.** This proposal is inconsistent with guidance set forth in the park's 2005 general management plan. The majority of park visitors are automobile-based, and total closure of the eastern segment of the road would degrade their experience. This would be too significant an alteration of visitor use patterns and does not meet the purpose and need of this plan.

- **Closing one lane of East Rim Drive for vehicles and converting it into a multiuse trail.** This option would create one-way vehicular traffic. A barrier would need to be constructed for pedestrian safety. In effect, this would create a one-lane road with no shoulder or passing areas, thus increasing auto-congestion during peak periods. Further, a crowded one-lane road would slow emergency response and threaten visitor safety. Alteration of the road would also create adverse impacts to cultural landscape character and historic integrity.

- **Expansion of snowmobiles, mountain bikes, and other mechanized and motorized forms of transit into backcountry zones / trails.** This would be inconsistent with the 2005 general management plan and park zoning and with NPS management policies and recommended wilderness.

- **Development of a second access trail to the lakeshore.** Caldera slope instability severely limits options for a second route. One or two possible locations exist, but trail construction would involve adverse environmental impacts to the lake itself. Any constructed trail would then require intensive maintenance, thus diverting funding and personnel resources from the rest of the trail system.

- **Development of trails on and around Llao Rock.** Trail development on the north rim in the vicinity of Llao Rock would necessitate intrusion into the Llao Rock Research Natural Area and would likely lead to a degradation of the unique flora and fauna found there (including rare plants). This would be inconsistent with the purposes for which the research natural area was established (NPS 2021).

- **Development of trails near Cascade Springs.** Spring habitats are inherently sensitive and prone to disturbance. Bank trampling, erosion, and sedimentation in and near springs could affect the water temperature and chemistry as well as water quantity, adversely impacting aquatic species in the springs as well as streams and wetlands downstream. Once disturbed, spring sites can take a long time to rehabilitate. Because springs form an ecotone between groundwater and surface water habitats, habitat conditions in springs are unique and different from the remainder of the stream network. In general, spring communities often contain rare or unique organisms that are adapted to the relatively constant temperature and water quality conditions found there (J. Hooke, pers. comm.). In addition, aquatic life in the streams, lakes, and wetlands that are fed by springs are highly dependent on the amount, duration, and timing of flow from those springs (Brown 2007 in Adamas et al. 2013), as groundwater flow from springs is generally warmer in winter and cooler in summer than surface water. Furthermore, Cascade Spring is one of the only groundwater spring sources in the eastern part of the park, and so it is a locally important habitat for wildlife (D. Hering,

pers. comm.). On multiple occasions, park resource staff have been to this area and noted an exceptional number of tracks within the spring and heavily used game trails in and around the spring (J. Hooke, pers comm.). Water is such a limiting factor in this area that the US Forest Service has added guzzlers to provide water to wildlife. Increased visitor use of the creek and springs would reduce habitat quality and cause some wildlife to avoid the area. Several springs in the park are already accessible by trail, such as Boundary Springs, Red Cone Spring, and Lightning Springs. The park has experienced a great amount of resource damage at other spring and waterfall areas with high levels of visitor use such as Lightning Springs, Plaikni Falls, and Vidae Falls—in some cases requiring an area closure. In addition, backcountry rangers must spend staff time cleaning trash out of the area around Lightning Springs (J. Hooke, pers. comm.).

COST ESTIMATES

NPS decision makers and the public must consider the costs and advantages of various alternatives, including the no-action alternative, to make a relevant comparison of the alternatives. The costs shown in table 7 are estimates for comparison purposes only and are not to be used for budgetary purposes or implementing funding requests. If and when the actions are implemented, actual costs would vary. Specific costs would be determined in subsequent, more detailed planning and design efforts. Once the plan in complete, funding will be sought in future years on a project-basis.

The estimates in this section include both one-time net construction costs and annual operations and maintenance (O&M) costs needed to implement the action alternatives. Construction costs for the preferred alternative (alternative 1) are $8.5 million. Over a 25-year period, the annualized cost of implementation would be $544K and the annual increase in O&M requirements would be $166K.There is no guarantee that the actions proposed in this plan would be funded. The park will continue to look for creative and diverse funding opportunities, and implementation of proposed actions are subject to available funding. Budget restrictions, requirements for additional data or regulatory compliance, and competing national park system priorities may prevent implementation of some actions.

Deferred maintenance of the existing Crater Lake trail system, as captured in work orders, was $3.3M in 2020. It would cost an additional $208K per year to address all deferred maintenance within a 25-year window, allowing for the escalation of project costs over time. Note that this cost does not include deferred maintenance on the Cleetwood Cove Trail, which will be rehabilitated as part of a separate project (discussed in chapter 3 and appendix B).

Table 7. Estimated Construction and Annual Operations and Maintenance Costs to Implement the Action Alternatives

Construction Costs*	Alternative 1	Alternative 2
Backcountry Campsites		$30,000
Castle Creek Canyon Overlook Trail	$448,400	
Castle Creek Canyon Trail and Parking	$233,900	
Chevron Trail	$25,200	$25,200
East Bald Crater Loop Trail (Removal)		$260,900
Falls to Flowers Trail	$520,600	
Maklaks Crater Loop		$686,100
Mazama Campground Loop Trail	$695,500	
Mazama Rock Trail	$272,400	
Munson Valley Roadside Trail	$3,534,000	
Munson Valley Spur	$107,000	
Panhandle Trail and Parking	$716,200	
Ponderosa Pine Trail	$90,800	
Pinnacles Trailhead Improvement	$489,700	
Raven Trail	$310,800	
Red Cone Trailhead Parking	$46,300	$46,300
Rim Trail (East Side)		$3,192,600
Union Peak to Stuart Falls Connector Trail	$1,009,000	
Vidae Ridge Trail		$575,100
Total Construction Cost	**$8.5 M**	**$4.2M**
Annualized Cost of Implementation	**$544,000**	**$272,000**
Additional Annual O&M Requirement	**$165,600**	**$49,000**

*Costs are escalated to 2021 dollars.

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Affected Environment and Environmental Consequences

CHAPTER

3

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION AND GENERAL METHODOLOGY

The "Affected Environment and Environmental Consequences" section describes the resources that could be affected as well as the potential environmental consequences of implementing any one of the alternatives being considered. The section is organized by resource topic and provides a comparison of the alternatives based on issues. Unless stated otherwise, impacts from actions common to all action alternatives are included as part of the impact analyses for alternatives 1 and 2.

The topics presented are those related to the key issues that could inform the NPS decision on how to manage the park's trail system. The descriptions of the resources provided in this chapter include resource trends and planned actions. They serve as an account of the baseline conditions against which the potential effects of the proposed actions considered in this plan are compared.

SOILS

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The Natural Resources Conservation Service (NRCS) produced a soil survey for the park in 2003. Twelve general soil types organized into six general categories were identified in the survey. The categories include (NPS 2005):

- soils on uplands, formed in air-fall deposited ash and pumice;
- soils on uplands, formed in air-fall deposited ash and pumice over glacial deposits;
- soils in valleys, formed in ash flow deposits consisting of ash, pumice and cinders;
- soils on cinder cones;
- soils on upland meadows with intermingled forests; and
- soils in seeps and on stream terraces.

Generally speaking, soils in the northern and eastern areas of the park consist of thick layers of gravel-sized pumice with an area of finer, sand-sized pumice and ash on the eastern slope of Timber Crater, whereas soils of cobble-sized pumice exist in park valleys and lower elevation lava plains. The caldera rim consists of ash and cinder soils with lesser amounts of pumice soils around the outcrops of hard andesitic or dacitic bedrock. The park's perennial streams run through deeply incised channels that expose layered ash flows, often with deeper soil development due to persistent moisture presence (USDA NRCS 2003; NPS 2017). Soils on the west side of the Cascade Crest have an udic or moist soil moisture regime, with a drier or xeric soil moisture regime east of the Cascade crest (USDA NRCS 2003; NPS 2017).

The 2003 soil survey by the Natural Resources Conservation Service provides ratings for erodibility and "trafficability" (ability to sustain continuous foot/equestrian traffic) for all soils identified in the park. While the survey acknowledges that most trails should not require notable cutting or filling for development and maintenance, it does identify soil types that are likely unsuitable for trail

development. The ratings are based on soil properties that affect their sustainability for trail, including stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer (USDS NRCS 2003). In general, new trails in areas of unsuitable soils have been removed from consideration in this plan.

Since the establishment of Crater Lake National Park, soils have been impacted by construction of roads and facilities to accommodate park visitors and operations. Most of these projects have occurred within or adjacent to existing developed areas in an approximately 274-acre footprint within the park, as well as along the 95 miles of existing trails in the park. Soils have been damaged by trail construction and high concentrations of people, causing compaction in visitor use areas as well as recurring maintenance of road and utility corridors and fuel breaks. These impacts affect soil resources in many ways, including damaging soil ecosystems; altering the soil profile and removing soil organic matter; affecting soil structure; and affecting nutrient cycling processes.

Trail braiding and widening occurs in spot-locations as trail users avoid rutted, rocky, snow-covered, or muddy areas on trails, trampling adjacent vegetation. Visitor-created trails have proliferated as hikers venture "off-trail" to explore, take photographs, and/or engage in other off-trail activities. Both of these activities result in ongoing compaction and erosion of the park's twelve soil types. Park managers implement seasonal closures where heavy visitor use and development of social trails threatens sensitive park habitat such as at Llao Rock Research Natural Area.

Proposed development projects within the park, including proposed installation of cellular towers in Rim Village and Mazama Village and improvement of visitor facilities at North Junction Viewpoint, would disturb up to 2.4 acres of native soils, resulting in soil compaction and loss of productivity. Proposed rehabilitation projects will adversely impact soils along 23.5 miles of the East Rim Drive, 1.1 miles of the Cleetwood Cove Trail, and 15 acres of unstable slopes above the trail and at the Annie Spring Entrance Station. These projects will impact up to 12 acres of soils through soil compaction and erosion when both temporary disturbance areas and development footprints are summed. Mitigation measures will be implemented to minimize adverse impacts to soils from these future planned actions, however, these projects will contribute long-term adverse effects to the overall adverse trends in soils in the park.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on soils would remain the same as described in the affected environment. The current resource threats (trail braiding and widening, off-trail travel, etc.) and impacts would continue to occur.

Alternative 1. Construction of 20.6 miles of new trails would result in permanent adverse impacts to up to 11.7 acres of undisturbed soils in the park. Initial trail construction would cause soil compaction and loss through erosion. In some areas, up to 6 to 8 inches of topsoil would be removed to create trail benches; this soil would be cast downhill from the trail. Implementation of mitigation measures listed in chapter 2 would reduce impacts from trail construction. Recreational use of the trails would cause continued adverse soil impacts including loss of organic litter and soil compaction, rutting, and erosion. In addition, trail widening or braiding may result in soil compaction and erosion on either side of new trails. However, implementation of management strategies listed in appendix A, such as improving signage, rehabilitating visitor-created trails, and establishing trail borders, would reduce off-trail travel and lessen adverse impacts from hiking on the trail corridors and adjacent areas.

Alternative 1 would permanently reduce soil productivity on up to 0.15 acres through development of two parking areas (Pinnacles Parking Area and Castle Creek Canyon Trail Parking) and associated facilities. Pavement overlays would cause permanent compaction and loss of soil productivity. Construction activities and fill associated with curbs would temporarily impact soils within a 5-foot wide perimeter (approximately 1,200 square feet at Castle Creek Canyon Trail and 1,400 square feet at Pinnacles Parking Area).

With construction of new trails and facilities, there is the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. These "visitor-created trails" are of concern to land managers when they become areas of soil erosion and compaction. However, implementation of management strategies listed in appendix A, such as improving signage, rehabilitating visitor-created trails, and establishing trail borders, would reduce off-trail travel and minimize adverse impacts.

The soil compaction and erosion caused by trail construction and recreational use would contribute long-term adverse effects to the overall adverse trends in soils when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Alternative 2. Construction of 23.2 miles of new trails and campsites would result in permanent adverse impacts to up to 9.9 acres of undisturbed soils in the park. Initial trail construction would cause soil compaction and loss through erosion. In some areas, up to 6 to 8 inches of topsoil would be removed to create trail benches; this soil would be cast downhill from the trail. Implementation of mitigation measures listed in chapter 2 would reduce impacts from trail construction. Recreational use of the trails and campsites would likely cause continued adverse soil impacts including loss of organic litter and soil compaction, rutting, and erosion. Trail widening or braiding or development of visitor-created trails may result in soil compaction and erosion on either side of new trails.

With construction of new trails and facilities, there is the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. These "visitor-created trails" are of concern to land managers when they become areas of soil erosion and compaction. However, use of management strategies listed in appendix A, such as improving signage, rehabilitating visitor-created trails, and establishing trail borders, would reduce off-trail travel and lessen adverse impacts from hiking on the trail corridors and adjacent areas.

The soil compaction and erosion caused by trail construction and recreational use would contribute long-term adverse effects to the overall adverse trends in soils when alternative 2 is added to past, ongoing, and reasonably foreseeable future actions.

Conclusion. Under the no-action alternative, impacts on soils would remain the same as described in the affected environment. Alternative 1 would result in greater levels of ground disturbance than alternative 2, with a subsequent increase in the potential for soil compaction, rutting, and erosion both on- and off-trail. On the whole, both action alternatives would have more adverse impacts to soils than the no-action alternative, although adverse impacts would be minimized through the implementation of mitigation measures and best management practices described in chapter 2 as well as management strategies identified in appendix A.

VEGETATION

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The native plant communities found in Crater Lake National Park are diverse and relatively intact given the protection and management of the park since its establishment more than a hundred years ago. Located in the southern segment of the Cascade Range, the park ranges from roughly 4,000 feet to a little under 9,000 feet in elevation (with Mount Scott being the highest point at 8,929 feet). These conditions are most ideal for montane forest communities, which are the most pervasive plant communities in the park. The primary native plant communities in the park include (NPS 2017; NPS 2005):

- **Lower elevation mixed conifer forest –** Dominant species include ponderosa pine, white fir, Douglas fir, sugar pine, and incense cedar.

- **Middle elevation forests** – Dominant species are either pure Shasta red fir or pure lodgepole pine.

- **Higher elevation mixed conifer forest** – Dominant species include Shasta red fir, western white pine, lodgepole pine, and mountain hemlock.

- **Subalpine forests** – Dominant species include mountain hemlock and whitebark pine at the highest elevations. The park's high elevation forests are either pure mountain hemlock, pure whitebark pine, or a mixture of mountain hemlock, whitebark pine, lodgepole pine, Shasta red fir, and/or subalpine fir. Please refer to the *"Whitebark Pine"* section of chapter 3 for a description of the whitebark pine community and analysis of impacts.

- **Herbaceous and grass communities** – Dominant species include oval-leaved *eriogonum*, Davis' knotweed, Geyer's everlasting, silvery ragwort, and squirreltail. The communities are most commonly found on the Crater Lake caldera rim slopes and in the surrounding pumice flats.

- **Chaparral and shrubland communities –** Dominant species include tobacco brush, green leaf manzanita, Fremont's silktassle, and Greene's goldenweed (in subalpine areas). While generally uncommon in the park, areas of chaparral community primarily exist in the mixed conifer and ponderosa pine communities in the vicinity of Crater Lake.

- **Wetland and riparian communities –** Please refer to the "Wetlands and Riparian Areas" section of chapter 3 for a brief description of riparian and wetland plan communities.

In terms of special status species, the park is home to a declining population of whitebark pine (proposed for listing as threatened under the Endangered Species Act). Blister rust (caused by a fungal pathogen), historic fire suppression, climate change, and mountain pine beetle are the primary causes of the population decline. The Crater Lake rockcress, which is the only known plant species that is endemic to the park, is a federal species of concern that is generally found at the higher elevations of the caldera and other peaks. In addition to the effects of climate change on most high elevation species, the rockcress is also threatened by recreational use and ground disturbances from

park facilities and amenities. Lastly, the pumice grape-fern is a high elevation plant that is endemic to the central and southern segments of the Cascade Range. The grape-fern is listed as threatened by the State of Oregon, with the threats primarily being associated with recreational use and related ground disturbances, as well as climate change (NPS 2017).

Past actions in the park have resulted in ground disturbance, removal of native vegetation, and subsequent establishment of invasive exotic plants. Existing facilities in the park cover about 300 acres of land. Construction, maintenance, and use of existing buildings, roads, and trails have created disturbed soil areas where invasive plant populations have become established. These plant populations continue to serve as sources of seed, causing persistent adverse impacts to native plants. Past restoration efforts have mitigated the adverse effects of previous ground-disturbing activities through revegetation with native plants. Historic fire suppression and then later wildland fire management and prescribed fire have also changed natural vegetation succession patterns across the park.

Invasive, nonnative plant infestations are currently the biggest threat to the native plant communities in the park (NPS 2017). Invasive plant infestations often occur on disturbed ground from visitor use and facility development or result from altered environmental conditions brought on by historic wildfire suppression. High levels of visitor use and recreation in the park—including trail use—continue to make the park's native plant communities prone to the expansion of established invasive plant infestations as well as the colonization of additional invasive species into the park (Parks et. al. 2005). Currently, established infestations include nonnative plants such as cheatgrass, Canada thistle, smooth brome, St. John's wort, and bull thistle.

Implementation of the park's invasive plant management plan and fire management plan will result in beneficial impacts to vegetation over the next 10 years across 250 acres and 1,500 acres, respectively, through actions to protect and maintain the health and integrity of native plant communities and the species dependent upon them. Mitigation measures will be implemented to reduce temporary adverse impacts from ground disturbance and mechanical and chemical treatment methods.

Trail braiding and widening occurs in spot-locations as trail users avoid rutted, rocky, snow-covered, or muddy areas on trails, trampling adjacent vegetation. Visitor-created trails have proliferated as hikers venture "off-trail" to explore, take photographs, and/or engage in other off-trail activities. Trampling of vegetation causes reductions in vegetation cover, height, and biomass; changes in species composition; and introduction and spread of nonnative plants along linear trail corridors (Marion et al. 2016). Park managers implement seasonal closures where heavy visitor use and development of social trails threatens sensitive park habitat such as at Llao Rock Research Natural Area.

Future development projects within the park, including proposed installation of cellular towers in Rim Village and Mazama Village and improvement of visitor facilities at North Junction Viewpoint, would result in permanent adverse impacts to vegetation through removal of up to 2.4 acres of native plants. Annual hazard tree mitigation will result in the removal of up to 500 trees over the next ten years in developed areas. Future rehabilitation projects will adversely impact vegetation along 23.5 miles of the East Rim Drive, 1.1 miles of the Cleetwood Cove Trail, and at the Annie Spring Entrance Station. These projects could impact up to 12 acres of vegetation through vegetation removal and introduction of nonnative plants when both temporary disturbance areas and development footprints are summed. Mitigation measures will be implemented to reduce adverse impacts to

vegetation, however, these projects will contribute long-term adverse effects to the overall adverse trends in vegetation at the park.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on vegetation would remain the same as described in the affected environment. The current resource threats (invasive plant species, off-trail travel, etc.) and impacts would continue to occur.

Alternative 1. Construction of 20.6 miles of new trails would require permanent vegetation removal in areas. Acreages are approximate pending further design, but it is estimated that the construction of the linear trails would result in the permanent removal of up to 11.7 acres of vegetation. Per trail design standards described in appendix E, trail construction would not remove trees over 6 inches in diameter. Branches extending over the trail corridor would be cut no higher than 10 feet above the trail surface. The maximum width of disturbance would be 8 feet wide, which accounts for the 4- to 6-foot trail widths, potential soil disturbance outside of trail surface (mainly on trail locations on a steep side slope where the cut slope would need to be wider), and the distance of vegetation thinning and trimming beyond the trail. However, trail design and route placement would minimize vegetation removal, and in forests and woodlands best management practices as outlined in appendix E would be implemented to maintain habitat conditions at the stand scale.

No rare endemic plants, including Crater Lake rockcress, pumice grape-fern, and Shasta arnica would be adversely affected by any proposed construction or restoration activities. The National Park Service would implement mitigation measures described in chapter 2, including examining potential rare plant habitat in and near all construction areas that have not been previously surveyed for the presence of rare plants. Known occurrences of rare plants in the vicinity of the proposed parking lot additions and improvements, new trails, and picnic areas would be delineated and protected during construction. If any rare plants were encountered on a proposed trail alignment, the plants would be marked so that individual plants can be avoided by routing the trail away from the plants.

With construction of new trails and facilities, there is the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. These “visitor-created trails” are of concern to land managers when they become areas of erosion and vegetation trampling. In addition, trail braiding and widening would continue to occur in spot-locations as trail users avoid rutted, rocky, snow covered, or muddy areas on trails, trampling adjacent vegetation. In particular, five Shasta arnica sites exist on the southeast face of Union Peak in close proximity to where the new connector trail ties to the existing trail. Off-trail activity in this area could damage individual plants, cause soil compaction, and reduce flowering potential. However, park staff would periodically monitor the number of visitor-created trails leaving designated trails as part of visitor use management. If the number of visitor-created trails exceeds the threshold set in appendix A (e.g., in frontcountry areas no more than three visitor-created trails leaving a designated trail per one mile) or if visitor-created trails are impacting sensitive resources, park staff would implement additional management strategies to protect sensitive resources such as rehabilitating visitor-created trails, restricting off-trail travel in sensitive areas, or establishing restoration areas around visitor-created trails. Therefore, the proposed actions under alternative 1 would not threaten the long-term viability of rare plant species within the park.

At the Pinnacles Parking Area, approximately 0.07 acres of lodgepole pine forest would be permanently removed to expand the parking lot and add a vault toilet and picnic area. Constructing a

10-car pullout parking area at the trailhead for Castle Creek Canyon Trail and installing a vault toilet would require permanently removing up to 0.08 acres of Shasta red fir forest. Construction activities and fill associated with curbs would temporarily impact vegetation within a 5-foot-wide perimeter (approximately 1,200 square feet at Castle Creek Canyon Trail and 1,400 square feet at Pinnacles Parking Area). To minimize temporary impacts to vegetation, staging areas would occur in previously developed areas or in the immediate project area, and mitigation measures and best management practices would be implemented as described in chapter 2.

Under this alternative, proposed construction activities that disturb vegetation could lead to increasing populations of nonnative invasive plants by removing established native plants that compete with noxious weeds, exposing mineral soil as a substrate for weed germination and dispersing existing or new weeds seeds or plants carried by construction equipment and trail users. To prevent the spread of invasive and nonnative vegetation, the National Park Service would manage weed infestations in accordance with the park's Invasive Vegetation Management Plan (NPS 2017) and other measures discussed in chapter 2.

In total, actions under alternative 1 would permanently remove up to 11.8 acres of vegetation as a result of constructing new trails, adding or expanding two parking lots in high visitor use areas, and adding a vault toilet and picnic area. Mitigation measures and best management practices listed in chapter 2 would be implemented to reduce adverse impacts to vegetation from these actions. Some rare plant species could be adversely affected through off-trail travel; however, management strategies listed in appendix A would be implemented to limit those occurrences.

Vegetation removal and trampling caused by trail construction and recreational use would contribute long-term adverse effects to the overall adverse trends in vegetation when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Alternative 2. Construction of 23 miles of new trails and campsites would result in the permanent removal of vegetation. Acreages are approximate pending further design, but it is estimated that the construction would result in the permanent removal of up to 9.9 acres of vegetation. Per design standards described in appendix E, trail construction would not remove trees over 6 inches in diameter. Branches extending over the trail corridor would be cut no higher than 10 feet above the trail surface. The maximum width of disturbance would be 8 feet wide, which accounts for the 3- to 4-foot trail widths, potential soil disturbance outside of trail surface (mainly on trail locations on a steep side slope where the cut slope would need to be wider), and the distance of vegetation thinning and trimming beyond the trail. However, trail design and route placement would minimize vegetation removal, and in forests and woodlands best management practices as outlined in appendix E would be implemented to maintain habitat conditions at the stand scale.

No rare or endemic plants, including Crater Lake rockcress, pumice grape-fern, and Shasta arnica would be adversely affected by any proposed construction or restoration activities. Under alternative 2, the National Park Service would examine potential rare plant habitat in and near all construction areas that have not been previously surveyed for the presence of rare plants. Known occurrences of rare plants in the vicinity of the proposed parking lot additions and improvements, new trails, and picnic areas would be delineated and protected during construction. If any rare plants were encountered on a proposed trail alignment, the plants would be marked so that individual plants can be avoided by routing the trail away from the plants.

With construction of new trails, there is also the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. These "visitor-created trails" are of

concern to land managers when they become areas of erosion and vegetation trampling. In addition, trail braiding and widening would continue to occur in spot-locations as trail users avoid rutted, rocky, snow covered, or muddy areas on trails, trampling adjacent vegetation. Specifically, several Crater Lake rockcress and pumice grape-fern sites exist in very close proximity to the proposed rim trail near Llao Rock and above Grotto Cove and Cloudcap Bay. Llao Rock Research Natural Area is closed to public entry whenever the area is covered by less than one continuous foot of snow in order to protect sensitive resources, including rare plant species. Above Grotto Cove and Cloudcap Bay, off-trail activity could damage individual plants, cause soil compaction, and reduce flowering potential. Above Grotto Cove and Cloudcap Bay, off-trail activity in this area could damage individual plants, cause soil compaction, and reduce flowering potential. However, park staff would continue to periodically monitor the number of visitor-created trails leaving designated trails. If the number of visitor-created trails exceeds the threshold set in appendix A or if visitor-created trails are impacting sensitive resources, park staff would implement additional management strategies to protect sensitive resources such as rehabilitating visitor-created trails, restricting off-trail travel in sensitive resource areas, or establishing restoration areas around visitor-created trails. Therefore, the proposed actions under alternative 2 are not likely to threaten the long-term viability of rare plant species within the park.

Under this alternative, proposed construction activities that disturb vegetation could lead to increasing populations of nonnative invasive plants by removing established native plants that compete with noxious weeds, exposing mineral soil as a substrate for weed germination, and dispersing existing or new weeds seeds or plants carried by construction equipment and trail users. To prevent the spread of invasive and nonnative vegetation, the National Park Service would manage weed infestations in accordance with the park's Invasive Vegetation Management Plan (NPS 2017) and other mitigation measures and best management practices strategies discussed in chapter 2.

Removal of the East Bald Crater Loop Trail from the trail system would reduce adverse impacts to 1.45 acres of vegetation caused by use of the trail corridor, including impacts such as soil compaction, vegetation, and introduction of invasive plant species.

In total, actions under alternative 2 would result in the removal of up to 9.9 acres of vegetation. Mitigation measures and best management practices listed in chapter 2 would be implemented to reduce adverse impacts to vegetation from these actions. Some rare plant species could be adversely affected through off-trail travel; however, management strategies listed in appendix A would be implemented to reduce those impacts.

Vegetation removal and trampling caused by trail construction and recreational use would contribute long-term adverse effects to the overall adverse trends to vegetation when alternative 2 is added to past, ongoing, and reasonably foreseeable future actions.

Conclusion. Under the no-action alternative, impacts on vegetation would remain the same as described in the affected environment. Actions proposed under alternative 2 would have greater overall impacts on vegetation than under alternative 1. Alternative 2 would result in greater levels of ground disturbance, as up to 13.8 acres of vegetation would be removed through construction of new trails. In addition, alternative 2 has a greater number of trail segments that are near populations of rare plant species, which could be adversely affected if visitors go off-travel and inadvertently trample individual plants. Some reduction of adverse impacts to native vegetation would occur under alternative 2 with the removal of the East Bald Crater Loop Trail from the trail system. On the whole, both action alternatives would have more adverse impacts to vegetation than the no-action alternative, although mitigation measures and best management practices listed in chapter 2 as well

as management strategies listed in appendix A would be implemented under all action alternatives to reduce adverse impacts to native vegetation, including rare plant species.

WETLANDS AND RIPARIAN AREAS

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Wetland and riparian areas in the montane, conifer-dominated landscape of Crater Lake National Park most notably offer unique, moist conditions that support a wide variety of water-loving plants, which in turn provide essential habitat for a great diversity of wildlife species. The value of each wetland and riparian corridor is further elevated by the fact that they make up a very small percentage of landscape area in this higher elevation, heavily forested park. Less than 1% of the park's landscape is estimated to possess wetland conditions (NPS 2017; Adamus and Bartlett 2008). There is a wide variety of wetland and riparian types in the park, which further emphasizes their ecological uniqueness and importance. These include, but are not limited to, stream corridors, ponds and pond fringes, fens and bogs, springs, moist groves of aspen, alder, and cottonwood trees, and wet meadows at various elevations (NPS 2017; Adamus and Bartlett 2008). More specifically, some notable riparian and wetlands areas worth calling out include Sphagnum Bog; Thousand Springs; Poison Meadows; the Whitehorse Ponds complex; Spruce Lake; the riparian corridors of Annie Creek, Sun Creek, and Sand Creek; Red Cone, Lightning, and Annie Springs; and the springs within the caldera and Crater Lake's shoreline.

Vegetation in each of the park's riparian and wetland areas varies depending on the specific type of feature it is. Small groves of aspen appear in wetlands, along riparian zones, and in more mesic montane meadows. Subalpine wet meadows are often dominated by forbs, sedges, and grasses with interspersed water-tolerant trees. At lower elevations in the park, Engelmann spruce is the coniferous tree species that is commonly found in and near wetlands and creek riparian corridors, whereas subalpine fir is more commonly the dominant conifer species in riparian corridors and wetlands at middle to high elevations (NPS 2017).

While a relatively recent analysis of the park's wetland and riparian areas concluded that they are in relatively good condition and only slightly affected by invasive plant species, these moist, nutrient-rich habitats are prone to the threat of nonnative, invasive plant infestations (NPS 2017; Adamus and Bartlett 2008; Zedler and Kercher 2004).

Past actions that have impacted wetlands and riparian areas at Crater Lake National Park over the years include road, facility, and trail construction and maintenance; recreational use; introduction of nonnative fish to park streams, and wildland and prescribed fire and fire management actions. These actions have resulted in adverse impacts to wetlands across the park, including changes in composition and structure of vegetation communities, altered hydrology and water flow patterns; altered nutrient cycling and water filtration processes, and altered temperature regimes from increases or decreases in canopy cover and insolation. Future installation of a new bulkhead and dock system at the Cleetwood Cove marina would result in adverse impacts to up to 0.09 acres of freshwater wetlands from ground disturbance, dredging, and permanent installations.

Ground disturbance and related soil erosion associated with trail maintenance and use degrades water quality at times in nearby wetlands and downstream waterways. Trail braiding and widening occurs in spot-locations as trail users avoid rutted or rocky areas on trails, trampling adjacent vegetation and causing soil erosion. Visitor-created trails have proliferated as hikers venture "off-

trail" to explore, take photographs, and/or engage in other off-trail activities. Use of these trails adversely affects wetland and riparian water quality at times from trail and bank erosion and subsequent sedimentation. Ground disturbance corridors associated with trails has also created conditions that are very favorable for invasive plant colonization.

Future implementation of the park's invasive plant management plan and fire management plan will reduce invasive plant infestations and minimize the fire danger to park resources from hazardous fuel accumulations. Mitigation measures would be implemented to reduce temporary adverse impacts from ground disturbance and mechanical and chemical treatment methods. These projects would add long-term beneficial effects to the overall neutral trends in wetlands and riparian areas.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on vegetation would remain the same as described in the affected environment. The current resource threats (invasive plant species, off-trail travel, etc.) and impacts would continue to occur.

Alternative 1. The eastern half of the Ponderosa Pine Trail would intersect black cottonwood riparian forest and montane wet meadow marsh; up to 3,520 square feet (0.08 acres) of riparian vegetation would be permanently removed through trail construction. Additionally, the northern part of the Munson Valley Road Trail would intersect subalpine fire/lodgepole pine-riparian woodland; up to 1,200 square feet (0.03 acres) of riparian vegetation would be permanently removed through trail construction. Use of these trails could adversely affect wetland and riparian water quality from trail and bank erosion and subsequent sedimentation. However, adverse impacts would be minimized with the implementation of best management practices and mitigation measures listed in chapter 2, as well as management strategies identified in appendix A.

Adverse impacts to wetlands and riparian areas from soil erosion and runoff following trail construction would be avoided or minimized by constructing trails when soils are not saturated or susceptible to erosion and runoff. If it is not possible to construct a trail or install a trail bridge with sufficient time for natural revegetation to occur before spring runoff, best management practices and mitigation measures described in chapter 2 incorporating standard erosion control and revegetation methods would be used. Areas adjacent to newly constructed trails where soils are disturbed are typically covered with materials found on-site such as duff and leaf litter or small pieces of vegetation removed by trail construction. Therefore, overall functions of nearby wetlands would not be noticeably altered.

With construction of new trails and opening up existing trails to additional uses, there is the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. For example, the Munson Valley Road Trail would make use of an old road corridor where it crosses Goodbye Creek and Munson Creek at the south end of the trail. Use of the Munson Valley Road Trail by hikers could lead to the development and use of spur trails connecting to either creek, increasing the potential for adverse impacts to riparian zones from bank erosion, riparian vegetation trampling, and sedimentation into creeks. However, use of management strategies listed in appendix A such as improving signage, rehabilitating visitor-created trails, and establishing trail borders would reduce off-trail travel and minimize adverse impacts.

Vegetation removal, riparian vegetation trampling, and soil erosion and runoff caused by trail construction and recreational use would contribute long-term adverse effects to the overall neutral

trends in wetlands and riparian vegetation when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Alternative 2. Several trail segments proposed under alternative 2 would either cross intermittent creeks or would run along riparian areas. The proposed Maklaks Crater Loop would cross an intermittent creek on its southern side; up to 200 square feet (<0.01 acres) of riparian vegetation would be permanently removed through trail construction. In addition, the proposed southeastern rim trail segment would travel along approximately 3.5 miles of a Sand Creek tributary. Adverse impacts to wetlands and riparian areas from soil erosion and runoff following trail construction would be avoided or minimized by constructing trails when soils are not saturated or susceptible to erosion and runoff. If it is not possible to construct a trail or install a trail bridge with sufficient time for natural revegetation to occur before spring runoff, best management practices incorporating standard erosion control and revegetation methods would be used. Areas adjacent to newly constructed trails where soils are disturbed are typically covered with materials found on-site such as duff and leaf litter or small pieces of vegetation removed by trail construction. Therefore, overall functions of nearby wetlands would not be noticeably altered by trail construction.

Visitor use of constructed trails in this area would adversely affect water quality (from trail erosion, sedimentation, etc.). In addition, where visitor-created trails develop and are used to access creeks, additional soil erosion, riparian vegetation trampling, and sedimentation would occur. However, park staff would continue to periodically monitor the number of visitor-created trails leaving designated trails. If the number of visitor-created trails exceeds the threshold set in Appendix A (e.g., no more than three visitor-created trails leaving a designated trail per 1 mile in frontcountry areas), or if visitor-created trails are impacting sensitive resources, park staff would implement additional management strategies to protect sensitive resources and minimize adverse impacts, such as rehabilitating visitor-created trails, restricting off-trail travel in sensitive resource areas, or establishing restoration areas around visitor-created trails.

Vegetation removal, riparian vegetation trampling, and soil erosion and runoff caused by trail construction and recreational use would contribute long-term adverse effects to the overall neutral trends in wetlands and riparian vegetation when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Conclusion. Under the no-action alternative, impacts on wetlands and riparian areas would remain the same as described in the affected environment. On the whole, both action alternatives would have more adverse impacts to wetlands and riparian areas than the no-action alternative, although adverse impacts would be minimized with the implementation of management strategies identified in appendix A that would reduce off-trail travel. Alternative 1 would result in greater impacts to wetlands and riparian areas than alternative 2 through direct removal of riparian vegetation (0.11 acres and 0.01 acres, respectively), although alternative 2 would result in more new trails being constructed near riparian corridors. Park staff would periodically monitor the number of visitor-created trails leaving designated trails. If the number of visitor-created trails exceeds the threshold set in appendix A (e.g., mile in frontcountry areas no more than three visitor-created trails leaving a designated trail per one) or if visitor-created trails are impacting sensitive resources, park staff would implement additional management strategies to minimize adverse impacts.

NORTHERN SPOTTED OWL

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The northern spotted owl (*Strix occidentalis caurina*) is listed as threatened under the federal Endangered Species Act. This species is dependent on old-growth forests and is at the eastern edge of its range in Crater Lake National Park. A detailed account of the taxonomy, ecology, and reproductive characteristics of the northern spotted owl is found in the 2018 Biological Opinion for activities proposed under the Crater Lake National Park Fire Management Plan (USFWS 2018a). Roughly 32,000 acres of forest habitat suitable for the northern spotted owl has been identified in the park, particularly in the lower elevations (NPS 2005). Northern spotted owls tend to favor mature mixed conifer forests made up of Douglas fir, mountain hemlock, white fir, Shasta red fir, and ponderosa pine (Mohren 2015a). The southern and western areas of the park tend to have the largest and highest density of suitable habitat patches in the park (Mohren 2015a; NPS 2005). While the northern spotted owl has been documented in other areas of the park, virtually all known nest sites occur within identified suitable forest habitat (NPS 2005). The primary threats to the northern spotted owl include habitat competition from the barred owl and the loss of suitable old-growth mixed conifer habitat. Barred owl competition is of particular concern at Crater Lake National Park (Mohren 2015a). In 2015, barred owls were detected at 30% of known spotted owl activity centers (Mohren 2015a).

Past actions that have impacted northern spotted owl include road, facility, and trail construction and maintenance; recreational use; and prescribed fire and fire management activities, including fire suppression. These actions have resulted in adverse impacts to northern spotted owl parkwide, including changes in species abundance and distribution, changes in availability and distribution of preferred habitat and food, and changes in predator-prey relationships and food web dynamics.

Future rehabilitation of the East Rim Drive would cause noise disturbances where road construction was occurring in or near active northern spotted owl habitat. Implementation of the park's fire management plan would have both adverse and beneficial impacts on the northern spotted owl. Thinning and prescribed fire would result in suboptimum habitat for nesting where multilayered understory was eliminated, causing adverse impacts to owls in those areas. However, these projects would increase landscape diversity relative to fire and reduce the potential for stand replacing fires that destroy owl habitat, resulting in long-term beneficial impacts across the landscape. Additionally, annual hazard tree mitigation would result in loss of nesting or roosting habitat. Owls would continue to benefit from implementation of the park's invasive plant management plan, as removal and/or controlling invasive vegetation promotes native plant communities that support prey species for the northern spotted owl.

Verizon Wireless has proposed the installation of two wireless telecommunication facilities. The proposed site at Rim Village is not near owl habitat. The proposed site at Mazama Village is near owl habitat but in an area with high anthropogenic activity; because of this northern spotted owls have not used this area in the past and are unlikely to use it in the future (S. Mohren, pers. comm., 1/21/2021). Therefore, there are no future state, tribal, or private actions reasonably certain to occur in the project area that would contribute to overall trends in northern spotted owl populations.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on northern spotted owls would remain the same as described in the affected environment.

Alternative 1. Impacts to northern spotted owl habitat are analyzed by assessing potential changes in habitat conditions within the proposed parking lot expansions and trail construction footprint. Under alternative 1, approximately 20.6 miles of new trail would be constructed. Tread width would be 4 to 6 feet, with additional vegetation thinning and trimming within 4 feet of the centerline of the trail tread—total width of 8 feet. Thus, the acreage of the Analysis Area related to trail construction is approximately 20.0 acres. In addition, approximately 0.2 acres of land would be disturbed through expansion of parking lots and associated facilities. This means the total area of habitat affected is approximately 20.2 acres.

A total of 20.0 acres of habitat would be impacted as part of the proposed trail construction under alternative 1. Per the trail program's standard operating procedures in appendix E, trail construction would not remove trees over 6 inches in diameter. Branches extending over the trail corridor would be cut no higher than 10 feet above the trail surface. The maximum width of disturbance would be 8 feet wide, which accounts for the 4- to 6-foot trail widths, potential soil disturbance outside of trail surface (mainly on trail locations on a steep side slope where the cut slope would need to be wider), and the distance of vegetation thinning and trimming beyond the trail. However, adverse impacts to habitat would be minimized through the implementation of mitigation measures and best management practices listed in chapter 2. For example, trail design would minimize vegetation removal through route location, and revegetation efforts would reconstruct the natural spacing, abundance, and diversity of native plant species in the trail corridor to the extent feasible. Proposed activities are intended to maintain habitat conditions at the stand scale.

At the Pinnacles Parking Area, approximately 0.07 acres of lodgepole pine forest would be permanently removed to expand the parking lot and add a vault toilet and picnic area. Constructing a 10-car pullout parking area at the trailhead for Castle Creek Canyon Trail and installing a vault toilet would require permanently removing up to 0.08 acres of Shasta red fir forest. Negative impacts at the sites would also include soil compaction and the loss of ground cover and understory species. Construction activities and fill associated with curbs would temporarily impact vegetation within a 5-foot wide perimeter (approximately 1,200 square feet at Castle Creek Canyon Trail and 1,400 square feet at Pinnacles Parking Area). However, both facilities are located next to roads, where spotted owls are less likely to nest (Kerns and Allwardt 1992 as cited in USFS 2017, pg. 77; Perkins 2000 as cited in USFS 2017, pg. 77), and neither are within one mile of any known northern spotted owl nest tree or pair locations.

For the same reasons cited above (minimal alteration of vegetation and small area of habitat affected), effects to northern spotted owl prey species are anticipated to be minimal. Some loss of cover through vegetation trimming and movement of woody debris and rocks may displace prey species. This displacement would be temporary as prey (wood rats, flying squirrels, etc.) are very mobile and would find new cover habitat. Good habitat for prey exists across the landscape, and prey species would not be measurably affected by actions under alternative 1.

Northern spotted owls are susceptible to disturbance from human-caused activity, especially during critical periods in the breeding season (Delaney et al. 1999 in USFWS 2018b). All of the trail and other construction projects proposed have the potential to increase noise above ambient levels. Actions that result in elevated sound levels can result in harassment-level disturbance of owls from

up to 0.25 miles away from the footprint of the project (USFWS 2006). However, adverse impacts to northern spotted owls and their habitat from construction would be minimized through the implementation of mitigation measures and best management practices described in chapter 2. For example, a seasonal restriction to minimize disturbance to nesting northern spotted owls from human-caused activity would be implemented as part of any action alternatives. During the spotted owl breeding season (March 1– August 10), trail or parking lot construction would not be conducted in those portions of treatment units that are within 0.25 miles of an active spotted owl nest site or activity center. Active/inactive nesting status would be determined via standard protocol surveys. In addition, any trail construction project or other project with significant amount of vegetation removal occurring within 1.2 miles of northern spotted owl habitat would require two years of protocol surveys for northern spotted owl if northern spotted owl habitat would be altered. Therefore, trail construction would not have a measurable impact on individual spotted owls through noise or visual disturbance.

Several proposed trails would pass through or near suitable nesting, roosting, and foraging habitat for the northern spotted owl. The National Park Service has identified visitor capacities, i.e., appropriate amount and types of use, for different trails in the park (see appendix B). Use of trails that is below the established visitor capacities would not be expected to cause a significant disruption of behavior because spotted owls do not seem to be startled by human presence on the ground (USFWS 2005 as cited in USFS 2017, pg. 66). If a nest tree, or flight path to the nest itself, is greater than 40 meters from a trail or other source of visual disturbance, there would be no visual disturbance of owls anticipated (USFWS 2006). The National Park Service would implement the management strategies outlined in appendix B to ensure actual use remains within the visitor capacities identified. The National Park Service would also implement mitigation measures and best management practices listed in chapter 2, including assessing potential impacts of visitor use when an active nest is discovered within 0.25 miles of a trail and determining if the trail needs to be temporarily closed. Therefore, trail use would not have a measurable impact on individual northern spotted owls.

The Pumice Flat Trail, an existing trail, would be opened to horseback riding. This trail runs less than 10 feet from the last known location of an observed pair of northern spotted owls; however, no known nests have been observed in this area. No habitat would be removed along the trail, and visitor use of the Pumice Flat Trail is already ongoing. With implementation of mitigation measures and best management practices identified in chapter 2, this change in use would not measurably impact individual northern spotted owls.

The proposed Union Peak to Stuart Falls Connector Trail would come within 3,570 feet (0.66 miles) at its closest distance to a known northern spotted owl nest tree location. This distance is outside the estimated distance at which harassment of northern spotted owls may occur from elevated action-generated sound levels (USFWS 2006). Additionally, adverse impacts to northern spotted owls and their habitat from construction and use of the trail would be minimized through the implementation of mitigation measures and best management practices described in chapter 2, such as protocol surveys occurring for two years prior to trail construction. Therefore, construction, maintenance, and use of the Union Peak to Stuart Falls Connector Trail would not measurably contribute human presence or noise disturbance to the northern spotted owl beyond the current condition.

The Grayback Road would continue to be open to hiking, equestrian, bike, and walking pets on-leash and would officially be repurposed as the Grayback Trail, potentially resulting in an increase in visitor use. However, the Grayback Trail is still 4,129 feet (0.78 miles) at its closest distance to a

known northern spotted owl nest tree location, which is outside the estimated distance at which harassment of northern spotted owls may occur from elevated, action-generated, sound levels (USFWS 2006). Additionally, adverse impacts to northern spotted owls and their habitat from construction and use of the trail would be minimized through the implementation of mitigation measures and best management practices described in chapter 2, such as protocol surveys occurring prior to any trail maintenance activity with potential to cause noise disturbance. Therefore, maintenance and use of the Grayback Trail would not measurably contribute human presence or noise disturbance to the northern spotted owl beyond the current condition.

The habitat loss caused by trail construction and recreational use would add long-term adverse effects to the overall adverse trends in northern spotted owl habitat when alternative 1 is added to past, future, and reasonably foreseeable future actions; however, it would not contribute noticeable or measurable effects to the overall adverse trends in northern spotted owl populations.

Alternative 2. Impacts to northern spotted owl habitat are analyzed by assessing potential changes in habitat conditions within the proposed parking lot expansions and trail construction footprint. Under alternative 2, approximately 19.1 miles of new trail would be constructed within conifer forest; the rest would be in meadows, shrubland, and rocky areas. Tread width would be 3 to 4 feet, with additional vegetation thinning and trimming within 4 feet of the centerline of the trail tread – total width of 8 feet. Therefore, a total of 18.5 acres would be affected as part of the proposed trail construction under alternative 2. Per the trail program's standard operating procedures in appendix E, the trail construction would not remove trees over 6 inches in diameter. Branches extending over the trail corridor would be cut no higher than 10 feet above the trail surface. The maximum width of disturbance would be 8 feet wide, which accounts for the 4- to 6-foot trail widths, potential soil disturbance outside of trail surface (mainly on trail locations on a steep side slope where the cut slope would need to be wider), and the distance of vegetation thinning and trimming beyond the trail. Trail design would minimize vegetation removal through route location. Habitat alteration would be minimal and on a very small scale (trail width). Proposed activities are intended to maintain habitat conditions at the stand scale.

Northern spotted owls are susceptible to disturbance from human-caused activity, especially during critical periods in the breeding season (Delaney et al. 1999 in USFWS 2018b). All of the trail and other construction projects proposed have the potential to increase noise above ambient levels. Actions that result in elevated sound levels can result in harassment-level disturbance of owls from up to 0.25 miles away from the footprint of the project (USFWS 2006). However, adverse impacts to northern spotted owls and their habitat from construction would be minimized through the implementation of mitigation measures and best management practices described in chapter 2. For example, a seasonal restriction to minimize disturbance to nesting northern spotted owls from human-caused activity would be implemented as part of any action alternatives. During the spotted owl breeding season (March 1– August 10), trail or parking lot construction would not be conducted in those portions of treatment units that are within 0.25 miles of an active spotted owl nest site or activity center. Active/inactive nesting status would be determined via standard protocol surveys. In addition, any trail construction project or other project with significant amount of vegetation removal occurring within 1.2 miles of northern spotted owl habitat will require two years of protocol surveys for northern spotted owl if northern spotted owl habitat will be altered. Therefore, trail construction is not expected to have a measurable impact on individual spotted owls.

Several proposed trails or trail segments would pass through or near suitable nesting, roosting, and foraging habitat for the northern spotted owl. Use of trails that is below the established visitor

capacities would not expected to cause a significant disruption of behavior because spotted owls do not seem to be startled by those situations (USFWS 2005, cited in USFS 2017, pg. 66), and good habitat for northern spotted owls exists across the landscape. In addition, the National Park Service would establish visitor capacities for these trails and would implement the management strategies outlined in appendix B if visitor capacities were being approached or exceeded.

The proposed Maklaks Crater Loop trail would come within 1,320 feet (0.25 miles) at its closest distance to a known northern spotted owl nest tree location. Adverse impacts to northern spotted owls and their habitat from construction would be minimized through the implementation of mitigation measures and best management practices described in chapter 2, for example, two years of surveys prior to trail construction as well as seasonal restrictions on construction or maintenance projects occurring within 0.25 miles of active nest sites. Therefore, construction, maintenance, and use of the Maklaks Crater Loop trail would not measurably contribute human presence or noise disturbance to the northern spotted owl beyond the current condition.

The Grayback Road would be repurposed as part the Rim Trail, which may result in additional use by hikers completing the entire or sections of the loop. However, the Grayback Trail is still 4,129 feet at its closest distance to a known nest tree location, which is outside the estimated harassment distance for actions affecting the northern spotted owl (USFWS 2006). Therefore, maintenance and use of the Grayback Trail would not measurably contribute human presence or noise disturbance to the northern spotted owl beyond the current condition.

The closure of the East Bald Crater Loop Trail would result in some beneficial impacts to northern spotted owls through improvement of habitat quality as the trail corridor naturally revegetates. Additionally, the closure would result in fewer disturbances of northern spotted owls from either visitor use or trail maintenance activities.

The habitat loss caused by trail construction and recreational use would add long-term adverse effects to the overall adverse trends in northern spotted owl habitat when alternative 1 is added to past, future, and reasonably foreseeable future actions; however, it would not contribute noticeable or measurable effects to the overall adverse trends in northern spotted owl populations.

Conclusion. Under the no-action alternative, impacts on northern spotted owls would remain the same as described in the affected environment. On the whole, both action alternatives would have more adverse impacts to northern spotted owls than the no-action alternative, although mitigation measures and best management practices listed in chapter 2, as well as management strategies identified in appendix A, would be implemented under all action alternatives to reduce adverse impacts to northern spotted owls. Actions proposed under alternative 2 would have greater overall impacts on habitat quality than under alternative 1, as alternative 2 would result in more trail mileage and vegetation removal within northern spotted owl habitat. In addition, one of the trails proposed under alternative 2 would come within 0.25 miles of a known northern spotted owl nest tree location. However, proposed activities are intended to maintain habitat conditions at the stand scale, and trail construction and maintenance would be timed to avoid noise and visual disturbances to northern spotted owls. Therefore, the actions proposed under the no-action alternative, alternative 1, and alternative 2 would not be of any new measurable consequence to northern spotted owls.

Under the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service guidance for implementing section 7 consultation under the Endangered Species Act, the no-action alternative, alternative 1, and alternative 2 each *may affect but is not likely to adversely affect* the northern spotted owl.

WHITEBARK PINE

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The whitebark pine (*Pinus albicaulis*) has been proposed for listing as a threatened species under the federal Endangered Species Act. This conifer species is particularly known for its ability to endure harsh climate conditions of higher elevations, particularly high winds, low temperatures, and deep or persistent snowpack (NPS 2005). US Fish and Wildlife Service (2018b) provides a thorough description of the species' physical environment and distribution; reproductive and other life history traits; and individual-level, population-level, and species-level ecology. At Crater Lake National Park, the whitebark pine stands are most common in the 7,000 to 9,000 foot elevation range, notably around the high rim of the caldera, as well as up the slope and along the ridges of the peaks that surround the park (NPS 2005, USDA NRCS 2003). Unlike the continuous and higher density forests of other dominant tree species in the park at lower elevations, the whitebark pines tend to coexist in more of an open woodland (NPS 2005) but are also found in denser stands with mountain hemlock and lodgepole pine. Recent vegetation mapping determined that there were 298.8 hectares of whitebark pine woodland and 639.1 hectares of mountain hemlock-lodgepole pine-whitebark pine forest (DiPaolo et al. 2018).

Original construction of the Rim Drive required substantial earthwork and vegetation clearing. Ongoing road maintenance, deterioration of the road and associated erosion, and visitor use has continued to affect the condition of vegetation resources near the road. Periodic maintenance activities to repair road damage result in some vegetation disturbance or introduction of invasive plant seeds, adversely affecting regeneration rates of whitebark pine trees. Off-pavement vehicle trespass and pedestrians walking outside of paved areas result in soil compaction, soil erosion, and vegetation trampling, which could also reduce regeneration rates of whitebark pine trees. Previously disturbed sites that have not been reclaimed remain sparsely vegetated and increase the potential for nonnative plant species invasion. Rehabilitation of the East Rim Road would result in removal of some individual trees adjacent to the road, although small trees would be salvaged and transplanted as feasible. There are no known future state, tribal, or private actions reasonably certain to occur in the action area that would impact whitebark pine trees.

This tree species is somewhat fire resistant and can survive moderately intense or slow-moving fires, unlike most other conifers in the region (USDA NRCS 2003). The regeneration of this species generally occurs in open areas that occur naturally and may have been created by past fires. Wildfire suppression over the last century has resulted in whitebark pine stands across its range that have generally become older, denser, and more susceptible to mountain pine beetles (USDA NRCS 2003). Implementation of the park's invasive plant management plan and fire management plan would result in beneficial impacts to parkwide vegetation over the next 10 years through actions to protect and maintain the health and integrity of native plant communities and the species dependent upon them. However, whitebark pines are notably declining in Crater Lake National Park and range-wide mainly due to infection by white pine blister rust, a disease caused by a nonnative fungal pathogen (NPS 2005). Whitebark pine are severely impacted by blister rust because trees infected with the disease either die before they reach a cone-bearing age, have their cone-bearing branches successively killed, or don't produce cones at all (USDA NRCS 2003). Coupled with increasing mortality from mountain pine beetles that are able to wreak more havoc at higher elevations due to warmer temperatures and milder winters, the prognosis for whitebark pine is a steady decline in

population and geographic extent unless the progress of climate change is curtailed and other stressors are mitigated.

Environmental Consequences

No Action-Alternative. Under the no-action alternative, impacts on whitebark pine would remain the same as described in the affected environment. The current resource threats (insects, disease, etc.) and impacts would continue to occur.

Alternative 1. There would be no specific ground disturbance under alternative 1 with the potential to adversely impact whitebark pine trees. The Munson Valley Road Trail would be constructed within 100 feet of a whitebark pine planting site, and the Panhandle Trail would be constructed within 100 feet of two long-term whitebark pine monitoring plots. Off-trail use by trail users could compromise the success of the plantings and adversely affect regeneration rates of future whitebark pine trees in this area. However, implementation of management strategies listed in appendix A, such as improving signage, rehabilitating visitor-created trails, and establishing trail borders, would reduce off-trail travel and minimize adverse impacts from hiking on the trail corridors and adjacent areas. Therefore, the actions proposed under the alternative 1 would not be of any new measurable consequence to whitebark pine.

Vegetation removal and trampling from trail construction and recreational use would not contribute noticeable or measurable effects to the overall adverse trends in whitebark pine when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Alternative 2. Under alternative 2, 2.7 miles of the proposed Rim Trail would be routed through mapped whitebark pine stands, and an additional 1.0 miles would be located within 100 feet of mapped whitebark pine stands. Construction of the proposed Rim Trail would result in the permanent removal of approximately 1.4 acres of vegetation from within whitebark pine stands.

In addition, all trees and brush more than 12 inches above ground would be cut to a 2- to 4- inch stump from within 4 feet of the center line of the trail tread. This would include the removal of trees 6 inches or less in diameter. However, trail design would minimize vegetation removal through route location, and in forests and woodlands, proposed activities are intended to maintain habitat conditions at the stand scale.

With construction of new trails and facilities, there is the potential for informal spur trails to develop as visitors travel off maintained trails to reach a destination. These “visitor-created trails” are of concern for whitebark pines when they become areas of erosion and vegetation trampling, which could compromise the success of whitebark pine seedlings and adversely affect regeneration rates of future whitebark pine trees in this area. The use of management strategies listed in Appendix A, such as improving signage, rehabilitating visitor-created trails, and establishing trail borders, would reduce off-trail travel and lessen adverse impacts from hiking on the trail corridors and adjacent areas. However, where off-trail travel occurs, impacts would be difficult to reverse as pumice soil turns to dust under heavy visitor use, and it is difficult to get plants to reestablish once the plant community cover is low or nonexistent. Regeneration of whitebark pine trees could be inhibited in those areas for decades.

Less than 2 acres of whitebark pine habitat would be impacted by trail construction, and up to 2 acres of habitat could be impacted through off-trail travel as described above. As the total potential acres impacted is less than 4 acres out of 298 acres of whitebark pine woodland and 639 acres of

mountain hemlock/lodgepole pine/whitebark pine forest the long-term viability of the whitebark pine population in the park would not be adversely impacted by actions under alternative 2.

Vegetation removal and trampling from trail construction and recreational use would contribute long-term adverse effects to the overall adverse trends in whitebark pine when alternative 1 is added to past, ongoing, and reasonably foreseeable future actions.

Conclusion. Under the no-action alternative, impacts on vegetation would remain the same as described in the affected environment. The current resource threats and impacts would continue to occur. Actions proposed under alternative 2 would have greater overall impacts on whitebark pine than under alternative 1 and the no-action alternative. Alternative 2 would result in greater levels of ground disturbance than alternative 1; up to 1.4 acres of vegetation within whitebark pine stands would be removed through construction of new trails. Still, trail design would prevent seedling or tree removal through route location, and habitat conditions would be maintained at the stand scale. In comparison, there is no specific ground disturbance under alternative 1 with the potential to adversely impact whitebark pine trees. Some beneficial impacts to whitebark pine trees would occur under both action alternatives through implementation of management strategies to reduce the development of visitor-created trails.

Under the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service guidance for implementing section 7 consultation under the Endangered Species Act, the actions proposed under the no-action alternative, alternative 1, and alternative 2 would not be expected to impact whitebark pine at a stand or population level and would not jeopardize the existence of the species. Furthermore, alternative 1 *may affect but is not likely to adversely affect* the whitebark pine.

WILDERNESS CHARACTER

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Recommended Wilderness in Crater Lake National Park. After four years of analysis and public input in the early 1970s, the Department of the Interior recommended to President Nixon that 122,400 acres in Crater Lake National Park met the definition set forth in the Wilderness Act and should be designated as wilderness. President Nixon sent this recommendation to Congress on June 13, 1974. However, Congress did not act on the recommendation. Although Congress has not yet acted on this formal departmental recommendation, these recommended wilderness areas have been managed per the terms of the Wilderness Act and NPS wilderness management policies. Various trails in the Crater Lake trail network traverse recommended wilderness areas.

In general terms, the recommended wilderness includes five general areas of the park, as follows (Unrau and Mark 2013):

1. **Northeast roadless areas** – Generally extending from the north entrance to the northeast corner of the park, then southward past the eastern slopes of Mt. Scott to the Pinnacles area. Its western boundary extends from the Pinnacles area along the Pinnacles Road, the Rim Drive, and the North Entrance Road. This area is quite dry, and the predominant visitor uses in this area are hiking and limited wilderness camping.

2. **Southeast roadless areas** – Generally extending from the Pinnacles Road at the eastern boundary, southward to the southeast corner of the park, and then along the south boundary westward to the Highway 62 (at park's southern panhandle). Its western and northern boundaries are the South Entrance Road, Rim Drive, and the Pinnacles and Grayback Roads. This area includes most of the Annie Creek drainage basin, which includes biologically diverse riparian corridors along the canyon bottoms, as well as unique geologic formations. Sun Creek, and its valued fishery, bisect this area.

3. **Southwest roadless areas** – Generally extending from the South Entrance Road along the south and west boundary, the West and South Entrance Roads, and the Union Peak Motor Nature Road. The Union Peak shield volcano, Red Blanket Canyon, several cones, and other volcanic features lie within this area. Plant cover represents three life zones and varies from a pumice desert to mature forest.

4. **Northwest roadless area** – Lying on the west slope of the Crater Lake caldera, this area is generally bound on the south and east by the West Entrance Road, West Rim Drive, the North Entrance Road, and roughly the northern and western park boundaries. This area includes upper headwaters of the Rogue River and several of its spring-fed tributary streams. The unique Sphagnum Bog complex lies in this area near the park's western boundary. It also includes forests of whitebark pine, mountain hemlock, as well as lodgepole, ponderosa and western white pines.

5. **Crater Lake and southern rim** – Generally consisting of the entire Crater Lake surface and the rim area on the southern side of the lake within the Rim Drive and the caldera walls, except for the Cleetwood Cove access and service corridor and a few acres at Wizard Island where boat docking and storage occur. Although Crater Lake was not part of the initial wilderness recommendation in the early 1970s, the National Park Service later concluded that the existence and use of tour boats and lake research boats should not preclude the lake surface from wilderness designation.

Qualities of Wilderness Character. Wilderness character is not specifically defined in the 1964 Wilderness Act, nor is its meaning discussed in the act's legislative history. However, the Wilderness Act identifies the following qualities that unify wilderness areas regardless of their size, location, or any other feature. The five qualities of wilderness character are:

- **Undeveloped** – "*an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation*. . ." This refers to areas that are essentially without permanent structures, enhancements, or modern human occupation. To retain its primitive character, a wilderness ideally is managed without the use of motorized equipment or mechanical transport. Scientific instrumentation, research installations, and other administrative structures diminish the *undeveloped quality* of recommended wilderness.

- **Natural** – "*protected and managed so as to preserve its natural conditions*. . ." This means areas that are largely free from the effects of modern civilization. It also refers to maintenance of natural ecological relationships and processes, continued existence of native wildlife and plants in largely natural conditions, and absence of distractions (e.g., large groups of people; mechanization; and evidence of human manipulation, unnatural noises, signs, and other

modern artifacts). Spread of nonnative species and noise have degraded the *natural quality* in portions of recommended wilderness within the park.

- **Untrammeled** – "*an area where the earth and its community of life are untrammeled by man*" and "*generally appears to have been affected primarily by the forces of nature…*" This refers to ecosystems that are unhindered and free from human control or manipulation. In other words, this wilderness quality can be degraded by human actions that control or manipulate components or processes of ecological systems within the wilderness area. Fire management and invasive species management have degraded the *untrammeled quality* when they are implemented in recommended wilderness areas. There would be no measurable difference in impacts to the *untrammeled wilderness quality* between alternatives; as a result, this wilderness character was dismissed from further analysis.

- **Solitude or Primitive and Unconfined Recreation** – the area "*has outstanding opportunities for solitude or a primitive and unconfined type of recreation…*" Solitude means encountering few, if any, people, and experiencing privacy and isolation. Primitive and unconfined recreation refers to freedom to explore with few restrictions, and the ability to be spontaneous. It means self-sufficiency without support facilities or motorized transportation, and experiencing weather, terrain, and other aspects of the natural world with minimal shelter or assistance from devices of modern civilization. The national park provides a variety of opportunities for visitors to find solitude. The noise and presence of other visitors, noise from overflights, vehicle traffic noise, and mechanized tools for research and maintenance activities degrade the character of this recommended wilderness quality.

- **Other Features of Value –** This quality applies to those values and features that are not fully covered in the other four qualities, including features of scientific or cultural value. In many cases, these values are often cultural resources that can teach us about the history and special significance of people's relationship to the land. Proposed actions and visitor use within recommended wilderness areas would avoid and protect other features of value. As a result, the *other features of value* quality of wilderness character was dismissed from further analysis.

Past actions that impacted wilderness character include road, facility, and trail construction and maintenance; prescribed fire and fire management activities, including fire suppression; invasive plant management activities; and placement of research installations. These actions have resulted in ongoing adverse impacts to the *natural quality* from the establishment of invasive plants and changes to the natural fire regime (see "Vegetation" section above). These actions have also resulted in ongoing adverse impacts to the *opportunities for solitude or primitive and unconfined recreation quality* from the existence of recreational facilities and management restrictions in wilderness as well as from noise and visual disturbances.

Ongoing implementation of the park's invasive plant management plan and fire management plan results in temporary adverse impacts to the *untrammeled quality* but also results in long-term beneficial impacts to the *natural quality* through actions to protect and maintain the health and integrity of native plant communities. The use of motorized equipment during implementation of either of these plans temporarily causes adverse impacts to the *undeveloped quality* and *opportunities for solitude or primitive and unconfined recreation quality* as well as the *natural quality* through disturbance of wildlife.

Construction-related noise and visual disturbances from proposed development projects and rehabilitation projects within the park, including proposed installation of cellular towers in Rim Village and Mazama Village, improvement of visitor facilities at North Junction Viewpoint, rehabilitation of the East Rim Drive, and rehabilitation of the Annie Spring Entrance Station, would impact nearby recommended wilderness areas. Although not occurring in wilderness, construction-noise would be audible from recommended wilderness areas and is likely to adversely affect the *solitude or primitive and unconfined recreation quality,* as well as the *natural quality* through disturbance of wildlife. However, mitigation measures would be implemented to reduce adverse impacts from construction-related noise and visual disturbances and to prevent the introduction of invasive plants.

Use of the area's authorized trails and off-trail travel causes reductions in vegetation cover, height, and biomass, changes in species composition, and introduction and spread of nonnative plants along linear trail corridors, resulting in adverse impacts to the *natural quality* of wilderness character. Maintenance of the trail system causes temporary adverse impacts to the *solitude or primitive and unconfined recreation quality*, while the continuing presence of trails in wilderness adversely impacts the *solitude or primitive and unconfined recreation quality*.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on wilderness character would remain the same as described in the affected environment.

Alternative 1. During the construction period, construction of the Raven Trail, Union Peak to Stuart Falls Connector Trail, Mazama Rock Trail, and Falls to Flowers Trail would degrade the wilderness character of opportunities for solitude or primitive and unconfined recreation due to the continued presence of work crews and new ground and human disturbance. Adding approximately 6.6 miles of new trails in recommended wilderness would increase the total wilderness trail miles by 6% in the park, resulting in a permanent adverse impact to opportunities for primitive and unconfined recreation. The presence of trails in wilderness detracts from the opportunity for unconfined recreation by potentially limiting self-exploration, self-determination, and reliance on personal skills.

Because most trail work in wilderness would be conducted with hand tools, construction noise would be limited, and disturbance would mostly be contained to the narrow trail corridor. Exceptions include use of mechanized equipment such as small hand tools, chainsaws, rock drills, generators, possible rock blasting, and use of helicopters for material delivery. Use of this equipment would result in adverse impacts to the *undeveloped quality* of wilderness character for the duration of the use of those tools. However, use of this equipment would be subject to minimum requirements analysis and is expected to be infrequent, limited to short durations, and used in compliance with the park's wilderness requirements. In addition, the noise from these actions would be heard and seen by visitors in nearby wilderness, resulting in occasional adverse impacts to the *solitude or primitive and unconfined recreation quality* during the construction season.

In addition, construction of these new trails would also have the potential to degrade the *natural quality* of wilderness by introducing nonnative plants, introducing noise, and displacing wildlife; however, mitigation measures and management strategies described in chapter 2, as well as management strategies described in appendixes A and B would be implemented to minimize this potential. The area affected by the sights and sounds of construction would vary depending on topography, vegetation, and other site conditions. The effects would diminish as one moves away

from the construction site. Sound from using mechanized equipment may be noticeable several miles or more from the site. These adverse effects on wilderness qualities would typically occur during a three- to four-month construction season occurring over several years.

Establishing visitor capacities and implementing them with appropriate management strategies would result in both long-term beneficial and adverse impacts to the *solitude or primitive and unconfined recreation quality* of wilderness character, as park staff may need to enforce additional management restrictions in order to protect opportunities for solitude.

Other actions under alternative 1 would involve constructing trails, expanding parking areas, and installing a vault toilet and picnic area. Although outside recommended wilderness, these actions would generate noise and visual intrusions from construction activities that may carry into wilderness and degrade the *natural quality* and opportunities for solitude during the few weeks involved for each location's short construction period. In particular, the combustion noise and other related equipment noise associated with construction activities for parking expansion at the Castle Creek Canyon Trail would have noticeable temporary adverse effects on wilderness character of the recommended wilderness lands immediately to the north.

Improving or adding trails in heavily used areas would have beneficial effects on recommended wilderness by limiting off-trail use and helping to reduce the footprint of informal trails. These beneficial effects would promote recovery of native vegetation on disturbed areas and eventually improve the *natural quality* of wilderness (see vegetation section above).

Under alternative 1, impacts to each of the wilderness qualities would continue to be greatest along trails and in highly developed areas since access to other parts of recommended wilderness is more difficult and time consuming. The impacts would continue to be localized and therefore would be minimal when compared to the overall amount of recommended wilderness in the national park.

The disruption caused by the noise and visual disruption of trail construction and other projects under alternative 1 would add temporary or short-term adverse impacts to overall adverse trends in wilderness character, while the addition of new trails in wilderness would contribute long-term adverse impacts to overall trends. However, establishing visitor capacities and implementing them with appropriate management strategies would also contribute beneficial impacts to the overall trends, specifically to solitude aspects of wilderness character.

Alternative 2. During the construction period, construction of the Rim Trail and Maklaks Crater Loop would degrade opportunities for solitude due to the continued presence of work crews and new ground and human disturbance. Adding approximately 12 miles of new trails in recommended wilderness would increase the total wilderness trail miles by 11% in the park, resulting in a permanent adverse impact to opportunities for primitive and unconfined recreation. The presence of trails in wilderness detracts from the opportunity for unconfined recreation by potentially limiting self-exploration, self-determination, and reliance on personal skills.

Construction of new trails would also have the potential to degrade the *natural quality* of wilderness by introducing nonnative plants, introducing noise, and displacing wildlife; best management practices and mitigation measures described in chapter 2 would be implemented to minimize this potential. Because most trail work in wilderness would be conducted with hand tools, construction noise would be limited, and disturbance would mostly be contained to the narrow trail corridor. Exceptions include use of mechanized equipment such as small hand tools, chainsaws, rock drills, generators, possible rock blasting, and use of helicopters for material delivery, which would also

result in adverse impacts to the *undeveloped quality* of wilderness for the duration of the construction. However, use of this equipment would be subject to minimum requirements analysis and is expected to be infrequent, limited to short durations, and used in compliance with the park's wilderness requirements. The noise from these actions would be heard and seen by visitors in adjacent wilderness areas, which diminishes opportunities for solitude or primitive and unconfined recreation. The area affected by the sights and sounds of construction would vary depending on topography, vegetation, and other site conditions. The effects would diminish as one moves away from the construction site. Sound from using mechanized equipment may be noticeable several miles or more from the site. These adverse effects on wilderness qualities would typically occur during a three- to four-month construction season occurring over several years.

Establishing visitor capacities and implementing them with appropriate management strategies would result in both long-term beneficial and adverse impacts to the *solitude or primitive and unconfined recreation quality* of wilderness character, as park staff may need to enforce additional management restrictions in order to protect opportunities for solitude.

Other actions under alternative 2 also involve trail construction outside wilderness that would generate noise and visual intrusions that may carry into wilderness and degrade the *solitude or primitive and unconfined recreation* and *natural qualities* during the few weeks involved for each location's short construction period.

Improving or adding trails in heavily used areas would have beneficial effects on recommended wilderness by limiting off-trail use and helping to reduce the footprint of informal trails. These beneficial effects would promote recovery of native vegetation on disturbed areas and eventually improve the *natural quality* of wilderness (see vegetation section above).

Under alternative 2, impacts to each of the wilderness qualities would continue to be greatest along trails and in highly developed areas since access to other parts of recommended wilderness is more difficult and time consuming. The impacts would continue to be localized and would be minimal when compared to the overall amount of recommended wilderness in the national park.

The disruption caused by the noise and visual disruption of trail construction and other projects under alternative 2 would add temporary or short-term adverse impacts to overall adverse trends in wilderness character, while the addition of new trails in wilderness would contribute long-term adverse impacts to overall trends. However, establishing visitor capacities and implementing them with appropriate management strategies would also contribute beneficial impacts to the overall trends, specifically to solitude aspects of wilderness character.

Conclusion. Under the no-action alternative, impacts on wilderness character would remain the same as described in the affected environment. The current threats and impacts would continue to occur. In comparison, actions proposed under alternative 2 would have greater overall impacts on wilderness character than under alternative 1 and the no-action alternative. Alternative 2 would result in 12 miles of new trails being constructed in wilderness, while under alternative 1 there would be 6.6 miles of new trails constructed in wilderness. Both of these would result in permanent adverse impacts to the *solitude or primitive and unconfined recreation quality*. The combustion noise and other related equipment noise associated with construction activities for parking expansion under alternative 1 would have adverse effects on wilderness character of the recommended wilderness lands within earshot, in particular the *natural quality* and *solitude or primitive and unconfined recreation quality*; however, these impacts would only last for the duration of the construction project. Noise and visual disturbances from trail maintenance and visitor use of new wilderness trails

would also adversely impact the *natural quality* and *solitude or primitive and unconfined recreation quality* under both action alternatives. Under both action alternatives, mitigation measures and management strategies would be implemented to reduce adverse impacts from construction and use of new trails and facilities. With more than 122,400 acres within the park's recommended wilderness, the actions proposed under alternative 1 and alternative 2 would impact a very small fraction of the park's recommended wilderness.

HISTORIC STRUCTURES AND CULTURAL LANDSCAPES

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

Historic structures and cultural landscapes in the affected environment consist of six documented historic roadways and trails and two bridges that are described below. Since several of these linear resources have been documented as both historic structures and cultural landscapes, these two resource types are combined for the purpose of this analysis.

- **Rim Drive Historic District.** Listed on the National Register of Historic Places, Rim Drive is a narrow, linear designed landscape centered on the 31.6-mile Rim Drive roadway that encircles the rim of the Crater Lake caldera. The district includes the road base, shoulders, surfacing, pavement, retaining walls, masonry guardrail, culverts and headwalls, spillways, drop inlets, paved ditches, bankslopes, devices to protect trees, planting beds, walkways, overlooks, cuts, and fills. Although not all of these design features contribute to the significance of the district, those that are original and retain integrity are included as features of the NRHP-listed road segments. The district also includes the Cloudcap spur road and the Vidae Falls service road and trails originally designed to encourage pedestrian circulation from Rim Drive. Overall, the Rim Drive Historic District possesses exceptional integrity. (CLI 2011, p. 42; CLR 2009; NR Nomination 2007).

- **Army Corps of Engineers Road System (ACERS) Historic District.** Between 1913 and 1918, the Army Corps of Engineers constructed the first engineered road circuit around the Crater Lake caldera. Crater Lake Rim Road, along with the Pinnacles Road approach route and Sentinel Road, represent the earliest period of highway engineering in Oregon as well as the starting point for vehicular circulation systems within Crater Lake National Park. The National Park Service later constructed portions of the wider, paved Rim Drive over the road, but segments of this earlier Rim Road remain intact and are currently used as vehicular roads and trails; the segments that predate the expansion of Rim Drive are distinct from the Rim Drive Historic District today even though the two historic districts overlap (NPS 2011). The ACERS Historic District, which was listed in the National Register of Historic Places in 2019, includes 11.8 miles of trail composed of 12 segments of the Rim Road, Pinnacles Road, and Sentinel Road as well as archeological sites associated with Army Corps construction activities and the remains of construction equipment used during road construction (NPS 2019).

- **Grayback Road**. Grayback Road (also called Grayback Drive) is an old road segment that was part of the Army Corps of Engineers road system (1913–1918). The road is a 4.77-mile two-track graded road in the southeast vicinity of the park between Dutton and Grayback ridges. It is currently used for administrative purposes only (FHWA 2000, NPS 2011).

- **Munson Valley (Bridle) Trail**. This trail is a remaining linear segment of a larger bridle complex of paths built during the 1930s and connected to Rim Village in 1940. It is located within the Munson Valley Historic District, which was listed on the National Register of Historic Places in 1988. The historic district includes the park headquarters area that was built between 1926 and 1949 (NPS 2005).

- **Munson Valley Road**. The Munson Valley Road runs from Highway 62 to Rim Village past Park Headquarters. There are two historic Mission 66-era bridges along this section of the roadway crossing Annie Creek and Goodbye Creek.

- **Fort Klamath to Rogue River Wagon Road**. This 22-mile military wagon road parallels State Highway 62 in places, but some segments veer some distance away from the highway, especially the spurs to Rim Village and Thousand Springs. Segments of the historic road are observable in or near various developed areas of the park, including Rim Village, Munson Valley, the abandoned Annie Spring campground, and Mazama Village. Potential character-defining features include roadbed segments, retaining or embankment walls, blazed trees, campsites, and artifacts associated with use of the road between 1865 and 1915 (NPS 2005).

- **Garfield Peak Trail.** The Garfield Peak Trail is a 3.4-mile trail documented as a component of the Rim Village cultural landscape that has been determined eligible for the National Register of Historic Places. The original trail of 1917 was shortened and reconstructed by the National Park Service in 1931 and begins east of the Crater Lake Lodge along the promenade. (NPS 2017).

The park manages its trail development and maintenance activities in accordance with the 2005 Crater Lake General Management Plan, NPS *Management Policies 2006*, and existing laws and policies including the National Historic Preservation Act. As part of the National Park Service's NHPA obligations related to cultural resources, resource managers assess how proposed park actions affect or impact resources eligible for listing in the National Register of Historic Places. All construction projects—including building new trails—are evaluated on a case-by-case basis to identify the potential for the actions to disturb historic resources and contributing cultural landscape features. Impacts can then be avoided or mitigated through further planning and consultation.

Past park actions including cultural resource surveys, baseline documentation, condition assessments, and monitoring programs have provided beneficial impacts in the form of information related to location, historic context and studies, and treatment recommendations for the historic structures and cultural landscapes identified in the park. While any groundbreaking activity—including new construction or trail development—may result in isolated damage to situ archeological resources, components of historic roads or trails and/or features associated with cultural landscapes, best practices included in the NPS *Management Policies 2006*, and compliance with the National Historic Preservation Act has limited the effects of past park undertakings. Emerging visitation trends have the potential to impact historic roads and associated cultural landscapes. Increasing park visitation and congestion contribute to informal parking along roads and the creation of undesignated social trails that diminish the integrity of historic trails and have the potential to disturb archeological and other cultural resources in proximity to the trail and road system. Continuation of current trail management would result in minimal potential for impacts to

significant historic properties, including historic structures, archeological resources, and cultural landscapes due to ongoing maintenance and the high level of visitation on the existing trail system.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on historic structures and cultural landscapes would remain the same as described in the affected environment. The current resource threats and impacts related to increased visitation and trail congestion would continue to occur.

Alternative 1. Under alternative 1, approximately 20 miles of new summer-use trails would be developed primarily in the southern and western portions of the park to better disperse visitors and provide them opportunities to experience more areas and features of interest. All proposed trail routes and areas of associated ground disturbance would be surveyed for archeological and other cultural resources to ensure avoidance of sites. Cultural resources adjacent to the trails would be protected by thoughtfully locating new formal trails away from visible and sensitive cultural resources as well as managing visitor-created trails and rehabilitating disturbed areas consistent with established indicators and thresholds. New formalized trails would direct users away from fragile cultural resources. Surveys would be phased and coordinated with the development of project designs prior to any ground disturbance.

The two NPS Mission 66-era bridges on Munson Valley Road would be retained and protected, and the trail that parallels the road would use the existing vehicular bridge at Annie Spring to avoid and minimize impacts. Other areas of potential ground disturbance would be surveyed and assessed to avoid cultural resources, including the proposed expansion of the Pinnacles parking area and construction of a vault toilet and picnic area. Grayback Road would be retained for administrative purposes, and its character-defining features would be protected. Equestrian use along the Pumice Flat Trail and in the Lodgepole Picnic Area could trample soils and damage in situ archeological artifacts found along the Fort Klamath to Rogue River Wagon Road, but any effects would be localized and could be mitigated through visitor education, collection of surface artifacts, or site monitoring. While all impacts to archeological resources are permanent, adherence to the mitigation measures and best management practices identified in chapter 2 of this environmental assessment and best practices included in NPS *Management Policies 2006* would be expected to avoid or minimize loss or disturbance of significant cultural resources and character-defining features, resulting in minimal localized impacts to archeological resources, cultural landscapes, and other cultural resources as a result of actions included in alternative 1.

The creation of new trails under alternative 1 would be expected to decrease the current trend of increased visitation, social trailing and the erosion and compaction associated with off-trail visitor use. Reduced social trailing and trail congestion would contribute beneficial impacts to historic trails and structures, although it is difficult to predict if these changes would result in a measurable impact to cultural resources or affect future visitor's actions.

Alternative 2. The impacts to cultural resources under alternative 2 are essentially the same as under alternative 1, with the establishment of approximately 23 miles of new summer-use trails primarily in the eastern portion of the park. In addition to a new loop trail, the Maklaks Crater Loop, 18 miles of new trails would be developed on the south, east, and north side of Crater Lake to connect with existing portions of Rim Trail on the western side and create a continuous 30-mile network. A new overnight camp would be developed at Palisades, and existing camps at Grouse Hill, Lightning Springs, and Lost Creek would be expanded to accommodate additional users. The east side of the proposed Rim Trail would follow the historic Rim Road segments; any changes in alignment,

materials, or setting would negatively affect the character-defining features of the National Register-listed ACERS district. Construction activities and ground disturbances on or along Rim Road would also endanger adjacent contributing sites and any in situ archeological artifacts. In common with alternative 1, all proposed trail routes and areas of associated ground disturbance would be surveyed for archeological and other cultural resources to ensure avoidance of significant sites, and additional consultation would occur related to the location, design, and construction of individual projects included in this alternative. Cultural resources adjacent to the trails would be protected by replacing user-created trails with formalized trails that would direct users away from fragile cultural resources. Surveys would be phased and coordinated with the development of project designs. These actions and adherence to mitigation measures described in chapter 2 and best management practices under NPS *Management Policies 2006* would be expected to minimize loss or disturbance of significant cultural resources. While all impacts to archeological resources are permanent, actions in this alternative would have minimal localized impacts to archeological resources, cultural landscapes, and other cultural resources.

Similar to alternative 1, the creation of new trails under alternative 2 would be expected to decrease the current trend of social trailing and the erosion and compaction associated with off-trail visitor use. Reduced social trailing and trail congestion would contribute beneficial impacts to historic trails and structures, although it is difficult to predict if these changes would result in a measurable impact to cultural resources in the project area or affect future visitor's actions.

Conclusion. Alternatives 1 and 2 would result in minimal / limited adverse impacts to historic trail segments and other previously identified significant cultural resources. Under existing laws and policies, National Park Service staff would survey and assess project areas and monitor and protect archeological resources, historic structures, cultural landscape features and other cultural resources. Should sites and isolates be identified, they would be noted in an official memo to the decision file and avoided by project redesign. Other best management practices would be implemented to further minimize or avoid project impacts to cultural resources.

VISITOR USE AND EXPERIENCE

Affected Environment (Current and Expected Future Conditions of Resources That Would Be Affected)

The Crater Lake trail system provides visitors with a variety of opportunities to explore the park. The trail system allows visitors to experience the unique environment inside the caldera and on the lake; enjoy scenic vistas along the caldera rim and on surrounding summits; access forested backcountry areas secluded from development; and amble amongst creeks, wildflowers, and waterfalls. The trail system provides recreational opportunities that range from solitude and self-reliance, to immersion in a mountainous landscape with small or medium-sized groups, to highly social trail experiences in a relatively secure environment. Visitors' motivations for using the trail system similarly range from those desiring challenge or exercise to those simply desiring a chance to stretch their legs and get away from the car for a while.

Visitation Trends. Visitation to Crater Lake has steadily increased over time. Trends over the last 20 years best illustrate this pattern. In 1999, there were 417,992 recreational visits to Crater Lake. By 2009, this number had risen to 446,516. In 2019, this number had risen sharply to 754,112, nearly double the visitation from 20 years before (figure 5). NPS staff have collected annual trail count data since 2014, and comparison of this data with parkwide visitation data indicates that overall trail use levels tend to mimic parkwide visitation trends. It is therefore reasonable to assume that trail use has experienced a similar increase over the last 20 years.

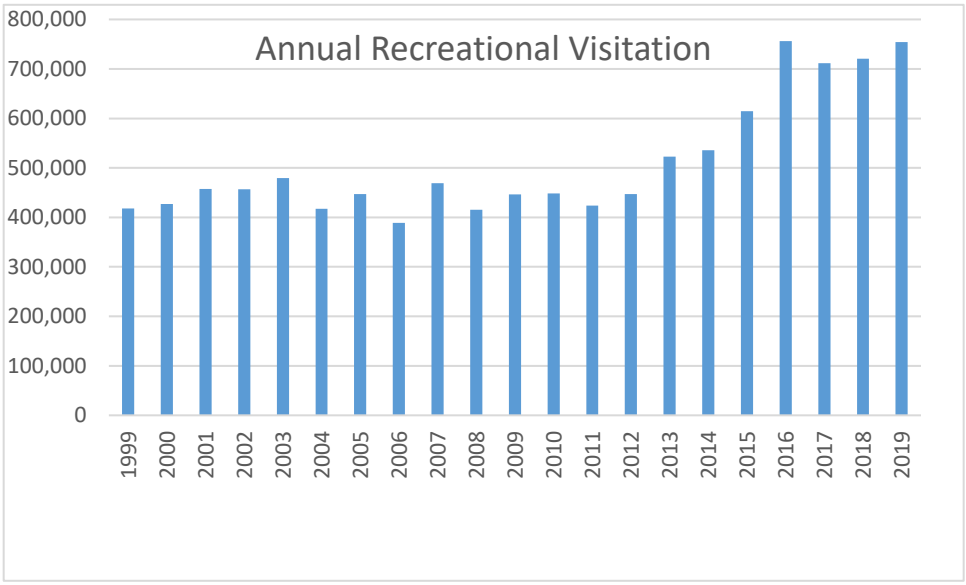

FIGURE 5. ANNUAL RECREATIONAL VISITATION TO CRATER LAKE NATIONAL PARK (1999–2019)

Visitation to Crater Lake is highly seasonal in nature, with summer easily being the busiest season. Over the past five years, monthly visitation during the summer months of June through September has averaged over 100,000, while monthly visitation during the winter months of December through March has averaged under 10,000. Monthly visitation during the shoulder season months of April and November has averaged around 15,000, while May and October have averaged around 45,000 (figure 6). While overall use in the shoulder season remains a fraction of summer use, it should be noted that the months of April, May, October, and November have seen respective increases of 112%, 75%, 35%, and 91% over the past 10 years, representing a dramatic shift to more shoulder season use.

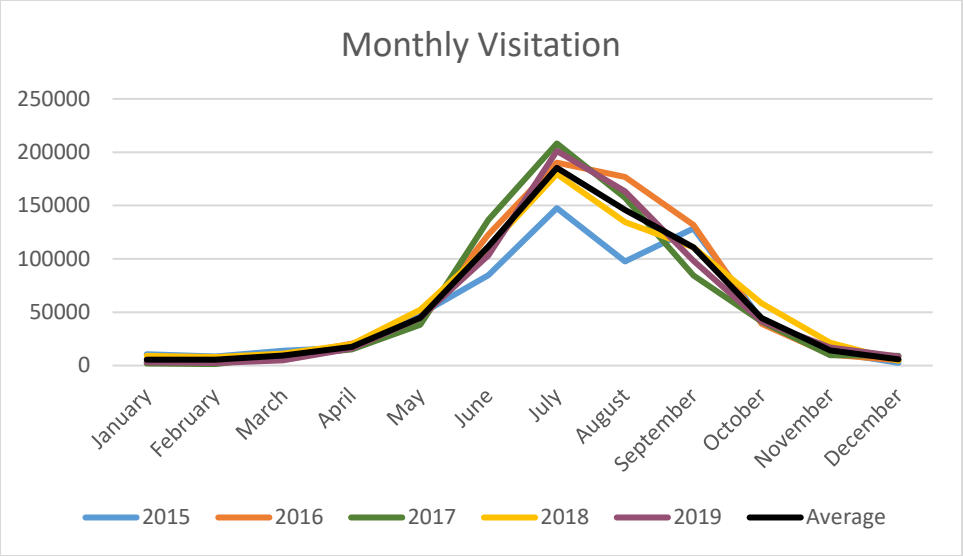

Figure 6. Monthly Recreational Visitation to Crater Lake National Park (2015–2019)

Use of the park's trails follows a similar pattern, though use of the trails is somewhat delayed as the snow melts in May and June. Once the snow melts, trail use typically increases quickly in June, peaks in July, tapers slightly in August, and then tapers more dramatically in September and October. A good example of this trend is the Cleetwood Cove Trail, where NPS staff have collected trail use information through infrared trail counters since 2014. Because of snow, park staff are usually not able to deploy the Cleetwood Cove trail counters until late June or early July (figure 7).

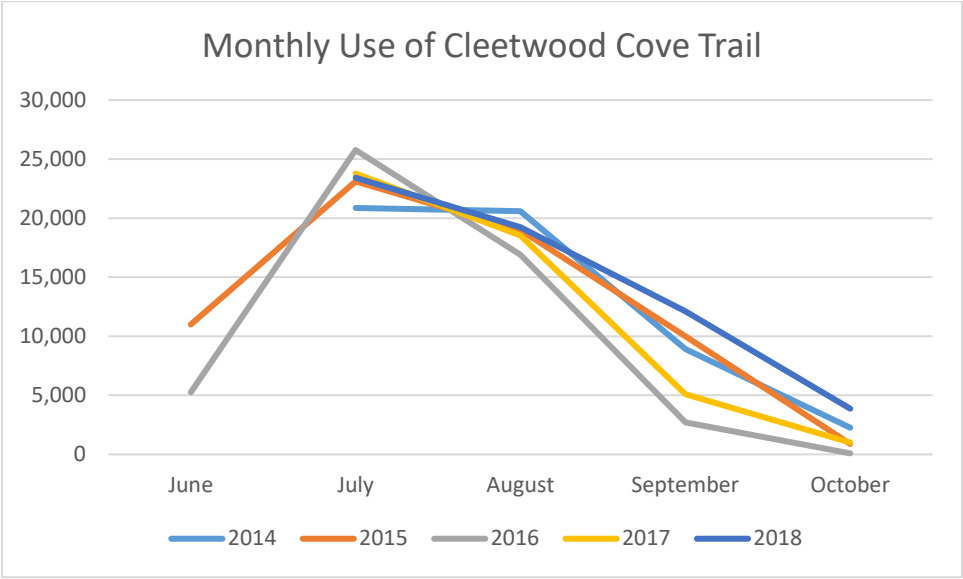

Figure 7. Monthly Use of the Cleetwood Cove Trail (2014–2018)

Use of the Crater Lake trail system is typically greater on weekends than on weekdays. Again, the Cleetwood Cove Trail is a good example of this. During the 2018 summer trail use season at Cleetwood Cove, the typical weekend day saw 22% more users than the average of the five weekdays preceding it.

Use of the trail system is also generally concentrated near the caldera rim of Crater Lake and near developed areas. As a general rule, the further a trail is from Crater Lake and from developed areas, the fewer users it receives. This distinction can be quite dramatic, with some trails that are near development and on the caldera rim receiving around 1,000 visits per day (while others receive between 200 and 300), trails near development and away from the caldera rim receiving around 100 visits per day, and trails that are near neither developed areas nor the caldera rim receiving only a handful or a few dozen visits per day. (For a detailed discussion of the varying trail use levels across the different areas of Crater Lake, see the visitor capacity analysis in appendix B.)

Visitor Access and Circulation. The primary way visitors access the Crater Lake trail system is by personal vehicle. Trailheads can be accessed by vehicle from three directions: from the north via the North Entrance Road, from the west (Medford, OR) via Oregon Route 62/Interstate 5, and from the south (Klamath Falls, OR) via Oregon Route 62/US Route 97.

Thirty-three miles of the Pacific Crest Trail pass through Crater Lake. Through-hikers on the Pacific Crest Trail can choose to follow an alternate route that brings them along the caldera rim and passes through the Rim Village, which can serve as an important restocking point.

Visitor Opportunities. The Crater Lake trail system is extensive, with roughly 95 miles of designated trails maintained by park staff. There are also user-created trails in the park, particularly along the caldera rim and in developed areas. These trails are not part of the designated trail system and they are not maintained by park staff.

Visitors can hike on all park trails, and this is easily the most popular trail activity. According to a 2001 visitor survey, more than one-third (37%) of visitors to Crater Lake hiked during their visit. Mountain biking, horseback riding, and dog walking (on-leash) are allowed on some park trails. Backpacking is also popular with some visitors. The trail system includes five designated backcountry campsites for backpackers and overnight stock users, though dispersed camping away from roads and water sources is allowed. In the winter, skiing, snowshoeing, and limited snowmobile use are all allowed.

While a variety of trail experiences are possible in the park in terms of scenery, frequency of encounters with other visitors, length, and difficulty, the trail system does not provide as great a diversity of opportunities as possible. Options generally include shorter out-and-back hikes near the caldera rim and longer backcountry excursions. There are few options for longer loop hikes, stock trips, biking, and hikes away from the caldera rim. This lack of diversity in available trail experiences contributes to the crowding and congestion seen on some trails, particularly popular trails near the caldera rim and near developed areas.

Examples of existing trail opportunities include:

- The Cleetwood Cove trail is the only trail that offers access to the lake and boat tours. Visitors can expect to encounter many other hikers, especially at peak times, along this strenuous 2.2-mile out-and-back trail.
- The Sun Notch trail provides opportunities to view the lake from the caldera rim. Visitors can expect to encounter some other hikers along this moderate half-mile trail.
- The Pinnacles trail allows visitors to experience eerie spires of volcanic ash sculpted by erosion. They can expect to encounter some other hikers along this easy one-mile roundtrip trail.

- The Bald Crater Loop trail offers visitors an opportunity to explore the forested areas of the park and spend a night or two in the backcountry. Visitors can expect to encounter very few other people along this strenuous 13.6-mile trail.

Planned Actions that Will Affect Visitor Use and Experience. The Steel Visitor Center is expected to be closed for two or more years beginning in 2021. This closure will temporarily change visitor use patterns so that Munson Valley will see lighter visitation than normal and Mazama Village will see greater visitation than normal. The disruption to visitor use patterns in this area is noteworthy as the trails around here are some of the busiest in the park.

The temporary closure of the Cleetwood Cove Trail for one or more summer seasons over the next few years to accommodate rock scaling, trail reconstruction, new dock installation and other work will displace visitors from one of the most popular trails in the park and remove any opportunity for visitors to experience the lakeshore and the lake itself.

Expected Future Conditions. Generally, the visitor use and experience on Crater Lake's trail system is expected to deteriorate if visitation trends continue and management continues unchanged. In the near-term, the existing trail system would continue to be accessible to the public and visitors use and enjoyment of the trails would be unchanged. However, park visitation and trail use is expected to continue rising. This would lead to increased crowding and congestion on the trails as well as associated infrastructure like trailheads, parking lots, and access roads, thus limiting visitors' opportunities for connection with nature and solitude.

Crowding and congestion may also reduce visitors' ability to access the trail system. As trailhead parking lots begin to fill earlier, more frequently, and potentially become overwhelmed, visitors could face the uncertainty or inability to find parking, thus preventing them from visiting certain portions of the trail system. It may also lead to increased informal parking, which causes safety and resource concerns. Increasingly heavy use of the trails would also cause more erosion and potentially increase the frequency of trail closures related to resource and safety concerns. These reactive closures would reduce visitors' access as they would have fewer areas to visit, and fewer locations would offer a particular type of use or experience that may be of interest.

Environmental Consequences

No-Action Alternative. Under the no-action alternative, impacts on visitor use and experience would remain the same as described in the affected environment. The current visitor use and experience trends and trail system management would continue unchanged. The continued unmanaged increases in visitation would likely result in substantial long-term adverse impacts to visitor use and experience as increased crowding and congestion would increasingly cause the visitor experience to decline and could threaten visitor access to some areas as facilities become overwhelmed.

Common to All Action Alternatives. The addition of a few new trails and the establishment of others for winter use would generally result in beneficial impacts to visitor use and experience, as they would provide year-round recreational opportunities for a variety of user types. Though some trails or portions of trails may be closed while improvements are being made, these closures would only result in minor, short-term adverse impacts while the construction occurs. The impacts would be minor, as the vast majority of trails would remain open at any one time and the park would provide timely and accurate communication regarding closures to minimize impact, as well as noise

abatement and visual screening as described in the "Mitigation Measures and Best Practices Common to All Action Alternatives."

The temporary closures may also lead to some increased competition for trails and campsites, particularly at popular trails near the caldera rim where visitors can view the lake from a distance, but this would be a minor impact as most trails would remain open at any one time. The impacts of temporary closure of some trails or portions of trails while improvements are being made could be compounded by the concentration of visitors in the Mazama Village area during the temporary Steel Visitor Center closure. The trails in this area are already some of the busiest in the park and altering the visitation pattern so more visitors use trails in the Mazama Village area would be a noticeable impact. The scale of this impact could be mitigated through careful timing and sequencing of the temporary trail closures to avoid further displacing visitors onto trails in the Mazama Village area while the Steel Visitor Center is under construction.

Lady of the Woods Trail —Marking this existing trail for winter use would improve the diversity and quality of visitor experience. The trail would provide visitors with a short, easy snowshoeing/hiking opportunity in winter. The winter trail would primarily benefit snowshoers but would also be available for use by skiers.

North Entrance Road — Added clarity and increased information about the winter recreational opportunities available on the North Entrance Road would beneficially impact visitor use and experience. Existing uses including snowmobiling, skiing, and hiking would be more well-known to the public. Additionally, visitors would have clarity and be aware that pets, dog-sledding, skijoring, and snow bikes are allowed. The information about the availability of these opportunities, some of which are unique in the park, would be especially beneficial as the long, gradual grade is friendly to recreationists at the beginner and intermediate levels. However, allowing multiple user types on a trail and publicizing the opportunities creates a higher potential for user conflicts, as different user groups have varying expectations for quiet and are traveling at various speeds. The potential for the presence of human waste and trash would increase as more visitors would be using the road with limited facilities that are available.

Red Cone Trailhead — The proposed additional parking at the Red Cone Trailhead could result in some adverse impacts to the visitor experience, as it may encourage more use of the nearby Grouse Hill Campsite by those looking for a free and easy-to-access alternative to paid campgrounds, therefore increasing competition for camping with PCT through-hikers. However, the addition of up to four oversize vehicle parking spaces would provide additional opportunities for equestrian users to access this portion of the park from park roads, rather than from neighboring lands. The added parking would also provide opportunities for RVs and other large size vehicle users to more easily park and hike or sightsee.

Accessibility — The use of ABA Accessibility Standards to improve accessibility of trails as practicable would benefit visitors of differing abilities. Improved information about the condition and difficulty of trails would allow visitors of all abilities to make informed decisions about which trails to use, thereby improving the overall quality of their experience at the park as it generally aligns with their expectations.

Management Strategies Associated with Indicators and Thresholds — The Indicators and Thresholds (See appendix A) contain a number of management strategies which would impact visitor use and experience.

Management strategies designed to improve the delineation and demarcation of trails would beneficially impact visitor use and experience. Improved trail identification and signage would mean visitors could more easily find their way and reconcile on-the-ground trails with mapped trails. Likewise, the evaluation and potential rehabilitation or designation of visitor created trails would prevent confusion and disorientation for visitors, who often mistake them for official trails. Rails and borders along trails would also make it easy to stay on trails in areas where they can become confusing. The restriction of off-trail travel and creation of restoration areas in some locations could adversely impact visitor use, though the wayfinding improvements and overall expansion of opportunities would largely mitigate these impacts, as would improve education about the importance of these measures.

The suite of management strategies designed to reduce the presence of human waste, pet waste, and litter would generally be beneficial to visitor experience. The actions include installation of more dog waste stations and restroom facilities, education about appropriate waste disposal and Leave No Trace ethics, expectation-setting about closed restrooms in winter, and other measures. These actions would all decrease the waste visitors find along park trails, making for a more pleasant experience. These strategies would also provide visitors with the information and equipment they need to avoid unpleasant surprises related to restroom needs and improve their comfort while visiting the park.

The temporary closures of the North Entrance Road to snowmobile use when the off-road use threshold is exceeded would adversely affect visitors who desire snowmobiling on the road when it is closed. However, this management strategy is designed to leverage this potential for an adverse impact to improve compliance with staying on the legal route, and ultimately prevent the temporary closures from occurring.

Management Strategies Associated with Visitor Capacity — The Visitor Capacity analysis includes management strategies designed to implement the visitor capacity. These management strategies would generally have a beneficial impact to visitor experience, though in some cases they may adversely affect visitor use.

The continued management of roadside parking at Cleetwood Cove would adversely impact visitor access as the trailhead parking lot frequently fills. As visitors face the uncertainty or inability to find parking, they may have to adjust their plans to arrive at a different time, or they may not be able to visit this highly desirable destination, which is unique within the park, at all.

Increased education and expectation setting encouraging visitors to visit Cleetwood Cove early or late in the day would beneficially impact visitor experience. As visitors are made more aware of the crowded conditions they are likely to find in the middle of the day and the possibility they may not be able to find parking, more visitors would choose to arrive early or late in the day. This would decrease crowding and congestion during the middle of the day and improve the quality of the experience for all visitors. Even if visitors do not alter their plans based on this information, they would know in advance to expect crowded conditions. As expectations more nearly match the actual experience, the perceived quality of the experience would improve.

The implementation of temporary trail closures during the summer or September visitation season to accommodate improved maintenance would adversely impact more visitors' ability to visit Cleetwood Cove.

Encouraging visitors to use newly constructed trails and lesser used trails would beneficially impact visitor use and experience as visitors become more aware of the opportunities available on trails throughout the park. This action would better distribute visitors across the park's trail system and reduce crowding and congestion to a limited degree on some of the park's most well-used trails, having a beneficial impact on visitor experience on all of the trails. This action could have an adverse impact on the experience of visitors that prefer to use some of the lesser-used trails for the solitude they provide. Encouraging more use on these trails would adversely impact their ability to have that experience. Setting appropriate expectations for visitors to some of the more popular trails in the park would also beneficially impact the experience as the crowding and congestion they encounter would not be a surprise, and therefore less detrimental to their experience.

Improved education regarding the lack of onsite restroom facilities at some trailheads would beneficially impact visitor experience, as visitors would be less likely to be surprised by this fact when they arrive at a trailhead. This education would likely mean fewer instances of human waste along the trail caused by visitors' lack of awareness about the absence of restrooms. This would increase visitor comfort while using the trails and reduce the unpleasantness associated with finding human waste along the trails.

Managing backcountry permits within identified capacities for designated sites in the Pacific Crest, Dutton Creek, and Lightning Spring backcountry trail loop would have beneficial and adverse effects to visitor use and experience. Some beneficial impacts would occur as visitors who plan ahead are able to ensure they would be able to experience this backcountry loop, removing the adverse impact that can come with uncertainty. Once visitors are on the trail, they would be able to experience conditions that are consistent with the desired conditions for the area, thus benefitting the visitor experience. Those who are not aware of the permit requirement could be adversely affected if they arrived without knowledge of the changed management system. Depending on implementation of the permit system, if day-of or walk-up permits are not available, it could reduce visitor spontaneity before and during their visit to the park. There would also be potential for adverse impacts to those unable to obtain a permit. Lastly, implementation of a permit system could lead to visitor perceptions that the park is less accessible.

Adaptive Management Strategies Associated with Visitor Capacity — The Visitor Capacity analysis also includes adaptive management strategies that would be implemented if and when they are necessary. These actions would typically be taken when visitor capacities are being approached or exceeded. These adaptive management strategies would generally have a beneficial impact to visitor experience, and they may adversely affect visitor access and use.

The strategy of actively managing the pace and flow of trail use on peak usage days on the Cleetwood Cove Trail would have beneficial and adverse effects on visitor access and experience. The most notable beneficial effect is that hikers would continue to have opportunities to have a high-quality experience within the caldera rim at all times of the day and throughout the visitation season. When visitors are able to get on the trail, they would be able to experience conditions that are consistent with the desired conditions for the area, thus benefitting the visitor experience. Visitors would no longer be subjected to the crowding and congestion that is inconsistent with desired conditions, and at times unsafe, during peak visitation times.

Visitors who arrive at the Cleetwood Cove Trailhead when it is being actively managed may be adversely affected as they will have to wait until the trail is less busy, return later in the day, or return another day to hike the Cleetwood Cove Trail. Some of these visitors would be displaced to other trails they find equally enjoyable, but for many visitors there would be no substitute for the

experience of walking down inside the caldera rim and to the lakeshore. While some visitors may be merely inconvenienced by the added wait time or need to return later, others that are on a short visit to the park may not be able to have this singular primary experience at all. The redistribution to times earlier and later in the day may also be undesirable for visitors wishing to be at the lakeshore at a certain time of day due to water temperature, weather conditions, and the boat tour schedule. This is particularly relevant for anglers, swimmers, and those planning to take a boat tour.

Managing the pace and flow of trail use at the Cleetwood Cove Trail, when taken together with the planned temporary closures for rock scaling, trail reconstruction, new dock installation, and other work at Cleetwood Cove, could have a combined adverse effect on visitor access and lead to visitor perceptions that this primary park experience is less accessible. However, the full temporary closures associated with the rehabilitation would be much more responsible for this adverse impact than the marginal increased impact caused by the more active management of pace and flow.

The addition of restrooms to some of the higher use trailheads would beneficially impact visitor experience as visitors have more opportunities to begin their hike at a location with a restroom. This would also reduce some of the human-waste related concerns along the trail, making for a more pleasant trail experience.

The designation of additional backcountry campsites in the backcountry and the possible phasing-out of dispersed camping in some areas would have beneficial and adverse impacts on visitor use and experience. The designated sites would provide a higher level of development, meaning campsites would be more comfortable and easily found, which could beneficially impact some visitors' experience. On the other hand, the designation of official sites would mean the loss of the sense of adventure and discovery that comes with finding a favorable dispersed site.

Trends Analysis —The addition of some trail-based opportunities, improved accessibility throughout the system, and improved management of visitation included in the actions common to all action alternatives would counteract the short-term adverse effects over the next few years associated with temporary closures of the Steel Visitor Center and Cleetwood Cove Trail. The actions common to all action alternatives would also help ameliorate the long-term adverse effects associated with crowding and congestion expected in the future.

Alternative 1. The additional trail mileage proposed in alternative 1 would result in long-term beneficial impacts to visitor access and experience. The new trails would vary in length and seasonal usability and would offer access to important features and key experiences that are not currently available in the southern and western portions of the park, as well as increased interconnectivity between park sites and with external trail networks. The additional trail miles would also improve the visitor experience by helping to disperse use, decreasing crowding and congestion on some of the more popular trails near the caldera rim. The additional trail miles would be particularly beneficial for visitors seeking solitude, as some of the new trails away from the crowding along the rim would provide more opportunity to have the trail to oneself.

Improved accessibility and the opening of some trails to new user types would increase the diversity of recreational opportunities within the park. In addition, the new trails would improve safety and allow for realistic alternatives to motorized transportation by separating pedestrians and cyclists from the main roads by motor vehicles in the busy Mazama Village-Munson Valley-Rim Village corridor. The addition of trails in some of the lower elevation areas with less snowfall in the southern and western portions of the park would improve the access to trail-based experiences during the early and late parts of the visitation season.

Though some trails or portions of trails may be closed while improvements are being made, these closures would only result in minor, short-term adverse impacts which would be largely mitigated by timely and accurate communication regarding closures, timing to minimize impact, as well as noise abatement and visual screening. Overall, Alternative 1 would result in long-term, beneficial impacts to visitor use and experience, as recreational opportunities within the park are added to, improved, and diversified.

Castle Creek Canyon Trail and Overlook — These new trails would provide beneficial impacts to access and the diversity and quality of visitor experience, as they would offer short, easy hikes at a lower elevation, thus giving visitors more hiking opportunities during the shoulder season when higher elevations are still under snow. The trail and overlook would be the first opportunity visitors have to stretch their legs, experience the park from outside their vehicle, and enjoy a trail after they enter the park from the west. They would be attractive to visitors as they access a unique point of interest in the park and are located away from the dense visitor use along the caldera rim. However, it is noted that spring shoulder season hiking may be made less enjoyable by the presence of ample mosquitos and relative lack of botanical diversity.

Falls to Flowers Trail — The Falls to Flowers Trail would connect the Munson Valley area with the Grayback Trail, providing visitors with the opportunity to access a longer out-and back hike totaling roughly 15 miles. This access to a longer hike beginning in the busy developed area of the park and extending roughly parallel to the caldera rim would be attractive to visitors looking for a longer, moderate, easy-to-access day-hike, and would beneficially impact their experience. The pedestrian access it would provide to Vidae Falls from the central visitor use corridor would also be beneficial in dispersing use and providing alternatives to a vehicle-based visit.

Grayback Trail — This existing administrative road would be reclassified as a trail and would continue to be open to hiking, equestrian use, dogs, and mountain biking. The reclassification would result in beneficial impacts to visitor experience by increasing the awareness of the diverse recreational opportunities available on this trail. However, adverse user-conflicts may become more likely as more user groups become aware of the trail and begin to use it in greater numbers. Additional beneficial impacts to the visitor experience would occur, as the trail offers recreation options away from the rim and would thus help to disperse visitors during peak periods. However, a lack of points of interest along the trail may limit its popularity and hence, its function in dispersing use.

Mazama Campground Loop Trail — This new, ABA accessible trail would provide additional opportunities for campground guests who wish to go on a short hike directly from the campground. Beneficial impacts to access, the visitor experience, and the diversity of recreational opportunities would be seen, as the trail would be open to multiple user groups. This type of access could create the possibility of user conflicts, though the risk would be mitigated by the width of the trail. There would also be beneficial impacts to visitor safety, as campground guests would no longer need to ride bikes on the roads through the campground. This trail would also expand opportunities for skiers in winter where they would be free of potential conflicts with snowshoers and pets.

Mazama Rock Trail — The addition of this new trail would beneficially impact visitor use and experience by providing an impressive view of Crater Lake accessed by a short—though difficult—hike. In this way, the experience would be similar to that at Watchman Overlook, and though somewhat redundant, may help to disperse use away from Rim Village providing a less crowded experience at both sites.

Munson Valley Roadside Trail — The new, paved, multi-use trail would have beneficial impacts to visitor access, as it would improve connectivity between Mazama Village area and the Park Headquarters-Steel Visitor Center area, as well as Rim Village (via the Munson Valley Spur). Mazama campground guests will particularly benefit from this additional trail opportunity that facilitates access to the lake. However, given the total elevation gain, many visitors would not see it as a viable alternative for parking at the rim. The trail would be especially attractive to cyclists, and would disperse some cycling use away from the rim. Separating vehicles and bicycles would have beneficial impacts on visitor safety. However, sustained grades would allow downhill cyclists to ride at high speeds, which could discourage other user groups from using it and potentially have an adverse impact on the visitor experience for non-cyclists. The trail would also provide new, easier recreational opportunities in the winter months for those seeking an experience not far from development.

Munson Valley Spur — This new trail, when combined with the Raven Trail, would be part of a loop-hike near the rim and would beneficially impact visitor access to the rim, especially when parking is scarce or full at Rim Village.

Panhandle Trail — This new trail would provide beneficial impacts to the diversity and quality of visitor experience, as it would offer an opportunity for a short hike within a forested portion of the park. The hike would be particularly attractive during times when higher elevation trails are snow packed. However, while this type of experience is somewhat unique within the park, this type of experience is already available to visitors on other public lands in the area and does not provide a rare or unique experience on a regional scale. Therefore, this trail is likely to appeal to non-local visitors who may only be aware of hiking opportunities within the national park and may be unaware of regional opportunities.

Ponderosa Pine Trail — This new trail would result in beneficial impacts to visitor access and experience, as it would provide an additional opportunity for visitors seeking a short hike to a feature of interest (a rare stand of old-growth trees), particularly when higher elevations are covered in snow. Like the adjacent Panhandle Trail, this trail would be particularly attractive during times when higher elevation trails are snow packed.

Pumice Flat Trail — Adding equestrian use to this existing trail would have beneficial impacts on the diversity and quality of visitor experience for equestrians, as they would have more opportunities for recreation, as well as improved connectivity to adjacent lands that have equestrian trails. Adverse impacts to the experience of non-equestrian users may result, as the new designation would increase the potential for user conflicts. However, the potential for conflict is only slight because use-levels would likely continue to be low-to-moderate and mountain bikes are not allowed.

Raven Trail — This new trail, when combined with the Munson Valley Spur Trail, would become part of a loop-hike near the rim. Beneficial impacts to the visitor experience would be seen, as this trail would help visitors access the rim when parking is scarce or full at Rim Village. The trail would also facilitate alternatives to a vehicle-based visit.

Union Peak Trail to Stuart Falls Trail Connector — This new trail would have beneficial impacts on the diversity and quality of visitor experience for hikers and equestrians. It would provide opportunities to complete a longer and more challenging backcountry loop of roughly 13 miles and provide more opportunities for recreation for those seeking overnight backpacking trips or equestrian rides in the park. It would also improve opportunities to experience the park's recommended wilderness and offer a high degree of solitude. Solitude and opportunities to access

key points of interest like Union Peak, Bald Top, and Stuart Falls would appeal to many backcountry users and would be a beneficial impact.

Pinnacles Parking Area — The expansion of this existing parking area would beneficially impact visitor use and experience as more parking will be available to accommodate visits to the area. The vault toilet and picnic area would also be beneficial. The expansion is unlikely to be large enough to incur any adverse impacts associated with crowding on the area's trails.

Trends Analysis — The additional trail miles in alternative 1 that would disperse use, decreasing crowding and congestion on some of the more popular trails near the caldera rim, and improve trail connectivity would ameliorate the short-term adverse effects over the next few years associated with temporary closures of the Steel Visitor Center and Cleetwood Cove Trail. Alternative 1 would also counteract and help to reduce the long-term adverse effects associated with crowding and congestion expected in the future.

Alternative 2. The additional trail mileage proposed in alternative 2 would result in long-term beneficial impacts to visitor use and experience similar to those described in alternative 1. While the total mileage of trail added in the two alternatives would be roughly the same, alternative 2 differs substantially in that these trail miles are concentrated in one medium-length, day hike trail and one long loop trail that would circumnavigate the lake. This is distinct from alternative 1, where the many more shorter trails are proposed that would create a network in the developed Rim Village-Munson Valley-Mazama Village corridor and add a few other shorter opportunities in lower elevation locations away from the caldera rim.

The new trails included in alternative 2 would result in beneficial impacts to visitor use and experience, as their addition would provide new options for recreation, primarily in the form of medium-length day-hikes and long, multi-day backpacking trips. The closure of one trail would result in a long-term adverse impact by removing access to an area of the park, but the effect of this impact would be lessened by the addition of other new trails and by the increased availability of park resources to improve conditions on the remaining trails.

As in alternative 1, some trails or portions of trails may be closed while improvements are being made. These closures would only result in minor, short-term adverse impacts which would be largely mitigated by timely and accurate communication regarding closures, timing to minimize impact, as well as noise abatement and visual screening. Overall, alternative 2 would result in long-term, beneficial impacts to visitor use and experience, as recreational opportunities within the park are added to, improved, and diversified. Alternative 2 would also be likely to result in some adverse impacts to safety and the quality of visitor experience due to the potential for an increase in unauthorized visitor activities, such as the creation of social trails leading to undeveloped viewpoints.

Maklaks Crater Loop — Beneficial impacts to access and the diversity and quality of visitor experience would result from the addition of this new hiking and equestrian trail. Though the trail contains no specific feature of interest or unique experience, it would be attractive as a loop trail of moderate difficulty and would further beneficially impact the visitor experience as it would encourage dispersal of use to a less-visited area of the park.

Rim Trail (East Side) and Vidae Ridge Trail — The chief feature of alternative 2 is the completion of a 30-mile Rim Trail that would circumnavigate Crater Lake. This trail would result in beneficial impacts to access and the quality of visitor experience as it would improve opportunities to engage in

the key experience at the park: viewing Crater Lake. This trail-based opportunity is not currently available along substantial portions of the southern, eastern, and northern parts of the caldera rim, and this trail would provide multiple viewpoints of the lake in a manner that is currently only available by vehicles in the summer season.

While this trail would provide outstanding access to the key park experience of viewing the lake, visitors would not be able to view the lake along the entire length of the trail. This condition has the potential to negatively impact the visitor experience, as visitors may be disappointed by the lack of views on some stretches of trail and may attempt to create their own trails in order to attain their desired lake-viewing experience. Visitor-created trails could create additional safety risks, as visitors may unknowingly enter hazardous areas of the park. Additionally, the proximity of the trail to the Rim Drive along much of its length would be likely to encourage informal roadside parking, which would present a danger to both pedestrians and motorists.

As overnight use would be allowed by permit along the Rim Trail (East Side), the opportunity to complete a three- or four-night backpacking trip in close proximity to the rim would be a new opportunity not currently available in the park. However, camping in unauthorized locations (i.e. along the rim) may increase as visitors cannot reach their reserved campsite, seek a less crowded campsite type, or prefer a campsite with views of the lake. Given the multiple points where this trail comes near the Rim Drive and front country facilities, it would offer a long-distance hiking opportunity especially appealing to beginner and intermediate-level hikers.

Given the proximity of the trail to the Rim Drive, the option of traveling only a segment of the trail would create opportunities for short, easy hikes with lake views that could help disperse some crowds away from Rim Village. However, the characteristics that draw beginner and intermediate-level hikers, such as the opportunity to do long-distance hiking near developed areas, may also attract inexperienced hikers and provide a false sense of safety. Visitor-created social trails could lead to unstable slopes or surfaces as visitors look for undesignated viewing areas that could result in adverse impacts to visitor safety.

East Bald Crater Loop — The closure of this loop trail would result in adverse impacts on the diversity and quality of visitor experience, as the number of hiking and riding opportunities in the backcountry would be reduced. However, the closure of this maintenance-intensive trail would free up a marginal amount of time and resources for the park trail crew, thus leading to a marginal improvement to conditions on other trails-- a beneficial impact to the users of those trails.

Trends Analysis — The three trail additions in alternative 2 would help to disperse use and would counteract the short-term adverse effects over the next few years associated with temporary closures of the Steel Visitor Center and Cleetwood Cove Trail. Alternative 2 would also counteract and reduce the long-term adverse effects associated with crowding and congestion expected in the future.

Conclusion. On the whole, both action alternatives would be beneficial to visitor use and experience and would be superior to the no-action alternative. Alternative 2 would have more potential for adverse impacts to visitors than alternative 1. In addition, the benefits of alternative 2 would be more concentrated in a few distinct types of recreation (medium to longer distance hiking) and areas (the eastern and northern sides of the lake). Alternative 1 would provide a much wider spectrum of recreational opportunities in more diverse settings. While both alternatives would have the potential to disperse visitors away from crowded areas along the caldera rim, alternative 1 would likely be

more effective at doing so since its new recreational opportunities appeal to more types of users and are located closer to major nodes of visitation. The impacts from actions common to all action alternatives would be both beneficial and adverse, though they would generally be more beneficial than the impacts from the no-action alternative.

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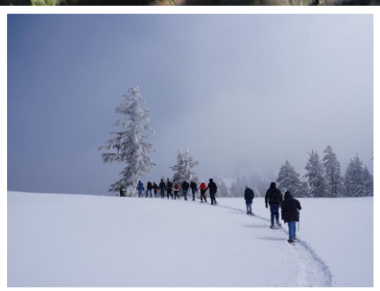
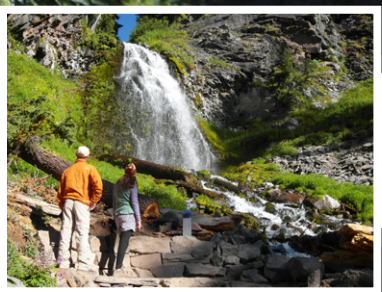
CHAPTER

4

Consultation and Coordination





CHAPTER 4: CONSULTATION AND COORDINATION

AGENCY CONSULTATION

During preparation of this trail management plan, members of the planning team met and/or consulted with various entities.

US Fish and Wildlife Service

Via the Information for Planning and Consultation website for the US Fish and Wildlife Service, the National Park Service requested the most recent list of species and their designated critical habitat protected under the federal Endangered Species Act that may be impacted by projects in Crater Lake National Park. This action served as a record that the National Park Service had initiated informal consultation with the US Fish and Wildlife Service pursuant to the requirements of the Endangered Species Act and NPS management policies.

National Historic Preservation Act Section 106 Compliance

On January 27, 2017, the park superintendent notified the Oregon State Historic Preservation Officer by letter that the park was beginning work on a trail management plan and had initiated the Section 106 process of the National Historic Preservation Act and consultation under 36 CFR 800. Plan goals, objectives, and the planning effort's progress were discussed during biannual meetings held between the Oregon State Historic Preservation Officer and park cultural resource management staff throughout the planning process. The Oregon State Historic Preservation Officer was also invited to attend open house scoping sessions. The park noted that further consultation with the Oregon State Historic Preservation Officer would occur as proposed undertakings and areas of potential effect were better defined with the development of project designs.

On January 27, 2017, the park superintendent notified the Klamath Tribes and the Cow Creek Band of the Umpqua Tribe of Indians by letter that the park was beginning work on a trail management plan. The superintendent informed the tribes of the National Park Service's intent to conduct government-to-government consultation with tribes pursuant to section 106 of the National Historic Preservation Act as proposed undertakings and areas of potential effect were better defined with the development of project designs.

The proposed actions described in this plan are conceptual and appropriate for a high-level comprehensive trail planning effort; exact locations, construction materials, and implementation strategies for trail segments included in the action alternatives have not been finalized.

Once individual actions from the selected alternative are considered for implementation, additional consultation will be conducted with the Oregon State Historic Preservation Officer, traditionally associated tribes and other consulting parties in accordance with the 2008 Programmatic Agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference or State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act and ACHP regulations (36 CFR Part 800).

CONTRIBUTORS

The National Park Service followed an interdisciplinary approach to prepare this plan. The following NPS staff, among others, contributed to its development.

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Trail Management Plan/ Environmental Assessment Appendixes

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APPENDIX A: INDICATORS AND THRESHOLDS

Monitoring to ensure desired conditions for resources and visitor experiences are tracked, achieved, and maintained over time is essential for the success of the Crater Lake National Park Trail Management Plan. The monitoring strategy for this plan was developed based on the principles described in the Interagency Visitor Use Management Council's (IVUMC's) "Visitor Use Management Framework" and the "Monitoring Guidebook." These documents and associated background material are available on the IVUMC's website at: http://visitorusemanagement.nps.gov/.

Monitoring in this plan is accomplished through establishment of "indicators" and "thresholds." "Indicators" are specific resource or experiential attributes that can be measured to track changes in conditions so that progress toward achieving and maintaining desired conditions can be assessed. "Thresholds" are the minimum acceptable conditions associated with each indicator. Indicators and thresholds provide park managers with monitoring protocols to ensure desired conditions for resources and visitor experiences are achieved and maintained over time.

The planning team considered many potential indicators related to visitor use-related impacts but ultimately identified four that are the most important to monitor the effectiveness of the plan's management strategies. The four indicator topics the planning team identified include: Visitor-Created Trails; Percent Change in Trail Width; Presence of Waste; and Mechanized Winter Recreation. These indicators and the associated thresholds are considered common to all action alternatives.

The planning team also identified management strategies associated with each indicator. Several of these strategies are currently in use and may be increased in response to changing conditions. Other strategies would be implemented upon completion of the plan to ensure conditions do not approach thresholds. Some management strategies would be implemented if and when monitoring indicates that conditions are changing and thresholds are being approached or exceeded. The impacts of these management strategies are analyzed in chapter 4. Details of potential management strategies would be developed at the time they are needed to ensure that the most effective approach is implemented.

Indicator Topic: Visitor-Created Trails
Indicator: Number of visitor-created trails leaving designated trail (measured every mile).
Threshold: Frontcountry: No more than three visitor-created trails leaving designated trail per 1 mile. Backcountry: No more than four visitor-created trails leaving designated trail per 1 mile. Sensitive Areas: No more than one visitor-created trail leaving designated trail per 1 mile.
Rationale for Indicator and Threshold: Visitor-created trails degrade natural and cultural resources and visitor experiences and therefore should be kept to a minimum. This indicator measures and/or serves as a proxy for many issues of concern, including vegetation trampling, soil compaction, spread of invasive species, habitat fragmentation,

Indicator Topic: Visitor-Created Trails
impacts on threatened and endangered species habitat, visitor wayfinding and safety, wilderness character, contact and disturbance to rare or sensitive resources, and degradation of cultural resources. The thresholds are based on the sensitivity of the resource, amount of use, and tolerance of impact. The threshold for trails with backcountry characteristics is higher than the threshold for trails with frontcountry characteristics because the natural resources in the backcountry are more resilient, and therefore visitor-created trails can be more easily repaired. There is also more concern about the normalization of undesirable behavior in the much more heavily trafficked frontcountry, where visitor-created trails can quickly become well-established through repetitive use. Sensitive areas are those places where the sensitivity of the resource is much greater than other front or backcountry areas and the tolerance for impact is therefore much lower. Park staff will identify trails in sensitive areas based on factors such as the presence of special status species, sensitive habitat, vulnerable ecosystems, or cultural features.
Monitoring: Current monitoring of visitor-created trails occurs through park staff observations. Park staff will walk the designated trails biannually to map and evaluate visitor-created trails that leave the designated trails.
Management Strategies: ▪ Educate visitors about the importance of protecting sensitive resources by staying on designated trails. ▪ Improve trail identification and signage. ▪ Rehabilitate visitor-created trails as soon as possible, prioritizing those that are located in sensitive areas. ▪ Evaluate visitor-created trails to determine appropriate management action. ▪ Formalize visitor-created trails as designated trails, if appropriate. ▪ Use site management / design such as constructing rails, borders, and pavement to improve delineation of designated trails. ▪ Restrict off-trail travel in sensitive resource areas. ▪ Establish restoration areas around heavily disturbed areas or visitor-created trails. These areas would discourage visitors from further trampling vegetation.

Indicator Topic: Percent Change in Trail Width
Indicator: Amount of trail that exceeds established trail width.
Threshold: No more than a 25% increase in trail width from baseline conditions.
Rationale for Indicator and Threshold: The conditions on any trail should remain consistent with the specified trail class. Changes in trail condition—such as widening and braiding of trail tread—impacts the surrounding soil, vegetation, and hydrology and can indicate heavy use or ineffective trail design. This indicator ensures that trail conditions remain consistent over time. This indicator will also account for soil compaction and trail expansion from trampling, soil moisture and snowpack, overuse, and ineffective trail design. This indicator was selected based on ease of measurement, ability to provide useful data, cost-effectiveness, and ability to provide useful results throughout the summer. The US Geological Survey confirms the utility of this indicator by recommending indicators for trails such as: "the number, length, and density of visitor-created trails, along with tread width, are the most commonly used indicators."
Monitoring: Current monitoring of trails occurs through park staff observations. Park staff will use Park Trail Management Objectives (TMOs) for baseline conditions (see appendix F for TMOs for select existing trails). Park staff will perform a comprehensive trail condition assessment, including measurement of trail width, on each trail every five years. A general condition assessment would be completed annually to note any conspicuous issues.
Management Strategies: ▪ Rehabilitate trails in excess of established widths as soon as possible. ▪ Educate hikers regarding sensitive resources and importance of staying within established trail widths. ▪ Construct borders along trails (natural or man-made). ▪ Restore areas along trails where widths exceed thresholds.

Indicator Topic: Presence of Waste

Indicator: Presence of waste per mile (includes human waste, pet waste, and litter).

Threshold:

Winter Season: trails would have no more than seven visible waste sites per mile.

Summer Season: trails would have no more than four visible waste sites per mile.

Rationale for Indicator and Threshold: Visible waste is defined as concentrations of litter, human, or pet waste visible on or from the trail. Human and pet waste poses threats to both humans and natural resources. As the presence of this waste increases, the risk of contamination of water sources also increases. The presence of litter has a negative impact on visitor experience and wilderness character. This indicator tracks where and how often waste is improperly disposed. By setting thresholds fairly low, managers will take actions to discourage the improper disposal of waste. This information may also help inform where temporary or new restroom facilities and waste receptacles are added to the park. Visitors tend to concentrate in certain areas in the winter leaving a greater density of waste. Whereas in the summer, visitors are more dispersed. Separate thresholds for the winter and summer seasons are established to manage these differences.

Monitoring: Current monitoring of waste occurs through park staff observations. Park staff will establish baseline conditions for human and pet waste by counting and documenting the number of human waste sites (including evidence of human waste such as toilet paper). They will then establish monitoring protocols for human and pet waste and establish types of areas that would be monitored. The presence of waste and litter would be monitored on a one-year interval.

Management Strategies:

- Install additional dog waste stations as these have proven successful. Particular focus could be given to the Rim Village area.
- Educate visitors on proper disposal of human waste in the backcountry at trailhead signs using a park mobile app, through backcountry permits, and using other educational materials. Particular focus should be given to winter when snow cover makes burying waste difficult. Education will include modeling of proper pet waste disposal and will leverage community-based social marketing techniques to improve compliance with pet waste disposal.
- Educate visitors on Leave No Trace.
- Emphasize need to pack out toilet paper when issuing backcountry permits.
- Increase public information to inform visitors that bathrooms are closed in the winter.
- Provide human waste bags in winter to backcountry permit holders (either for free or under a cost-recovery fee) and/or offer them for sale at the visitor center.
- Install additional restroom facilities in areas where human waste issues are most pronounced.
- Install additional waste receptacles in areas where pet waste and litter issues are most pronounced.
- Install more signage on Leave No Trace protocol.
- Prohibit pets from using specific backcountry trails where pet waste becomes an issue. Signage regarding the prohibition of pets at certain trailheads will be increased and made consistent.

Indicator Topic: Mechanized Winter Recreation
Indicator: Incidences of off-road travel per snow season.
Threshold: No more than five incidences of off-road snow machine tracks adjacent to the North Entrance Road per snow season.
Rationale for Indicator and Threshold: Winter recreational snowmobile and snow coach use along North Entrance Road was analyzed in the 1994 Winter Use Plan and the 2005 Crater Lake General Management Plan and approved as an acceptable use in the Record of Decision for the general management plan. The general management plan also required the initiation of a data collection and monitoring program to gather information on winter use and resource conditions to ensure the long-term protection and sustainable use of park resources. Data has not been collected consistently since the implementation of the general management plan and is proposed as part of the trails management plan. This data will then be used to analyze trends in winter recreation at the park and determine if impacts are occurring. One issue park staff are currently aware of is illegal off-road travel by snowmobiles. This occurs most frequently in the Pumice Desert and at Merriam Point. High winds in these exposed locations can lead to a shallower snowpack exposing sensitive vegetation to impacts. Extensive off-road use also has the potential to impact wildlife, soundscapes, expose operators to unsafe conditions, and negatively impact other park resources and values. Once a visitor is off-road, they are using a mechanized vehicle in an unauthorized area.
Monitoring: Current monitoring of trails occurs through park staff observations. Park staff will establish baseline conditions for off-road use of mechanized equipment. The park will then establish monitoring protocols for recreational use on North Entrance Road. They will collect data on the number and type of use occurring while the road is open to winter use. Park staff will attempt to collect data on the type of mechanized equipment used and any differential impacts from equipment types. Then they will determine resources and/or values of concern to be monitored for potential impacts.
Management Strategies: ▪ Close North Entrance Road to snowmobiles when off-road use threshold is exceeded. Reopen the road once evidence of illegal use is no longer visible (wind and new snowfall eliminates evidence of off-road travel). ▪ Educate visitors on park regulations at trailhead signs, along the roadway and through partner organizations at Diamond Lake. Employ Community-Based Social Marketing techniques (leveraging social pressures to encourage behavioral change) by encouraging visitors to stay on the legal routes so the routes remain open to future users, thereby leveraging social pressures and norms to gain compliance.

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APPENDIX B: VISITOR CAPACITY

INTRODUCTION

This appendix for the Crater Lake National Park Trail Management Plan identifies visitor capacities for the currently existing and proposed trails included in the plan. Visitor capacity is defined as the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established. The visitor capacities are identified based on the principles described in the Interagency Visitor Use Management Council's (IVUMC's) "Visitor Use Management Framework" and "Visitor Capacity Guidebook." These documents and associated background material are available on the IVUMC's website at: http://visitorusemanagement.nps.gov/.

Among the goals of the trail management plan are ensuring that the trail system offers high-quality visitor experiences while protecting park resources from impacts associated with trail use (see chapter 1). By identifying capacities, and managing the amounts and types of use within those capacities, the National Park Service can ensure that resources are protected and that visitors have opportunities for high-quality experiences.

In addition to being an effective management tool, identifying visitor capacities is also directed by legal mandate. The National Parks and Recreation Act of 1978 requires the National Park Service to identify and implement commitments for visitor capacities for all areas of a park unit. Likewise, the National Trails System Act of 1968 requires the National Park Service to identify capacities for National Scenic Trails including the Pacific Crest Trail in Crater Lake National Park.

Visitor capacities are management decisions based on the best available data and other factors, including professional judgment, staff experience and expertise, lessons learned, and public input. Visitor capacity identifications, like other management decisions, provide management direction, but are not intended to be permanently binding. Visitor Capacities can be adjusted with appropriate environmental compliance as new information becomes available through further study, analysis, and monitoring.

Visitor capacities were identified using the four guidelines described in the "Visitor Capacity Guidebook:"

1) determine the analysis area,

2) review existing direction and knowledge,

3) identify the limiting attribute, and

4) identify visitor capacity.

Additional background on the process used to identify the capacity is included below. It should be noted that while the same guidelines were used for each analysis area, the level of analysis does vary somewhat among the analysis areas. This is consistent with the concept of "the sliding scale of analysis" described in the "Visitor Use Management Framework," whereby the depth of analysis required to adequately address visitor use management issues and opportunities is commensurate with the issue's complexity in terms of uncertainty, risk, stakeholder involvement, and level of

controversy. This concept is most pertinent at Cleetwood Cove, where the area's increased complexity required a higher level of analysis than in the other analysis areas.

Determine the Analysis Areas

To effectively analyze appropriate levels of use for the trails included in the trail management plan, the trails—both existing and proposed under both action alternatives—were grouped into five analysis areas (see figure B-1). Together, these analysis areas comprise all of the visitor use areas within the Crater Lake trail system. Visitor capacities for other areas outside of the trail system are outside the scope of this project and would be identified in future planning. The analysis areas include:

- Cleetwood Cove Trail
- High Elevation Frontcountry Trails
- Low Elevation Frontcountry Trails
- Pacific Crest, Dutton Creek, Lightning Spring Backcountry Trail Loop
- Backcountry Trails

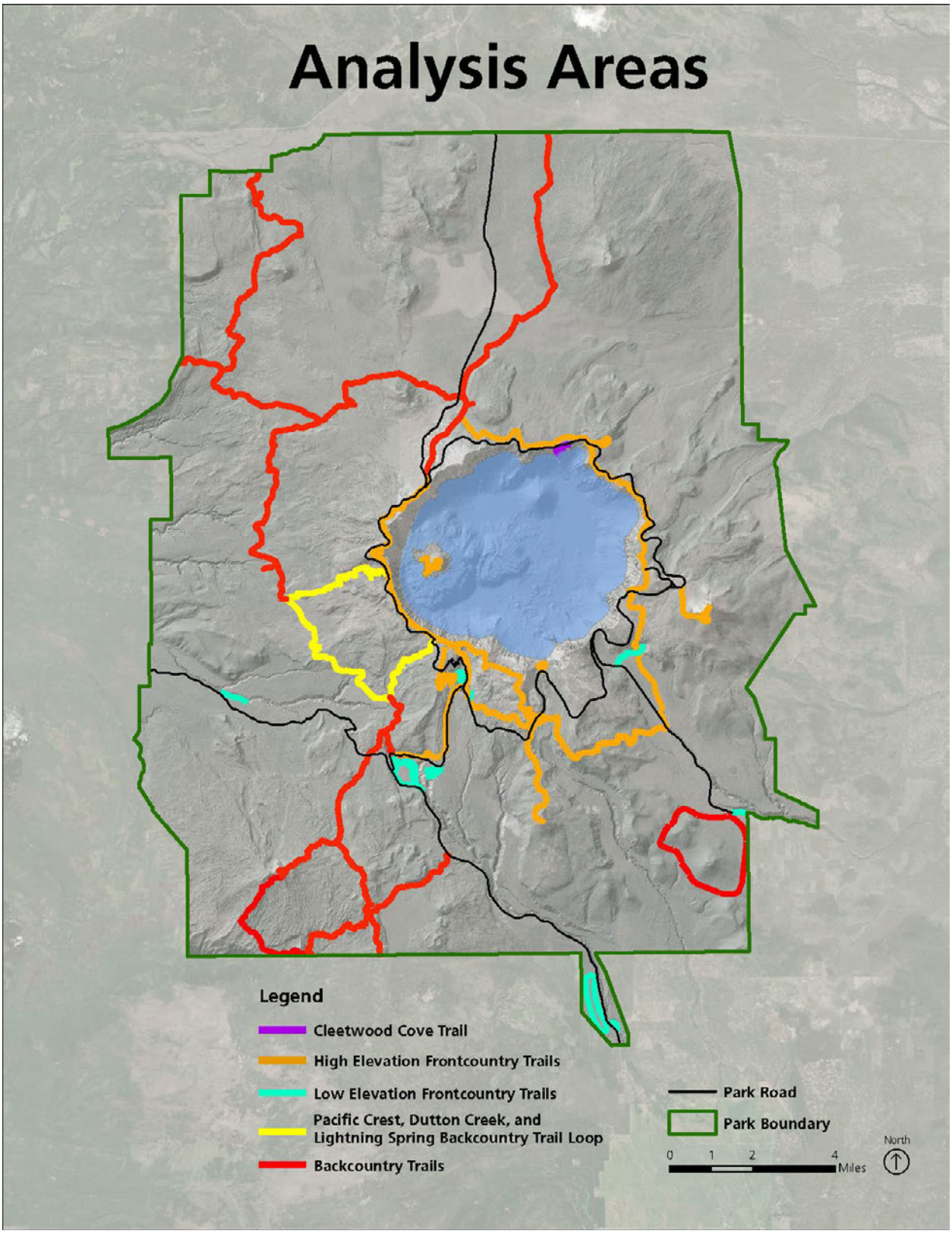

FIGURE B-1. MAP DEPICTING THE FIVE ANALYSIS AREAS FOR VISITOR CAPACITY IDENTIFICATION

The trails were grouped into these analysis areas as they contain similar resources and provide similar experiences to visitors. For example, the high elevation frontcountry trails (defined as trails with frontcountry trail characteristics that are predominantly above 6800 feet) typically contain more sensitive resources such as whitebark pine, provide the desirable visitor experience of having views of Crater Lake, and tend to have higher levels of visitor use. In contrast, the backcountry trails (defined as trails with backcountry trail characteristics) typically contain more resilient resources, provide opportunities for solitude in a forested setting, and tend to have much lower use levels. (See table B-1 for a list of the existing and proposed trails evaluated in each analysis area).

Table B-1. Existing and Proposed Trails by Analysis Area

Cleetwood Cove Trail

Trail Name	Existing	Alt. 1	Alt. 2
Cleetwood Cove Trail	X	–	–

High Elevation Frontcountry Trails

Trail Name	Existing	Alt. 1	Alt. 2
Crater Peak Trail	X	–	–
Discovery Point Trail	X		
Fumarole Bay Trail	X	–	–
Garfield Peak Trail	X		
Grayback Trail	X	–	–
Mount Scott Trail	X		
Rim Trail Section 1—Discovery Pt. to North Junction	X	–	–
Sun Notch Trail	X		
Watchman Lookout Trail	X	–	–
Wizard Island Trail	X		
Falls to Flowers Trail	–	X	–
Mazama Rock Trail		X	
Munson Valley Roadside Trail	–	X	–
Munson Valley Spur		X	
Raven Trail	–	X	–
Rim Trail (East Side)			X
Vidae Ridge Trail	–	–	X
Chevron Trail		X	X

Low Elevation Frontcountry Trails

Trail Name	Existing	Alt. 1	Alt. 2
Annie Creek Canyon Trail	X	–	–
Annie Creek Spur Trail	X		
Castle Crest Wildflower Trail	X	–	–
Castle Crest Wildflower Spur Trail	X		
Godfrey Glen Trail	X	–	–
Lady of the Woods Historic Trail	X		
Pinnacles Trail	X	–	–
Plaikni Falls Trail	X		
Castle Creek Canyon Overlook	–	X	–
Castle Creek Canyon Trail		X	
Mazama Campground Loop Trail	–	X	–
Panhandle Trail		X	
Ponderosa Pine Trail	–	X	–

Pacific Crest, Dutton Creek, and Lightning Spring Backcountry Trail Loop

Trail Name	Existing	Alt. 1	Alt. 2
Dutton Creek Trail	X	–	–
Dutton Creek Camp Trail	X		
Lightning Spring Trail	X	–	–
Lightning Spring Camp Trail	X		
Pacific Crest National Scenic Trail—Dutton Creek to Lightning Spring	X	–	–

Backcountry Trails

Trail Name	Existing	Alt. 1	Alt. 2
Annie Spring Trail	X	–	–
Bald Crater Loop Trail	X		
Bert Creek Trail	X	–	–
Boundary Springs Trail	X		
Boundary Springs Spur Trail	X	–	–
Bybee Creek Horse Camp Trail	X		
Grouse Hill Camp Trail	X	–	–
Pacific Crest National Scenic Trail—Excluding Dutton Creek to Lightning Spring	X		
Pumice Flat Trail	X	–	–
Red Cone Spring Camp Trail	X		

Trail Name	Existing	Alt. 1	Alt. 2
Rim Trail Section 2 –North Junction to Pacific Crest Trail	X	–	–
Stuart Falls Trail	X		
Union Peak Trail	X	–	–
Union Peak to Stuart Falls Connector Trail	–	X	–
Maklaks Crater Loop	–	–	X

This visitor capacity analysis is for summer only. The amount of winter use is anecdotally only a small fraction of summer use. During the winter, visitors can enjoy the 512 inches of average annual snowfall in the area by skiing, snowshoeing, and snowmobiling (along the North Entrance Road). Winter use is limited by reduced vehicular access, and the equipment and skill required to recreate on snow. However, park staff have noted that use in winter is increasing at a significant rate and there is a need to gather more data to inform the future identification of a visitor capacity for winter. This could include trail cameras that record the frequency, timing, type, and amount of winter use that occurs along the North Entrance Road and trail corridors that are used during the winter, winter visitor use studies, increased monitoring of concession data related to winter equipment rentals, and collection of data at entrance fee booths.

As described above, the level of analysis that occurs during visitor capacity identification is determined on a sliding scale depending on the complexity and context. At the present, the complexity of visitor use during the winter months is very low and use levels and types are not tracked. Rather than identifying winter visitor capacities, resource and experiential conditions will be monitored via the "presence of waste" and "mechanized winter recreation" indicators. If monitoring reveals that the complexity of winter visitor use is increasing, future planning could establish desired conditions for winter, evaluate current use levels and types as well as current conditions, and visitor capacities could be identified.

Review Existing Direction and Knowledge

During the first step of the visitor capacity identification process, the planning team reviewed desired conditions for the analysis area, existing conditions in each analysis area, any major concerns related to visitor use, as well as particularly relevant indicators and thresholds.

Desired conditions for each area were drawn from the zone descriptions in the General Management Plan (NPS 2005). The General Management Plan includes desired conditions for resource condition or character, visitor experience, and activities and facilities for a backcountry zone, frontcountry zone, and other zones. Since trails are linear features which travel through multiple zones, desired conditions were drawn from the zone description that corresponds with the analysis area's trail characteristics. Therefore, the Cleetwood Cove Trail, High Elevation Frontcountry Trails, and Low Elevation Frontcounty Trails analysis areas consider the desired conditions for the frontcountry zone; while the Pacific Crest, Dutton Creek, Lightning Spring Backcountry Trail Loop and Backcountry Trails analysis areas consider the desired conditions for the backcountry zone.

The following two tables summarize desired conditions for the frontcountry and backcountry zones, as described in the general management plan (GMP) (tables B-2 and B-3).

Table B-2. Desired Conditions for Frontcountry Zone (drawn from the 2005 GMP)

Resource Condition or Character	**Transition between developed areas and those managed for natural values** • Managed predominately for natural values • Subtle site modifications to accommodate use that harmonizes with natural environment • Moderate level of management for resource protection • Tolerance for resource degradation would be low to moderate
Visitor Experience	**In contact with nature, close to modern conveniences** • Common to encounter other visitors • Some physical exertion required • Short to moderate time commitment • Moderate tolerance for noise and visual intrusions
Appropriate Activities or Facilities	**Support facilities** • Trails, possibly paved • Facilities for visitor comfort and convenience- may include restrooms, trash cans, benches, tables, kiosks, signage or drinking fountains • Facilities necessary for park operations • Bicycling and other nonmotorized recreation

Table B-3. Desired Conditions for Backcountry Zone (drawn from the 2005 GMP)

Resource Condition or Character	**Biological diversity and ecological integrity** • Managed for wilderness character and values • Moderate level of management for resource protection and visitor safety • Minimal evidence of modern civilization • Subtle onsite controls and restrictions • Resource modifications would harmonize with the natural environment • Tolerance for resource degradation in this zone would be very low
Visitor Experience	**Immersed in nature, away from comforts and conveniences** • Opportunities for solitude • Few other visitors • High level of independence, challenge, adventure and application of outdoor skills • Longer time commitment • Low tolerance for noise and visual intrusions • Generally requires higher level of physical exertion
Appropriate Activities or Facilities	**Minimal** • Primitive trails • Small, designated campsites • Small facilities, including antennas • No motorized vehicles (except to attain management objectives when determined necessary) • If any, facilities in the zone would avoid sensitive resources • Hiking and stock use

The assessment of existing conditions was drawn primarily from trail counter data collected by park staff over the previous five years and their anecdotal observations. Trail counter data shows that use of the park's trails follows a fairly standard bell curve after the snow melts in May and June. Visitation increases quickly in June, peaks in July, tapers slightly in August, and then tapers more dramatically in September and October (figure B-2).

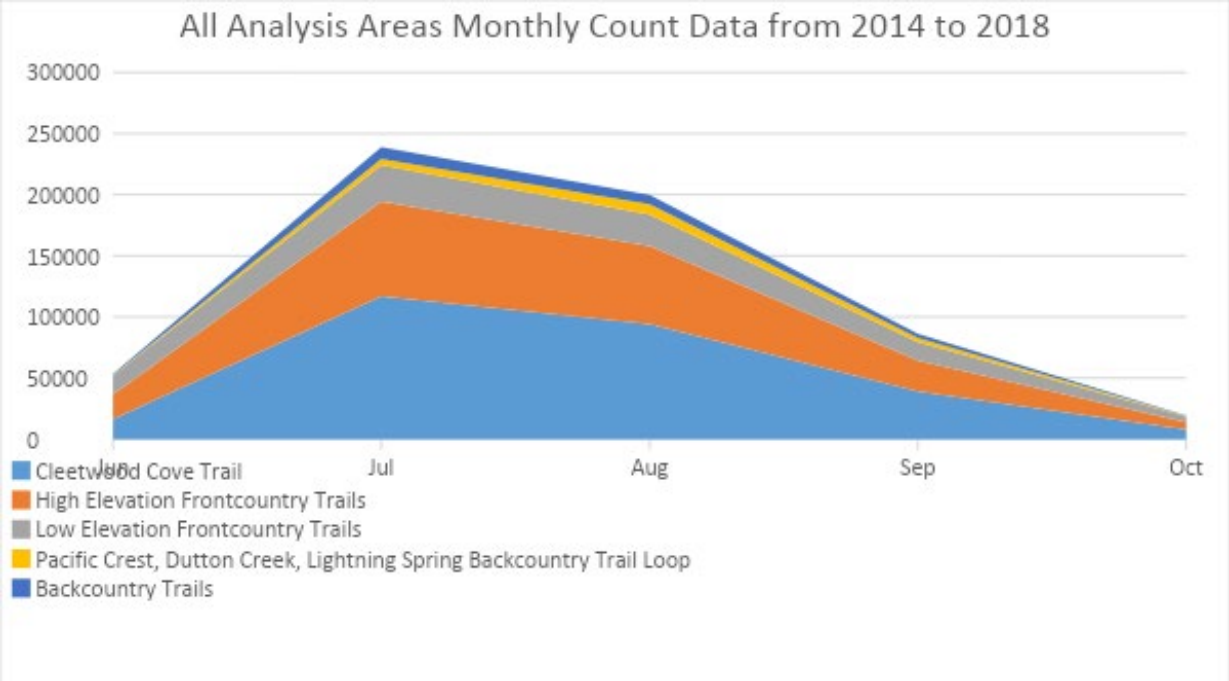

FIGURE B-2. ALL ANALYSIS AREAS MONTHLY COUNT DATA FROM 2014 TO 2018

During the five-year timeframe of data collection, visitation to the park during the summer months of July, August, and September increased from around 330,000 in 2014 to around 425,000 in 2018, with a peak of nearly 500,000 during the NPS Centennial summer of 2016 (NPS 2019). This seven percent average annual increase in summer visitation is also reflected on the trail system. For the five trails which have multiple summers of reliable data during the 2014-2018 period, the average annual increase in use was also seven percent (table B-4).

Table B-4. Total Visits in July, August, and September Between 2014 and 2018 and Average Annual Percentage Change

Trail	2014	2015	2016	2017	2018	Average Annual Percentage Change
Cleetwood Cove Trail	50,377	52,109	45,393	47,429	54,793	2%
Crater Peak Trail		868			1,050	7%
Garfield Peak Trail	19,874	–	–	–	19,107	-1%
Pacific Crest Trail -South	1,171	4,125	2,699		2,133	21%
Pinnacles Trail	–	–	17,415	–	22,358	7%
Average of 5 Trails Above						7%
Parkwide Recreational Visitation	333,705	373,694	498,886	450,006	425,109	7%

Use of the park's trails is typically greater on weekends than on weekdays. In July 2018, the Cleetwood Cove Trail saw an average of 840 hikers on weekdays and 1038 on weekends, while average weekday use in July 2014 was 618 compared to 910 on weekends. Over the past five Julys, the Cleetwood Cove Trail saw between 24% and 57% more use on weekends than on weekdays.

Use is generally concentrated near the rim of Crater Lake, and near frontcountry areas. As a general rule, the further a trail is from Crater Lake and from developed areas, the fewer users it receives.

Use types vary from trail to trail (see tables 2–5 in chapter 2 showing allowed summer uses). Generally, Crater Lake trails are used primarily by hikers; however there are a few backcountry trails which allow pack animals (mainly horses). Bikes are currently allowed on one short frontcountry trail and would be allowed on a few more trails under alternative 1 (all wide, hardened, class 4 and 5 paths near roads and campgrounds, or on old roadbeds). Since these uses are confined to just a few select trails that either see very few visitors or are designed specifically for this use type, and considering that conflicts between users is not a significant concern, this visitor capacity analysis is primarily focused on the number of people using a given trail, and separate capacities for different use types are not identified.

To analyze and identify a capacity for each individual trail in the park, it is necessary to define a "current use level" for each trail. As described above, use levels on a given trail vary depending on the month of the year, and the day of the week (weekday vs. weekend). Since July is typically the busiest month of the year, the current use levels are based on data for this month. However, rather than interpret the typically higher levels of use on July weekends as the "current use level," the average of all days in July is used to identify a "current use level." The effect of this is that "current use level" represents approximately the 90th percentile use level day, rather than one of the very busiest days of the year. Throughout this capacity analysis, "current use level" is understood to mean the average use level in July, and approximately 10% of days in a given season exceed this use level.

"Current use level" is also understood to be based on trail counts from 2018. Trail counters were rotated between the park's various trails throughout the 2014 to 2018 time period. As was noted above, use of the park's trails generally increased by an average of 7% per year. For this reason, trail counts from earlier years were adapted to 2018 numbers using this 7% annual adjustment factor. For example, if a trail counter counted an average of 100 people per day in July 2014 but no data was collected on that trail since then, the "current use level" is said to be 130. Note that "current use level" has generally be rounded in increments of 5.

Visitor use dynamics do change over time. To continually monitor these dynamics, park staff will continually monitor use levels on the park's trails. Generally, trail counters will be maintained on key trails with relatively high use levels to capture long-term and short-term trends use levels and timing. Some trail counters will be deployed on an annual rotation to the lower use trails to capture any changes that may be occurring on these trails. Since this capacity analysis is based on current knowledge and guidance, it may need to be revisited if new information becomes available through further study and monitoring.

Identify the Limiting Attribute

This guideline involves the identification of the limiting attribute(s) that most constrains the analysis area's ability to accommodate visitor use while achieving and/or maintaining desired conditions. The limiting or constraining attribute can vary from analysis area to analysis area and is described under each key analysis area. For example, a limiting attribute might be encounters with other groups

traveling along a trail, a historic bridge's structural integrity and ability to accommodate a volume of foot traffic, or trampled vegetation. Identification of the limiting attribute is an important step as it connects on-the-ground conditions with the identified visitor capacity number.

Identify Visitor Capacity and Implementation Strategies

Visitor capacity contains two parts. First is the identification of the visitor capacity (maximum amounts and types of use), and second is the identification of management strategies and/or actions that could be taken to implement visitor capacity to ensure the amount of visitor use is managed to achieve and maintain desired conditions.

Identify Visitor Capacity. To identify the appropriate amounts and types of use for each of the analysis areas, the previous steps were reviewed to understand current conditions and how they compare to desired conditions for the area. Based on this understanding, the planning team determined whether visitation levels should be allowed to increase, maintained at the current level, or decreased to achieve desired conditions. If current conditions are in keeping with desired conditions, the visitor capacity allows for an increase in visitation from current levels. However, if current conditions are not consistent with desired conditions, the visitor capacity is set below the current use level. When current conditions align with desired conditions, but are close to violating them, the visitor capacity is set at or about the current use level. It should be noted that management strategies included in a plan often impact an analysis area's ability to accommodate use and this simple approach would need to be more nuanced. However, in the case of this Trail Management Plan, the management strategies, which primarily include the construction of additional trails to distribute use (see chapter 2), do not affect the ability of the individual trails to accommodate use (though they may affect the ability of the park's trails to accommodate use on a parkwide level).

While the trails within a given analysis area do share general visitation dynamics, visitor experiences, and resources, the overall use level can vary significantly from trail to trail. With this in mind, a broad determination to generally increase, maintain, or decrease the visitation level was made at the analysis area level. Within the analysis area, visitor capacities for individual trails vary somewhat in the degree to which levels are increased or decreased compared to current use levels. This variability was based on unique circumstances of each trail. In some cases, the variability allows for redistribution of use from high-use trails to similar trails that don't receive as much use within the same analysis area.

Visitor capacities were identified not only for existing trails that have ample trail counter data from previous years, but also for trails which have little or no counter data and trails which are proposed under the alternatives and therefore do not have previous data. For trails that do not have data on which to rely, the capacities were set by identifying a similar trail with comparable use patterns based on staff knowledge.

Because of the varying complexity of managing visitor use on the different trails in the trails system, current trail use levels and visitor capacities are expressed in terms of the number of people per day for most trails and the number of people at one time in the Cleetwood Cove area. This visitor capacity will allow for simple implementation and monitoring, as park staff can review trail counter data on a daily use level and quickly assess if the trail is at or over capacity.

Implementation Strategies. Management strategies to ensure actual use levels stay within identified visitor capacities were adapted from best practices in visitor use management and examples from other plans and projects across the National Park Service. Implementation strategies include actions

that would be taken immediately as well as adaptive management strategies. The adaptive management strategies would only be implemented if and when conditions dictate they are necessary. These conditions would be evaluated through routine monitoring.

VISITOR CAPACITY IDENTIFICATION AND ASSOCIATED IMPLEMENTATION STRATEGIES

Cleetwood Cove Trail

Analysis Area. This analysis area includes the Cleetwood Cove Trail (figure B-3).

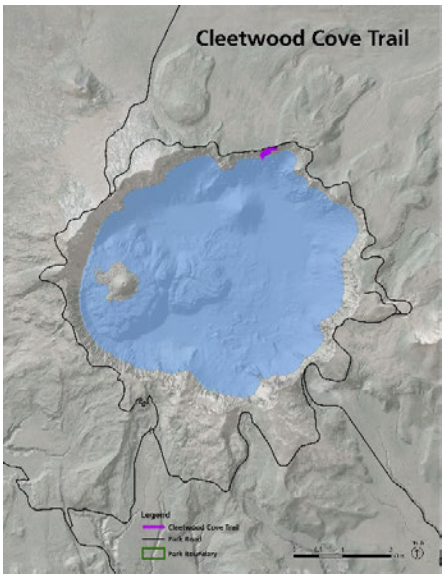

FIGURE B-3. ANALYSIS AREA: CLEETWOOD COVE TRAIL

Existing Direction and Knowledge. The Cleetwood Cove Trail is the only authorized access to the shore of Crater Lake. The trail also leads to the boat dock, the departure point for three types of boat tours—standard lake cruises that circumnavigate Crater Lake, shuttles to Wizard Island, and Wizard Island tours that combine both activities. The tours are highly desirable iconic park experiences. The trail also provides access to the lakeshore where visitors swim, fish, and enjoy the scenery.

Cleetwood Cove is one of the most popular hikes in the park. The hike is relatively short, steep, and strenuous, descending 700 feet in 1.1 miles. Restrooms are located at the top and bottom of the trail, which is usually open from late June to late October.

The Cleetwood Cove area is rezoned as "frontcountry" as part of this plan. The desired conditions for the frontcountry describe that visitors are "in contact with nature, close to modern conveniences." They also state it will be common to encounter other visitors, that some physical exertion will be required, visits will require a short to moderate time commitment, and visitors will need to have a moderate tolerance for noise and visual intrusions.

Visitor use of the Cleetwood Cove Trail has steadily risen by an average annual increase of 7.4% over the last five years. In 2014, an average of 696 people per day hiked the trail in July, while 901 did so in 2018. Weekend use is typically greater than on weekdays. In July 2018, the average weekend day was 16% busier than the average day for the month, and 24% busier than the average weekday that month (table B-5).

Table B-5. Visitor Use on the Cleetwood Cove Trail: Average Daily Use in July

Cleetwood Cove Trail	2014	2015	2016	2017	2018
July People/Day (All Days)	695	745	830	765	900
July People/Day (Weekday)	615	695	750	675	840
July People/Day (Weekend)	910	890	1,005	945	1,040

The Cleetwood Cove Trailhead parking area was expanded in late 2018. The expansion doubled the number of designated parking spaces to 156. This expansion was completed in response to the prevalence of parking on the road shoulder near the trailhead, which was impacting vegetation and posed a safety concern. The new parking lot was designed to accommodate current use levels at the time. During July 2019, the first summer with the newly completed parking lot, visitation on the Cleetwood Cove Trail only increased by around 1% from 2018 levels to an average of 910 people per day.

While the available trail counter data allows for an understanding of how many people per day use the Cleetwood Cove Trail, it does not provide information about how many people at one time (PAOT) are on the trail and at the lakeshore. To gain a usable working understanding of how many people at one time are on the trail and lakeshore, it is necessary to make some assumptions about the direction people are hiking past the trail counter at different times of the day. Based on park staff's experience in the area and the established boat schedule, the following table of rates for inbound and outbound foot traffic was developed (See table B-6).

Table B-6. Average Cleetwood Cove Trail Use and Estimated Direction of Travel

Hour	Hourly Average Use (July 2019)	Percent Inbound	Number Inbound	Percent Outbound	Number Outbound
6 a.m.	2	100%	2	0%	0
7 a.m.	23	100%	23	0%	0
8 a.m.	42	98%	41	2%	1
9 a.m.	47	90%	42	10%	5
10 a.m.	89	90%	80	10%	9
11 a.m.	137	80%	109	20%	27
Noon	194	70%	135	30%	58
1 p.m.	208	60%	125	40%	83
2 p.m.	245	50%	122	50%	122
3 p.m.	292	50%	146	50%	146
4 p.m.	205	25%	51	75%	154
5 p.m.	148	15%	22	85%	126
6 p.m.	121	5%	6	95%	115
7 p.m.	43	0%	0	100%	43
8 p.m.	11	0%	0	100%	11
9 p.m.	2	0%	0	100%	2

Note: Table of rates for inbound and outbound foot traffic on the Cleetwood Cove Trail. Note the Hourly Average Use numbers are based on data from the Cleetwood Cove Trail counter in July 2019. The Percent Inbound, Percent Outbound, and derived inbound and outbound numbers are estimates.

The table assumes that the day begins and ends with zero people on the trail and lakeshore since there is no overnight use. It also assumes that the vast majority of traffic in the morning hours is inbound, meaning people are headed from the trailhead (where the counter is located) to the lakeshore area, while the opposite is true in the late afternoon. Lastly, the table assumes that visitors that hike the trail, but do not take a boat tour, are in the area for an average of about two hours.

Based on the estimated direction of travel and known use levels and timetables for the various boat tours and shuttles, it is possible to determine an estimated number of people at one time on the trail and lakeshore. See figure B-4.

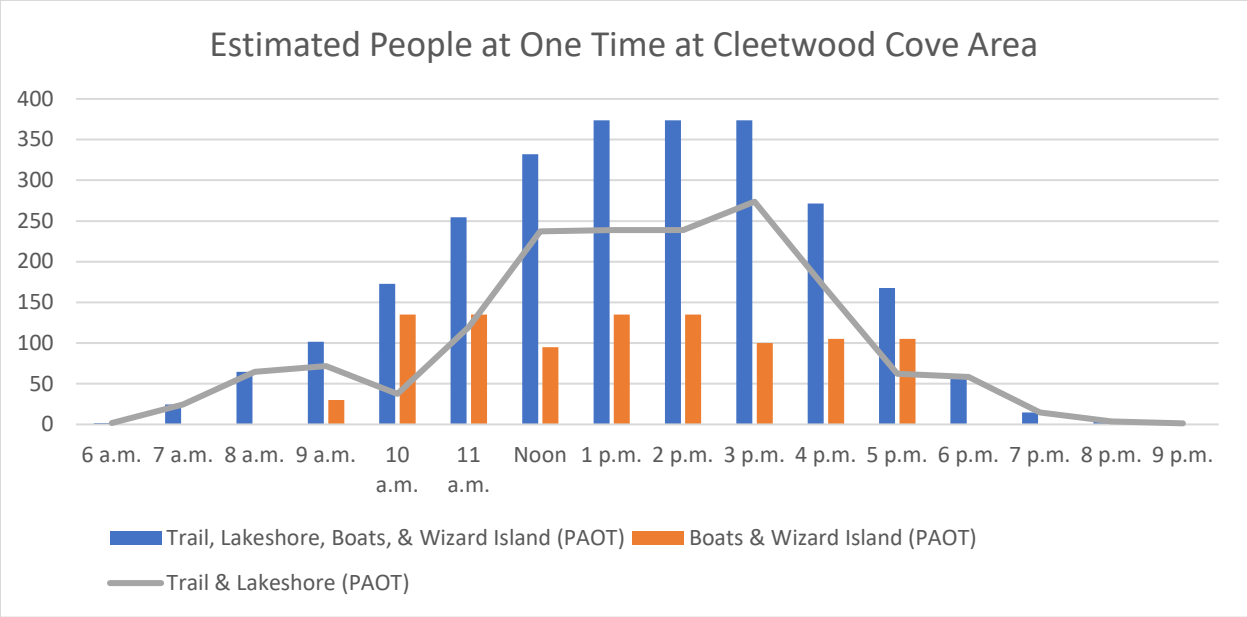

FIGURE B-4. ESTIMATED PEOPLE AT ONE TIME IN THE CLEETWOOD COVE AREA. THE "AREA" CONSISTS OF THE TRAIL, LAKESHORE, BOATS, AND WIZARD ISLAND. AFTER SUBTRACTING THE NUMBER OF PEOPLE ON BOARD BOATS AND ON WIZARD ISLAND AT ONE TIME, THE REMAINING NUMBER CAN BE ASSUMED TO BE ON THE TRAIL AND LAKESHORE. FIGURES BASED ON JULY 2019 TRAIL USE DATA AND ESTIMATES REGARDING DIRECTION OF TRAVEL.

Generally, the number of people at one time on the Cleetwood Cove Trail and lakeshore is highest between noon and 4 p.m. During this time, it is estimated that the number of people at one time is between 200 and 300. On the average July day, the use may peak around 275 PAOT around 3 p.m. On the average July weekend, this peak use around 3 p.m. may be closer to 325 PAOT.

The Cleetwood Cove Trail is in critical need of major repairs. The poor condition of the trail can be attributed to a complex array of factors, including that the trail receives an extremely high level of foot traffic, is built on unstable soils related to the caldera's unique geology, was poorly designed, and is utilized by mechanized equipment for NPS and concession operations. Additionally, maintenance of this trail has been limited during the summer months due to the high demand to keep this popular trail open. A geotechnical report completed by the Department of Transportation in 2018 noted that rockfall and debris slides are common occurrences on the Cleetwood Cove Trail and that limited maintenance has contributed to unstable trail tread and retaining walls (USDOT 2018). Visitor behavior, including shortcutting switchbacks near the top of the trail and the associated erosion, also contribute to safety and maintenance concerns at Cleetwood Cove.

Over the next few years, park management intends to make significant infrastructure improvements to remedy the trail sustainability and safety concerns. A large-scale rockfall mitigation program including rock reinforcement, hanging screens, and wire mesh would be implemented. The trail itself would be completely rehabilitated by stabilizing and potentially hardening the trail tread and replacing all retaining walls to accommodate mechanized equipment use (small tractors, trailers, and power tracked wheelbarrows). Lastly, the failed dock would be replaced with a structurally stable one.

The most relevant indicators to monitor are the number of visitor-created trails leaving the designated trail, which is a particularly prevalent issue toward the top of the Cleetwood Cove Trail near the trailhead, and the amount of trail that exceeds established trail width.

Limiting Attribute. Crowding at the bottom of the trail near the lakeshore and associated impacts to the visitor experience and visitor safety are the most limiting attributes at Cleetwood Cove. Visitors tend to congregate in a queuing area at the dock and gathering area near the restrooms. Visitors also span out along the rocky shoreline to enjoy the scenery, swim, and fish. Crowding tends to be focused more at the shoreline destinations and queuing or gathering areas than along the trail itself, though hikers on the trail occasionally become clustered leading to some crowding.

High levels of visitors along the rocky shoreline contributes to soil loss and vegetation disturbance, and is also a safety concern as crowds on the unstable ground contribute to more slips, trips, and falls as visitors navigate the challenging terrain and each other. High levels of visitors in the queuing and gathering areas contribute to visitor frustration with long wait times and a disconnection with nature as visitors become more focused on each other than the surrounding environment. Crowded conditions have been documented to adversely affect the visitor experience in national parks (Whittaker & Shelby 2010).

Historically, public use of the shoreline area has been allowed only within 300 feet of the Cleetwood Docks. This shoreline restriction has been in place to protect public safety, as areas further away from the docks have been documented to be prone to rockfall and rockslides. However, this shoreline restriction has not been well defined or widely enforced. After reviewing the current area open to the public as a part of this planning effort, park management determined to extend the area open to the public by approximately 200 feet to the west. This change will incorporate shoreline areas immediately west of the bathroom (figure B-5).

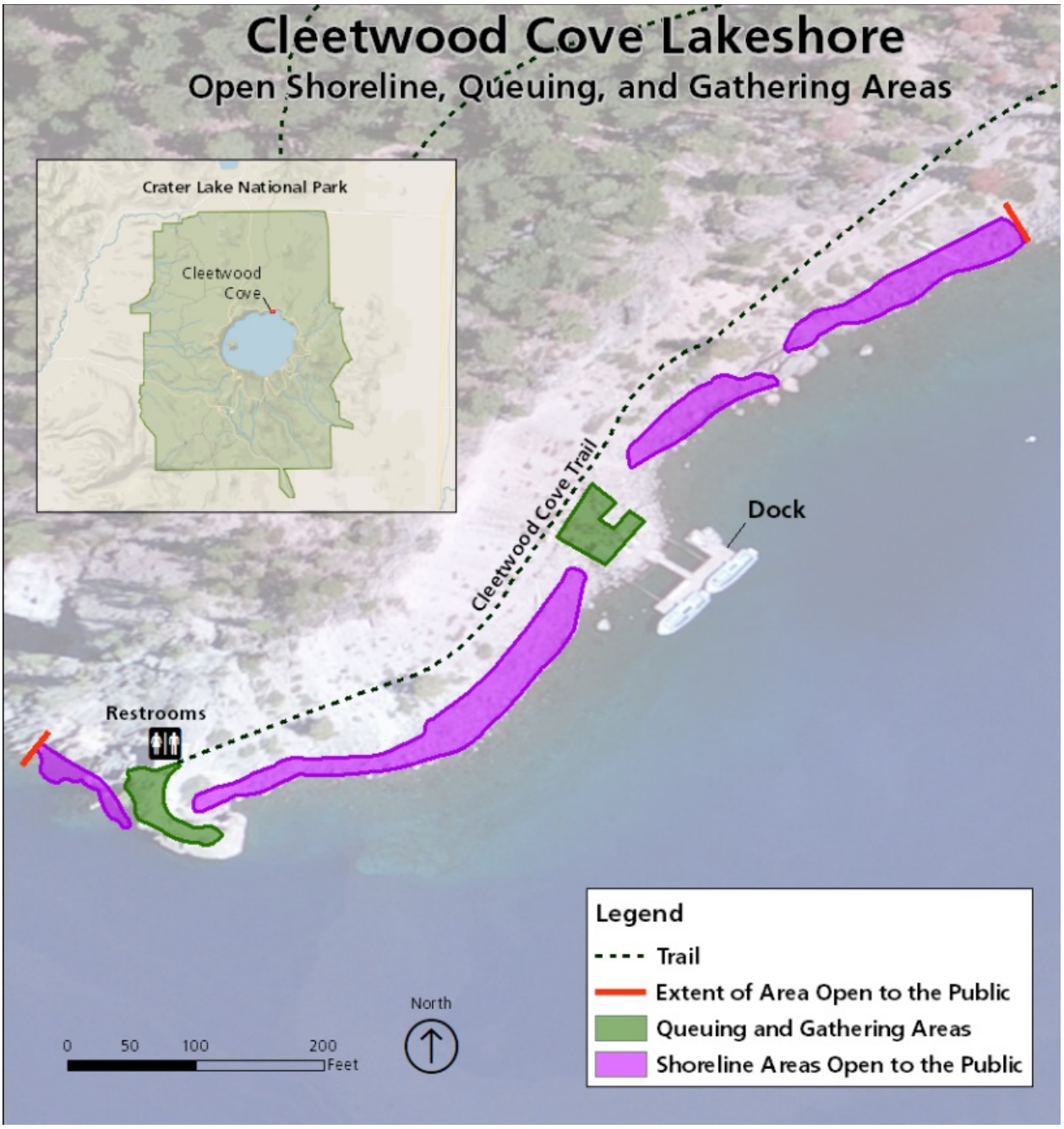

FIGURE B-5. MAP OF CLEETWOOD COVE LAKESHORE SHOWING SHORELINE AREAS OPEN TO THE PUBLIC AS WELL AS THE QUEUING AND GATHERING AREAS.

Park management will place considerable effort in ensuring that the risk of rockfall is mitigated in shoreline areas that are open to the public. This mitigation includes scaling, bolting, wire netting, fencing, and potentially others. These methods are considered to be very effective in mitigating rockfall risk. However, outside of this area, rockfall mitigation is more difficult and will generally not occur. Therefore, shoreline areas outside the designated open area are closed to the public.

Visitors to the shoreline have shown a preference for dispersing to areas that are outside of the open and rockfall-mitigated area. This presumably occurs because visitors feel crowded in areas closer to the docks and disperse to areas where there is a lower density of people. To ensure that visitors are not pressured to displace to these hazardous rockfall zones, it is important to understand visitor preferences and the density at which visitors begin to displace.

While no study has been completed on Cleetwood visitors' preferences for density, studies have been conducted on national park visitors' preferences in analogous settings. One such study is "Boats, Beaches, and River Banks: Visitor evaluations of Recreation on the Merced River in Yosemite Valley," published by Doug Whittaker and Bo Shelby in 2012. This study evaluated visitors' perceptions of use levels, crowding, resource conditions, and management actions related to the Merced River corridor in Yosemite Valley. It found that on average visitors prefer to have about 10 linear feet of shoreline available per person. Based on the information in Whittaker and Shelby's study and other data, the National Park Service identified "acceptable" and "displacement" density levels for "High Use Beaches" in The Merced Wild and Scenic River Final Comprehensive Management Plan. The "acceptable" density was identified as 100 square feet/person, while displacement was identified at 60 square feet/person. Above these density levels, it is generally believed that visitors will seek to disperse to lessen their perceived crowding.

The beaches and riverbanks of the Merced River in Yosemite are different from the Cleetwood Cove area in two notable ways: 1) it is a river and not a lake, 2) it is generally sandy and not rocky. However, the study findings and management experience along the Merced River are useful to inform management at Cleetwood Cove since they are comparably high use areas of national parks along bodies of water. It is reasonable to assume that visitors' expectations and attitudes, and therefore preferences and perceptions about density and crowding, are likely to be comparable. If anything, the more rugged nature of the Cleetwood Cove shoreline is likely to point toward a preference for more space and shoreline per visitor. Therefore, the density standards from Merced should likely be understood as being on the "high-end" of Cleetwood visitors' preferences. Further study or experience may reveal that visitors to Cleetwood have a lower (or higher, for that matter) tolerance for density.

Unlike the shoreline itself, the queuing and gathering areas at Cleetwood Cove are designed for a very high density of visitor use. Experience indicates that visitors generally tolerate high levels of density in these small and concentrated locations as their purposes for being there are largely utilitarian in nature—boarding the boats or using the restrooms. This is different from the shoreline areas where visitors are seeking opportunities to swim, fish, relax, enjoy the scenery, and experience a connection with nature. Accordingly, a density standard related to visitor presences for density along the shoreline (such as the those provided from Merced) is not as useful as a standard based on the utilitarian function of the area. The Transportation Research Board's Highway Capacity Manual provides such standards. The manual sets Level of Service standards for Queuing Areas like those at Cleetwood. The highest level of service, "Level A," is described as "standing and free circulation through the queuing area is possible without disturbing others within the queue." This level of service is achieved when there is greater than 13 square feet/person.

Overall, conditions in the lakeshore area during the busiest times of day on the busiest days are becoming inconsistent with the area's desired conditions for visitor experience—which include opportunities to be in contact with nature, and a moderate tolerance for noise and visual intrusions—as well as desired conditions for resource condition or character—which include management for natural values, subtle site modifications and a low to moderate tolerance for resource degradation. Management to levels within those described by the various density standards would ensure that desired conditions are maintained.

Visitor Capacity. Currently, visitation to Cleetwood Cove spikes during the middle of the day on the busiest summer weekends, creating conditions that are not in keeping with the desired conditions for the trail (table B-7). However, park managers believe that desired conditions are still being achieved on the average busy summer day and during non-peak hours of the busiest days. Therefore, the visitor capacity is identified as being between peak usage on the average July weekend day (325 PAOT) and peak usage on the average July day (275 PAOT). Visitor Capacity for the Cleetwood Cove Trail and Lakeshore is identified as 300 PAOT. Park managers believe this to be the maximum level of use that will protect desired conditions for resources and visitor experiences now and into the future.

Table B-7. Visitor Capacities in the Cleetwood Cove Area

Area	Visitor Capacity
Cleetwood Cove Area (Trail, Queuing and Gathering areas, and Shoreline)	300 PAOT
Cleetwood Cove Shoreline	65 PAOT
Cleetwood Cove Boat Dock Queuing Area	108 PAOT
Cleetwood Cove Restroom Gathering Area	92 PAOT

The shoreline areas that are open to the public include roughly 7,300 square feet of available space and just under 600 linear feet of available shoreline. Using the preference standard from Whittaker and Shelby's study of visitor perceptions along the Merced River, there would be space for 60 people at one time in the shoreline areas.

$$\frac{600\ linear\ feet\ of shoreline}{10\ linear\ feet\ of\ shoreline\ per\ person} = 60\ PAOT\ on\ the\ shoreline$$

Using the acceptability standard from the National Park Service's Merced Wild and Scenic River Final Comprehensive Management Plan, there would be space for 73 people at one time in the shoreline areas.

$$\frac{7300\ square\ feet\ of\ shoreline\ area}{100\ square\ feet\ of\ shoreline\ per\ person} = 73\ PAOT\ on\ the\ shoreline$$

Using the displacement standard from the National Park Service's Merced Wild and Scenic River Final Comprehensive Management Plan, there would be space for 122 people at one time in the shoreline areas.

$$\frac{7300\ square\ feet\ of\ shoreline\ area}{60\ square\ feet\ of\ shoreline\ per\ person} = 122\ PAOT\ on\ the\ shoreline$$

The areas outside the open section of shoreline are hazardous, and park managers want to ensure that visitors do not experience conditions that are close to forcing some or many of them to want to disperse out of the rockfall-protected area. Nor do park managers want to create conditions within the open areas of shoreline that could create the opportunity for more slips, trips, and falls as visitors scramble on the rocks and attempt to avoid one another. What's more, the opportunity to be on the shoreline of Crater Lake is an iconic park experience that many visitors count as the highlight of their trip to the park. With these considerations in mind, park managers identified a capacity that is closer to the acceptability and preference standards and well below the displacement standard. The visitor capacity for the shoreline areas is identified as 65 people at one time.

To ensure quality experiences, the queuing and gathering areas at the dock and restroom would be managed at or above the Highway Capacity Manual's Level of Service "A," or 13 square feet per person. The queueing area at the dock is roughly 1,400 square feet, while the gathering area near the restroom is about 1,200 square feet. Using the Level of Service standard of 13 square feet per person, there would be space for 108 people at one time in the dock queuing area and 92 people at one time in the gathering area near the restroom.

$$\frac{1{,}400\ square\ feet\ of\ queuing\ area\ at\ dock}{13\ square\ feet\ of\ queuing\ area\ per\ person} = 108\ PAOT\ at\ the\ dock\ queuing\ area$$

and

$$\frac{1{,}200\ sq.ft.of\ gathering\ area\ near\ restroom}{13\ sq.ft.\ of\ queuing\ area\ per\ person} = 92\ PAOT\ at\ the\ restroom\ gathering\ area$$

When the number of people at one time in the shoreline areas and queuing/gathering areas are taken together, the maximum number of people at one time in the whole lakeshore area would be 265.

$$65\ at\ shoreline + 108\ at\ Dock + 92\ at\ restroom = 265\ PAOT\ at\ lakeshore$$

Subtracted from the total Cleetwood Cove Trail capacity of 300 PAOT, this means there would be 35 PAOT on the trail itself. While there would be considerable variability in the number of people encountered on the trail throughout the day given the shifts in direction of travel, this means the average hiker would encounter about 35 people during their hike up or down the trail. Since the hike takes most people 35 to 45 minutes to complete, the average hiker would encounter somewhere between 45 and 60 people per hour. This is consistent with encounter rate thresholds established on high use trails in other national parks. For example, Sequoia and Kings Canyon National Park's 2014 Wilderness Stewardship Plan establishes a threshold of 45 people encountered per hour for "very high use trails." Likewise, Saguaro National Park's 2009 Comprehensive Trails Management Plan establishes a threshold of 45 people per hour on "natural trails." John Day Fossil Beds National

Monument's 2009 General Management Plan establishes a threshold of 60 people encountered per hour in the "Semi-developed/Pedestrian Zone."

As noted above, park management intends to make significant infrastructure improvements in the near future at Cleetwood Cove to remedy the trail sustainability and safety concerns. While these visitor capacities were identified using the current infrastructure configuration, the design and scale of rockfall mitigation, trail stabilization, retaining wall work, dock replacement, and any other changes to the infrastructure at Cleetwood Cove would generally be informed and guided by these visitor capacities as they are based on resource and experiential conditions. Most of the foreseeable infrastructure improvements would not change the assumptions about limiting attributes made in this analysis. For example, the rockfall mitigation is not expected to expand the area where visitors can safely experience the shoreline or alter their perceptions of crowding. Similarly, the dock replacement is not expected to affect the size of the queuing area or the space required to achieve Level of Service "A."

However, if some of the assumptions about limiting attributes are affected by infrastructure improvements (e.g. the shoreline area open to visitors is expanded), then the logic in this capacity analysis could be followed to identify an appropriate adjustment to the identified visitor capacities. Likewise, as was noted in the introduction, visitor capacities are based on the best available data, lessons learned, and other factors. While they are intended to provide management direction, they are not intended to be permanently binding. If new information becomes available through further study, analysis, and monitoring (e.g., more refined information about the direction of travel on the trail throughout the day or data about Cleetwood visitors' perceptions of crowding becomes available), the visitor capacities could be adjusted with appropriate environmental compliance. Any adjustments to the visitor capacities would first and foremost consider protection of the lakeshore area resources and the visitor experience.

Strategies to Implement Visitor Capacity — The following strategies would be implemented to ensure visitor use remains within the visitor capacities identified above.

- Increase visitor outreach and education to encourage visitors to visit Cleetwood Cove early in the morning or later in the afternoon. This would spread out use from the peak times of noon to 4 p.m. when use reaches visitor capacities to times when there is available capacity.
- Amend the superintendent's compendium to clarify shoreline areas that are open to the public. Clearly sign the boundaries of this open area so visitors do not disperse into hazardous areas that are prone to rockfall and rockslides.
- Continue to manage overflow roadside parking through the placement of roadside barriers (i.e., large rocks) and increased NPS presence in the area.
- Implement temporary trail closures to accommodate adequate maintenance of the trail. These temporary closures would no longer be only in the off-season and may be implemented during the summer or, more likely, after Labor Day to accommodate a longer maintenance window.

Adaptive Management Strategies to Implement Visitor Capacity — The following adaptive management strategies could be utilized as needed to ensure use remains within the visitor capacities identified above.

- Actively manage the pace and flow of trail use at peak times on peak usage days. At times when visitor capacities at Cleetwood Cove are met or exceeded, redirect visitors to other areas, actively meter vehicle entry to the Cleetwood Cove Trailhead, and/or actively meter pedestrian entry onto the Cleetwood Cove trail. These actions would ensure the area is managed to desired resource and visitor experience conditions. Consideration would be given to visitors with boat tour reservations. Implementation details would be determined at a later date.

High Elevation Frontcountry Trails

Analysis Area. This analysis area includes all frontcountry trails, both existing and proposed, with significant portions of trail above 6,800 feet in elevation (figure B-6).

Existing Trails

- Crater Peak Trail
- Discovery Point Trail
- Fumarole Bay Trail
- Garfield Peak Trail
- Grayback Trail
- Mount Scott Trail
- Rim Trail Section 1 – Discovery Point to North Junction
- Sun Notch Trail
- Watchman Lookout Trail
- Wizard Island Trail

Proposed Trails in Alternative 1

- Falls to Flowers Trail
- Mazama Rock Trail
- Munson Valley Roadside Trail
- Munson Valley Spur
- Raven Trail

Proposed Trails in Alternative 2

- Rim Trail (East Side)
- Vidae Ridge Trail

Proposed Trails Common to All Action Alternatives

- Chevron Trail

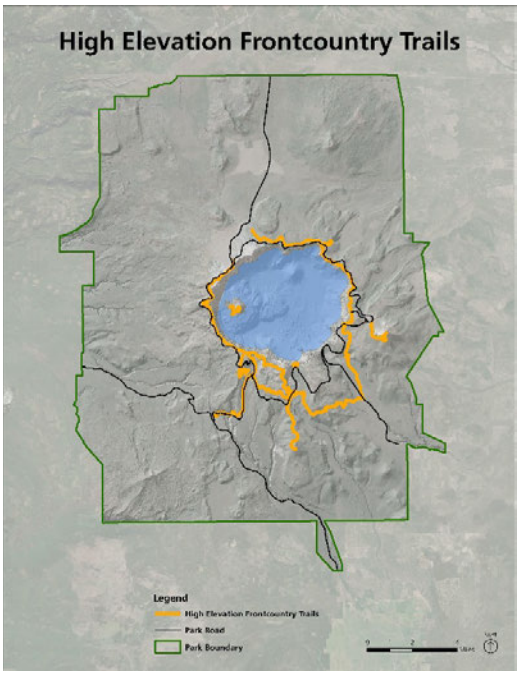

FIGURE B-6. ANALYSIS AREA: HIGH ELEVATION FRONTCOUNTRY TRAILS

Existing Direction and Knowledge. The high elevation frontcountry trails of Crater Lake National Park are among the most popular of the park's trails, receiving more visitation than any other trails except for Cleetwood Cove. These trails are popular because they provide the most desirable trails-based experience in the park—having views of Crater Lake itself—and have relatively easy access from Rim Village and various points along Rim Drive. The majority of the trails in this analysis area are concentrated along the caldera rim and on Wizard Island. The other trails in this analysis area, such as Mount Scott and Crater Peak, are set a little ways back from the rim and provide visitors opportunities to climb to higher elevation points.

The desired conditions for the frontcountry describe that visitors are "in contact with nature, close to modern conveniences." It will also be common to encounter other visitors, some physical exertion will be required, visits will require a short to moderate time commitment, and visitors will need to have a moderate tolerance for noise and visual intrusions.

Within this analysis area, there is a wide range of current visitor use levels on the individual trails. In 2018, trail counters gathered use data on five of the trails in this analysis area. Contrary to the typical trend, two of these trails, Crater Peak and Wizard Island, were busier on weekdays than holidays and weekends (table B-8).

Table B-8. Visitor Use on Existing High Elevation Frontcountry Trails: Average Daily Use in July

High Elevation Frontcountry Trails	July 2018 People/Day (All July Days)	July 2018 People/Day (Weekday)	July 2018 People/Day (Weekend and Holiday)
Crater Peak Trail	10	15	10
Discovery Point Trail	1,135	1,075	1,250
Garfield Peak Trail	290	270	335
Sun Notch Trail	225	215	245
Wizard Island Trails	340	350	320

Since the majority of park visitors desire these higher elevation trails with views of the lake, they are generally more crowded than other park trails. This has led to a proliferation of user-created trails and trail braiding on some of these trails, as visitors seek to pass each other in a constrained space. The most relevant indicators to monitor are the number of visitor-created trails leaving the designated trail each mile and the amount of trail that exceeds established trail width.

These higher elevation trails exist in subalpine habitat with sensitive resources including whitebark pine. The volume of visitors hiking around these sensitive resources is a concern to park managers since trampling of the roots, which are not protected by any understory, can lead to erosion and compaction of the pumice soil and damage to the trees. This trampling is caused by hikers stepping off to the side of the trail to let others past and by hikers following the established trails. Whitebark pine seedlings are also trampled when visitors leave the trail to seek scenic views or rest stops, which also results in widespread trampling of fragile subalpine vegetation including rare/sensitive plants.

Limiting Attribute. The most limiting attribute for high elevation frontcountry trails is crowding, which is closely related to vegetation damage. The crowding on these trails is a result of the desirability of the experience they provide—views of the lake. Crowding along the high elevation frontcountry trails leads to experiential impacts, and also causes social trailing and vegetation trampling along trails and near overlooks as visitors look to get away from crowds and find a view of the lake. This can damage sensitive species such as whitebark pine, which is very difficult to restore. While the desired conditions for visitor experience for this area state that it is common to encounter other visitors in this area, the desired conditions also include opportunities to be in contact with nature, which cannot happen when crowded conditions exist. Likewise, extensive social trailing and vegetation damage is inconsistent with the desired conditions for resource condition that describe these areas as being managed predominantly for natural values with a low to moderate tolerance for resource degradation. Both opportunities for visitors to be in contact with nature, and sensitive species, need to be protected.

Visitor Capacity. Trails in the high elevation frontcountry analysis area are busy, and sometimes crowded during peak use times. While the desired conditions allow for relatively high levels of use and frequent encounters with other visitors, they also call for opportunities to be in contact with nature. The crowding that currently occurs on some trails during peak times prevents connection with nature and is therefore not in keeping with desired conditions. Since this crowding could be

alleviated by redistributing visitation from some of the higher use trails in this analysis area to some of the lower use trails and trails that are proposed for construction, the visitor capacities for this analysis area were identified to maintain current use levels. The effect of maintaining capacity at the current use level would be to redistribute some of the highest peak use from busier trails to lower use trails.

Trails in this analysis area that receive the greatest use and occasional crowding include the Discovery Point Trail and Watchman Lookout Trail. Since these crowded conditions do not support the achievement of desired conditions for these two trails, their capacities were identified to be about 5% below the current use level. The remaining trails in this analysis area could accommodate slightly more use without violating desired experiential conditions, therefore the visitor capacities were identified to be about 10% above current use levels (see table below). These visitor capacities account for a redistribution of use from the Discovery Point and Watchman Peak trails to the remaining trails in this analysis area which provide similar opportunities and can accommodate the increase in use.

The addition of new trails to this analysis area as proposed in the two action alternatives would also allow for redistribution of use within this analysis area. In sum, trails in the high elevation frontcountry analysis area would allow more trail users to experience this type of highly desirable trail while desired experiential conditions would be protected.

Within the high elevation frontcountry trails analysis area, visitors would still have a range of trail opportunities (table B-9). Some trails, such as the Crater Peak Trail, would have relatively low levels of visitation, thus allowing for greater opportunities to connect with nature and fewer encounters with other visitors, while higher use trails like Discovery Point Trail and Garfield Peak Trail would have more encounters with other visitors and more limited opportunities for connection with nature. Both would provide for the achievement of the desired conditions described for this area.

Table B-9 Existing and Proposed High Elevation Frontcountry Trails: Current Use Levels and Identified Visitor Capacity

Existing Trails

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Crater Peak Trail	10	50
Discovery Point Trail	1,135	1,075
Garfield Peak Trail	290	320
Grayback Trail	N/A*	320
Fumarole Bay Trail	N/A*	370
Mount Scott Trail	N/A*	320
Rim Trail Section 1 – Discovery Point to North Junction	N/A*	250
Sun Notch Trail	225	250
Watchman Lookout Trail	N/A*	1,075
Wizard Island Trail	340	370

*Indicates existing trails for which no recent trail counter data exists.

Proposed Trails in Alternative 1

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Falls to Flowers Trail	N/A	50
Mazama Rock Trail	N/A	75
Munson Valley Roadside Trail	N/A	200
Munson Valley Spur	N/A	50
Raven Trail	N/A	50

Proposed Trails in Alternative 2

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Rim Trail (East Side)	N/A	100
Vidae Ridge Trail	N/A	100

Proposed Trails Common to All Action Alternatives

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Chevron Trail	N/A	250

Notes:

- Crater Peak Trail–Capacity identified at 50 visitors per day, instead of a 10% increase as this trail is well-suited to accommodate 50 visitors per day while still enduring desired conditions are achieved.
- Chevron Trail—Comparable to Rim Trail Section 1.
- Fumarole Bay Trail—Comparable to Wizard Island Trail.
- Grayback Trail—Comparable to Garfield Peak Trail.
- Mount Scott Trail—Comparable to Garfield Peak Trail.
- Rim Trail Section 1—Comparable to Sun Notch Trail.
- Watchman Lookout Trail—Comparable to Discovery Point Trail.
- Falls to Flowers Trail—Planned to be comparable to Crater Peak Trail.
- Mazama Rock Trail—Planned to be similar to Sun Notch Trail, though with a less busy experience more comparable to Crater Peak Trail.
- Munson Valley Roadside Trail—Planned to be a relatively busy paved multi-use pathway.
- Munson Valley Spur and Raven Trail—Planned to be similar to Rim Trail Section 1, though with a less busy experience more comparable to Crater Peak Trail.
- Rim Trail (East Side)—Planned to be similar to Garfield Peak Trail, though resources could not sustain those levels of use.
- Vidae Ridge Trail—Planned to be similar to Garfield Peak Trail.

Strategies to Implement Visitor Capacity — The following strategies would be implemented to ensure visitor use remains within the visitor capacities identified above.

- Repair and restore damaged areas of existing trails
- Construct new proposed trails as identified in the plan

- Encourage responsible use of trails and educate visitors to not travel off-trail as it can damage fragile vegetation and soils
- Encourage use of newly constructed trails
- Educate visitors about the opportunities to recreate on lesser-used trails
- Set appropriate expectations for visitors to high use trails. Inform them that they will encounter many other visitors, and those seeking a quieter experience can choose other locations.

Adaptive Management Strategies to Implement Visitor Capacity — The following adaptive management strategies could be utilized to ensure actual use remains within the visitor capacities identified above.

- Potentially improve delineation of the trail's location so visitors can more easily follow it. This could be accomplished through guardrails, trail hardening, and/or visual cues.

Low Elevation Frontcountry Trails

Analysis Area. This analysis area includes all frontcountry trails, both existing and proposed, with elevations below 6,800 feet in elevation (figure B-7).

Existing Trails

- Annie Creek Canyon Trail
- Annie Creek Spur Trail
- Castle Crest Wildflower Trail
- Castle Crest Wildflower Spur Trail
- Godfrey Glen Trail
- Lady of the Woods Historic Trail
- Pinnacles Trail
- Plaikni Falls Trail

Proposed Trails in Alternative 1

- Castle Creek Canyon Overlook
- Castle Creek Canyon Trail
- Mazama Campground Loop Trail
- Panhandle Trail
- Ponderosa Pine Trail

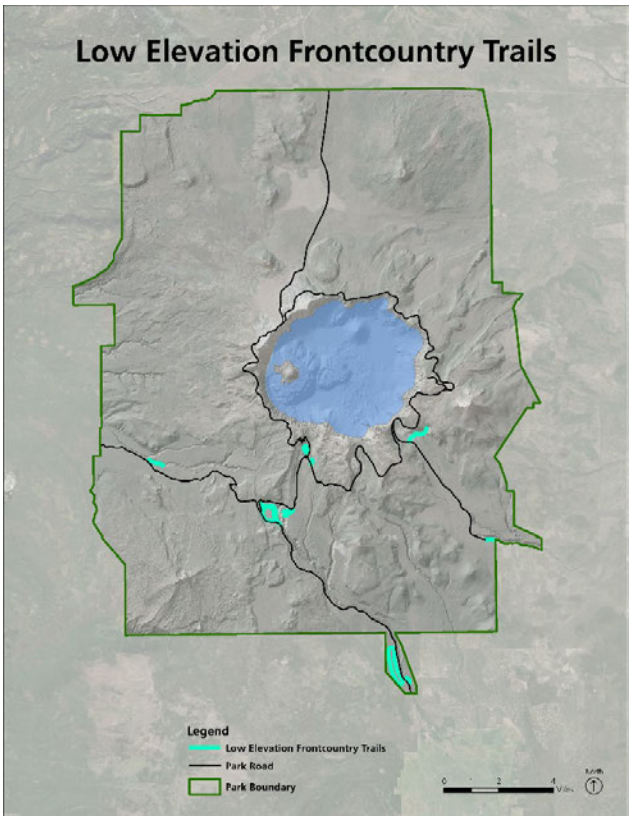

FIGURE B-7. ANALYSIS AREA: LOW ELEVATION FRONTCOUNTRY TRAILS

Existing Direction and Knowledge. The low elevation frontcountry trails of Crater Lake National Park are not as popular as the high elevation frontcountry trails or Cleetwood Cove, however they do receive substantially more use when compared to backcountry trails (B-10). These trails are located away from the caldera rim adjacent to vehicular travel corridors. While they do not have views of the lake, they provide easy access to waterfalls, wildflowers, creeks, canyons, historic sites, and other features. These trails are generally set in more forested settings.

The desired conditions for the frontcountry describe that visitors are "in contact with nature, close to modern conveniences." They also state it will be common to encounter other visitors, that some physical exertion will be required, visits will require a short to moderate time commitment, and visitors will need to have a moderate tolerance for noise and visual intrusions.

Within this analysis area, there is a range of current visitor use levels on the individual trails. With trail counts adapted to 2018 numbers, people/day ranged from 35 to 395.

Table B-10: Visitor Use on Existing Low Elevation Frontcountry Trails: Average Daily Use in July

Low Elevation Front-country Trails	July 2015 People/Day (Weekday/Weekend and Holiday)	July 2016 People/Day (Weekday/Weekend and Holiday)	July 2018 People/Day (Weekday/Weekend and Holiday)	July People/Day in 2018 Numbers (Weekday/Weekend and Holiday)
Annie Creek Trail	65 (60/75)			80 (75/90)
Godfrey Glen Trail		80 (70/95)		90 (80/110)
Castle Crest Trail			240 (235/250)	240 (235/250)
Lady of the Woods Trail			160 (160/170)	160 (160/170)
Plaikni Falls Trail	125 (120/145)			155 (145/180)
Pinnacles Trail		230 (220/265)	290 (285/305)	290 (285/305)

There is a degree of crowding on these trails that occurs due to people wanting to see key destinations such as waterfalls and geologic features. Visitors often trample vegetation at the falls as they try to get close to falls, sometime scrambling up scree slopes despite educational signage. Degradation of other trails is largely related to guided group hikes. Due to these large groups, hikers often have to step off to the side of the trail.

Crowded to overflowing parking lots and human waste issues have been observed at some of these trailheads. The most relevant indicators to monitor are the amount of trail that exceeds established trail width and presence of waste and litter per mile.

Limiting Attribute. The most limiting attribute for low elevation frontcountry trails is crowding, specifically around key destinations. Crowding in key areas is a result of the desirability of viewing and experiencing waterfalls and other destinations. While the desired conditions for this analysis area state that it is common to encounter other visitors, they also make clear that opportunities to be in contact with nature will be present. Crowding around key destinations is not consistent with maintaining opportunities to be in contact with nature.

Natural resources along these low elevation trails tend to be more tolerant of use levels than the higher elevation trails since sensitive species are not as present as they are in the subalpine environments.

Visitor Capacity. Currently, trails in the low elevation frontcountry trails analysis area are busy, and crowded around key destinations such as waterfalls. While the desired conditions allow for relatively high levels of use and frequent encounters with other visitors, they also call for opportunities to be in contact with nature. The crowding that occurs around key destinations is close to the point that it will prevent connection with nature, and therefore is close to violating desired conditions.

Trails in this analysis area that experience crowding around key destinations include the Castle Crest Wildflower Trail, Pinnacles Trail, and Plaikni Falls Trail. Visitor Capacities at these trails are set at current (2018) levels in order to protect desired experiential conditions. The other trails in this analysis area do not currently experience crowding at key destinations and could accommodate more use while still achieving desired conditions. For these trails, the capacity is set at about 25% greater than current (2018) levels. This allowable increase in use level on some of the existing trails, when combined with new opportunities on trails included in alternative 1, would mean that more visitors would have opportunities to have the type of experience that low elevation frontcountry trails provide.

Within the low elevation frontcountry trails analysis area, visitors would still have a range of recreational opportunities and experiences available to them (table B-11). Some trails, such as the Annie Creek trails, would have relatively low levels of visitation, while higher use trails like the Pinnacles Trail and Castle Crest trails would have more encounters with other visitors.

Table B-11. Existing and Proposed Low Elevation Frontcountry Trails: Current Use Levels and Identified Visitor Capacity

Existing Trails

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Annie Creek Canyon Trail	80	100
Annie Creek Spur Trail	N/A*	100
Castle Crest Wildflower Trail	240	250
Castle Crest Wildflower Spur Trail	N/A*	250
Godfrey Glen Trail	90	120
Lady of the Woods Trail	160	200
Pinnacles Trail	290	300
Plaikni Falls Trail	155	160

*Indicates existing trails for which no recent trail counter data exists.

Proposed Trails in Alternative 1

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Castle Creek Canyon Overlook	N/A	250
Castle Creek Canyon Trail	N/A	250
Mazama Campground Loop Trail	N/A	1,000
Panhandle Trail	N/A	50
Ponderosa Pine Trail	N/A	100

Notes:

- Annie Creek Spur Trail—Set at 100 to match adjoining Annie Creek Spur Trail.
- Castle Crest Wildflower Spur Trail—Set at 250 to match adjoining Castle Crest Wildflower Trail.
- Castle Creek Canyon Trail and Overlook—Planned to be comparable to Castle Crest Wildflower Trail and adjoining spur.

- Mazama Campground Loop Trail—Planned to be a short, paved pathway around the campground. Not similar to any existing trail, and plan is to have high levels of use by campers, families, and dog walkers.
- Panhandle Trail—Planned to be a low use trail, more comparable to Crater Peak Trail in terms of use level.
- Ponderosa Pine Trail—Comparable to Annie Creek Canyon Trail.

Strategies to Implement Visitor Capacity — The following strategies would be utilized to ensure actual use remains within the visitor capacities identified above.

- Repair and restore damaged areas of existing trails
- Construct new proposed trails as identified in the plan
- Encourage responsible use of trails and educate visitors to not travel off-trail as it can damage fragile vegetation and soils
- Construct new proposed trails as identified in the plan,
- Encourage use of newly constructed trails
- Educate visitors about the opportunities to recreate on lesser-used trails
- Improve signage regarding the lack of onsite restrooms and the availability of restroom locations nearby

Adaptive Management Strategies to Implement Visitor Capacity — The following adaptive management strategies could be utilized to ensure actual use remains within the visitor capacities identified above.

- Add restrooms to high use trailheads, these could be temporary restrooms installed during peak use times or permanent restrooms

Pacific Crest, Dutton Creek, and Lightning Spring Backcountry Trail Loop

Analysis Area. This analysis area includes the trails that make up a backcountry loop from the Lightning Spring Picnic area, down to the Pacific Crest Trail, and back to the Dutton Creek/Rim Trail Junction (figure B-8). It does not include the portion of the Rim Trail between Lightning Spring and Dutton Creek.

Existing Trails

- Dutton Creek Trail
- Dutton Creek Camp Trail
- Lightning Spring Trail
- Lightning Spring Camp Trail
- Pacific Crest National Scenic Trail (Section between Dutton Creek Trail Junction and Lightning Spring Trail Junction)

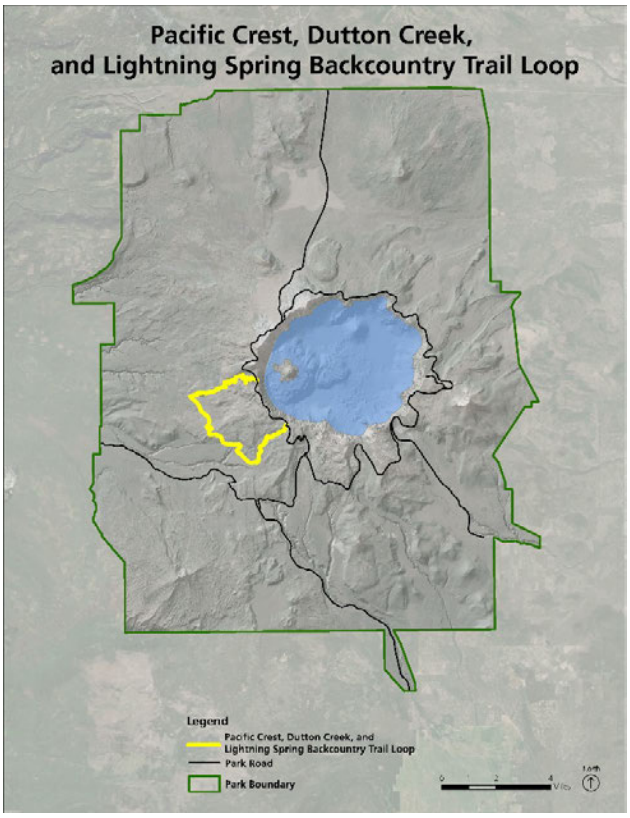

FIGURE B-8. ANALYSIS AREA: PACIFIC CREST, DUTTON CREEK, AND LIGHTNING SPRING BACKCOUNTRY TRAIL LOOP

Existing Direction and Knowledge. This backcountry loop is one of the few readily accessible backcountry loops in Crater Lake National Park and the surrounding area, and thus has seen increasing use in recent years. These trails are typically busier than the other trails in the backcountry. Visitors to these trails have a variety of motivations including through hikers on the Pacific Crest Trail using the trail for access to Rim Village and the services it provides, backpackers on a one or two-night overnight loop trip, and day hikers accessing Dutton Creek. Most of these trails fall within the recommended Crater Lake National Park Wilderness and are maintained and managed accordingly.

The desired conditions for the backcountry describe that visitors are "immersed in nature, away from comforts and conveniences." Visitors should have opportunities for solitude; encounter few other visitors; have a high level of independence, challenge, adventure, and application of outdoor skills; commit to a longer visit; have a low tolerance for noise and visual intrusions, and be willing to have a higher level of physical exertion.

Trail counts for 2018 show that use is fairly consistent throughout the analysis area. All of the trails receive relatively low use. Given the backcountry nature of the trails in this analysis area, use levels do not vary substantially between weekdays and weekends, so only the average for the month is included in the table below (table B-12).

Table B-12. Visitor Use on Dutton Creek and Lightning Spring Trails: Average Daily Use in July

Trail	July 2018 People/Day (All July Days)
Dutton Creek Trail	20
Lightning Spring	35

Park managers are concerned about interruptions to solitude that can occur on this backcountry loop. As an old wagon road, the Dutton Creek Trail is a historic resource and poses a maintenance challenge since it must be protected as a cultural resource but it tends to be prone to erosion as it was not designed as a sustainable trail. Use of the trail adds to the soil movement and potential degradation of this resource.

Given that these trails are at a lower elevation, there is less concern about potential impacts to natural resources.

Regarding the visitor experience, park managers have noted a recent increase in use along these trails, particularly at backcountry campsites, but they are not crowded to any degree. Current use levels generally seem acceptable.

The most relevant indicator to monitor is the presence of waste and litter per mile. Human waste in this area tends to be associated with the backcountry campsites.

Limiting Attribute. The limiting attribute for this backcountry hiking loop is opportunities for solitude and limited encounters with other visitors. Opportunities for solitude and few encounters with other visitors are central to the desired conditions for this backcountry area. Interruptions to this solitude are a primary concern and therefore would constrain the analysis area's ability to accommodate visitor use, while the sustainability of the trail tread on the historic wagon road and waste issues are also of concern. Opportunities for solitude need to be protected in the backcountry to ensure that desired conditions are maintained.

Visitor Capacity. Currently, trails in the Pacific Crest, Dutton Creek, and Lightning Spring backcountry loop are just busy enough so that opportunities for solitude can be interrupted. While encounters with other visitors are still relatively infrequent, they do appear to be increasing, which is a concern to park managers (table B-13). Likewise, the human and pet waste issues associated with backcountry camping in this area is becoming a concern, though it has not yet reached an unacceptable level.

Therefore, the visitor capacities for the trails that comprise this backcountry loop are set at current (2018) levels for the most visited section of the loop for which trail counter data exists (Lightning Spring Trail). The capacities for the two camp trails are set to accommodate three camping groups each with 8 individuals. The Pacific Crest National Scenic Trail section is set higher than the Dutton Creek and Lightning Spring trails to accommodate the daily July average of 40 through-hikers (see Backcountry Trails analysis area below). These capacities will ensure that desired experiential conditions are maintained.

Table B-13. Pacific Crest, Dutton Creek, and Lightning Spring Backcountry Trail Loop: Current Use Levels and Identified Visitor Capacity

Existing Trails

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Dutton Creek Trail	20	40
Dutton Creek Camp Trail	N/A*	24
Lightning Spring Trail	35	40
Lightning Spring Camp Trail	N/A*	24
Pacific Crest National Scenic Trail (Section between Dutton Creek Trail Junction and Lightning Spring Trail Junction)	N/A*	80

*Indicates existing trails for which no recent trail counter data exists.

Strategies to Implement Visitor Capacity — The following strategies would be utilized to ensure actual use remains within the visitor capacities identified above.

- Construct new proposed trails as identified in the plan to facilitate redistribution of use
- Encourage use of newly constructed trails
- Educate visitors about the opportunities to recreate on lesser-used trails
- Improved signage regarding the lack of onsite restrooms and the availability of restroom locations nearby
- Backcountry permits for designated sites in this area will be managed within the identified capacities (i.e., 3 permits/night at all sites, 8 people per group)
- Increase Leave No Trace education and practice through increased presence of backcountry rangers

Adaptive Management Strategies to Implement Visitor Capacity — The following adaptive management strategies could be utilized to ensure visitor use does not damage fundamental resources and values.

- Add restroom facilities at the Lightning Spring trailhead, these could be temporary restrooms installed during peak use times or permanent restrooms
- Designate additional backcountry campsites to further manage camping. Dispersed camping could be phased out with the exception of through-hikers on the Pacific Crest Trail

Backcountry Trails

Analysis Area. This analysis area includes all backcountry trails, both existing and proposed, except for the Pacific Crest, Dutton Creek, and Lightning Spring backcountry loop.

Existing Trails

- Annie Spring Trail
- Bald Crater Loop Trail
- Bert Creek Trail
- Boundary Springs Trail
- Boundary Springs Spur Trail
- Bybee Creek Horse Camp Trail
- Grouse Hill Camp Trail
- Pacific Crest National Scenic Trail (Excludes section between Dutton Creek Trail junction and Lightning Spring Trail Junction)
- Pumice Flat Trail
- Red Cone Spring Camp Trail
- Rim Trail Section 2 – North Junction to Pacific Crest Trail
- Stuart Falls Trail
- Union Peak Trail

Proposed Trails in Alternative 1

- Union Peak to Stuart Falls Connector Trail

Proposed Trails in Alternative 2

- Maklaks Crater Loop

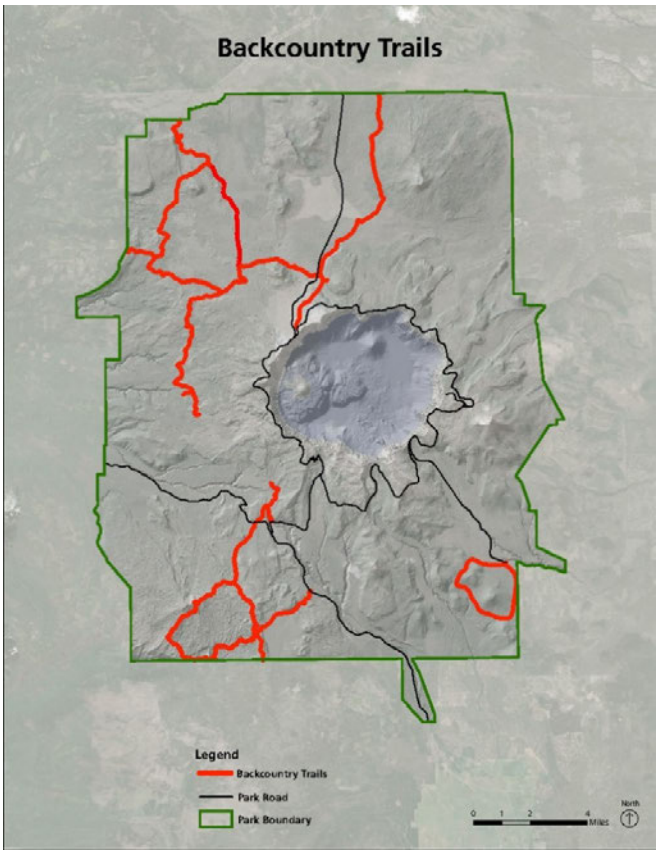

FIGURE B-9. ANALYSIS AREA: BACKCOUNTRY TRAILS

Existing Direction and Knowledge. The backcountry trails in Crater Lake National Park are mostly scattered throughout the western half of the park and located well away from the crater rim. They are generally the least visited trails in the park. The Pacific Crest National Scenic Trail is a draw for some hikers, and use on this particular trail jumped dramatically following release of the major motion picture *Wild* prior to the 2015 summer season. Most of these trails fall within the recommended Crater Lake National Park Wilderness and are maintained and managed accordingly.

The desired conditions for the backcountry describe that visitors are "immersed in nature, away from comforts and conveniences." Visitors should have opportunities for solitude; encounter few other visitors; have a high level of independence, challenge, adventure, and application of outdoor skills; commit to a longer visit; have a low tolerance for noise and visual intrusions, and be willing to have a higher level of physical exertion.

Within this analysis area, the Annie Spring and Bert Creek trails have a moderate amount of use, while the other trails all receive very minimal traffic. With trail counts adapted to 2018 numbers, the average people/day in 2018 numbers ranges from nine to 42. Given the remote backcountry nature of the trails in this analysis area, use levels do not vary substantially between weekdays and weekends, so only the average for the month is included in table B-14 below.

Table B-14. Visitor Use on Existing Backcountry Trails: Average Daily Use in July

Backcountry Trails	July 2014 People/Day	July 2015 People/Day	July 2016 People/Day	July 2017 People/Day	July 2018 People/Day	Average July People/Day in 2018 Numbers
Annie Spring Trail					40	40
Bert Creek Trail					10	10
Boundary Springs Trail				15		15
Stuart Falls Trail			10			10
Union Peak Trail					15	15
Pacific Crest Trail - South	15	75**	15	960*	30	40
Pacific Crest Trail - North					20	20
Pumice Flat Trail	20					30

*This outlier was likely due to fire management activity in the area. The number has been excluded from calculations.
**This outlier was most likely attributable to the release of the film *Wild* in December 2014, though it was included in the calculations.

Given the current low use levels these trails receive, park managers are not overly concerned about crowding, impacts to solitude, or natural resource impacts. The natural resources at these lower elevation trails are also much more resilient than those found at higher elevations.

This analysis area contains three designated backcountry campsites, each containing sites for three groups. In addition to designated backcountry campsites, dispersed camping is allowed in the backcountry. Repeat use of the same dispersed site tends to be an issue as overuse of these sites can create large, disturbed areas; extensive social trail networks; erosion; and other resource impacts. This concentration of use can also lead to issues with human waste.

As most of the parking areas that access the backcountry trails are relatively small, parking lots do tend to fill beyond capacity during busy summer days.

The most relevant indicators to monitor are the presence of waste and litter per mile, the number of visitor-created trails leaving the designated trail, and the amount of trail that exceeds established trail width.

Limiting Attribute. The limiting attribute for backcountry trails is the impact to dispersed backcountry campsites. These impacts would include large areas of denuded soil, scars associated with illegal campfires, human waste, social trails, and other issues associated with additional visitor use. These types of impacts would not be in keeping with the desired conditions for the backcountry, which state that tolerance for resource degradation is low, that evidence of modern civilization is minimal, and that the area should be managed for wilderness character and values. The current level of impacts to dispersed backcountry sites is consistent with desired conditions, however, it is the factor that most constrains the analysis area's ability to accommodate additional visitor use.

Visitor Capacity. As the impacts at some of the backcountry campsites are not yet near the point at which they will violate the desired conditions for the backcountry, the visitor capacity for these trails was identified by park staff at approximately 50% above current (2018) levels. This will ensure that desired resource conditions at the backcountry campsites are maintained. Capacities for camp trails are set at 24 to accommodate 3 groups of 8 people per day. See table B-15 below.

Table B-15. Existing and Proposed Backcountry Trails: Current Use Levels and Identified Visitor Capacity

Existing Trails

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Annie Spring Trail	40	60
Bald Crater Loop Trail	N/A*	30
Bert Creek Trail	10	30
Boundary Springs Trail	15	30
Bybee Creek Horse Camp Trail	N/A*	24
Grouse Hill Camp Trail	N/A*	24
Pacific Crest National Scenic Trail (Excludes Dutton Creek to Lightning Spring)	40	60
Pumice Flat Trail	30	45
Red Cone Spring Camp Trail	10	24
Rim Trail Section 2-North Junction to Pacific Crest Trail	N/A*	60
Stuart Falls Trail	10	15
Union Peak Trail	15	20

*Indicates existing trails for which no recent trail counter data exists.

Proposed Trails in Alternative 1

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Union Peak to Stuart Falls Connector Trail	N/A	15

Proposed Trails in Alternative 2

Trail	Current Use Level (People/Day)	Visitor Capacity (People/Day)
Maklaks Crater Loop	N/A	30

Notes:

- Bald Crater Loop Trail—Comparable to Boundary Springs Trail.
- Rim Trail Section 2—Comparable to Pacific Crest National Scenic Trail.
- Union Peak to Stuart Falls Connector Trail—Comparable to Stuart Falls and Union Peak trails.
- Maklaks Crater Loop—Comparable to Boundary Springs Trail.

Strategies to Implement Visitor Capacity — The following strategies would be utilized to ensure actual use remains within the visitor capacities identified above.

- Construct new proposed trails as identified in the plan
- Encourage use of newly constructed trails
- Educate visitors about the opportunities to recreate on lesser-used trails
- Improve signage regarding the lack of onsite restrooms and the availability of restroom locations nearby
- Backcountry permits for designated sites in this area will be managed within the identified capacities (i.e., 3 permits/night, 8 people per group)

Adaptive Management Strategies to Implement Visitor Capacity — The following adaptive management strategies could be utilized to ensure actual use remains within the visitor capacities identified above.

- Designate additional backcountry campsites to replace the need for dispersed camping. Dispersed camping would not be allowed with the exception of through-hikers on the Pacific Crest Trail.

APPENDIX C: IMPACT TOPICS NOT CARRIED FORWARD FOR DETAILED ANALYSIS IN THIS PLAN/ENVIRONMENTAL ASSESSMENT

The following impact topics have been dismissed from this plan / environmental assessment (plan/EA) because they do not exist in the project area, the likelihood of impacts are not reasonably expected from the conceptual projects included in this high-level plan, impacts do not differentiate between alternatives, there would be no potential for significant effects through the application of mitigation measures, or because they do not respond to purpose and need. Some topics that have been dismissed from detailed analysis for this planning effort may be impacted by individual actions depending on specific trail alignment and new information available at the time of detailed project development, design, and construction.

Acoustic Environment and Soundscapes

The development of a sustainable trail system would not contribute to long-term impacts on the acoustic environment and soundscapes at the park for several reasons. First, no motorized use would be allowed on trails. New trail construction would likely have temporary impacts on the soundscape while construction activities occur; e.g., human-caused sounds from equipment, vehicular traffic, and trail crews. Any construction associated with implementation of the alternatives; e.g., hauling materials or operating equipment could result in dissonant sounds, but such sounds would be localized and of very short duration, typically less than a couple weeks in any given spot. Therefore, acoustic environment and soundscapes was dismissed as an impact topic.

Air Resources

Construction activities, including operating equipment and hauling materials, could result in temporary increases in vehicle exhaust and emissions as well as inhalable particulate matter. In various isolated areas, construction activities would have localized effects on air quality. However, the increase would be too slight to quantify, and visibility would not be impacted. Air quality in the park would therefore not be measurably affected by the action alternatives.

Archeological Resources

Archeological resources—including precontact and historic sites/districts, historic road and trail alignments, and individual artifacts—are located throughout the park. The trail location reconnaissance study developed by Hartell intern Lauren Rieke during the summer of 2012 identifies potential trail alignments and their potential cultural resource impacts for six locations previously suggested as sites for further trail construction: the Rim Village and Upper Munson Valley, Thousand Springs, Lower Annie Creek, Whitehorse Ponds, Sphagnum Bog, and Cascade Spring. The study offers preliminary archeological investigations to help guide the development of new routes away from potential sites and isolates and to inform further consultation efforts. The study also included potential design considerations associated with each potential route.

The proposed actions described in the plan are conceptual and appropriate for a high-level comprehensive trail planning effort; exact locations, construction materials, and implementation strategies for trail segments included in the action alternatives have not been finalized. Consultation required under section 106 of the National Historic Preservation Act (NHPA) will continue on a

project-level basis when additional details about trail development and specifics related to construction activities that may affect cultural resources are available.

More detailed trail alignments moved forward for implementation as part of the selected alternative would be informed by trail location studies and designed to avoid sensitive archeological resources and/or preserve the character-defining features of historic road alignments and historic districts. In areas of the landscape where in situ archeology may occur, such as on lands not previously surveyed for archeology or not disturbed by earlier construction activities, the National Park Service would conduct a phase 1 archeological investigation of the areas planned for ground-disturbing activities associated with this plan. Any such archeological studies and investigations would be carried out and evaluated for effect before construction and in consultation with the Oregon State Historic Preservation Officer under the provisions outlined in 36 CFR Part 800, regulations issued by the Advisory Council on Historic Preservation (ACHP) implementing section 106 of the National Historic Preservation Act of 1966, as amended (NHPA; 54 USC 306108). Mitigation measures are described in chapter 2 as part of the proposed action and additional project-specific measures would be developed in collaboration with associated tribes and the Oregon State Historic Preservation Officer (SHPO), if necessary. Therefore, the impact topic of archeological resources was dismissed from detailed analysis at this time. Further consultation between park cultural resource staff, the Oregon State Historic Preservation Officer, and/or associated tribes to complete section 106 obligations will continue on a project-specific basis as proposed actions associated with this planning effort more towards implementation.

Ethnographic Resources

The park's ethnographic overview (Maris and Winthrop 1994) and a traditional use study (Deur 2008) identify and describe ethnographic resources and traditional resources gathering practices of tribes of south-central Oregon and northeastern California. These studies highlight the historical importance and enduring significance of Crater Lake, a site of religious importance located at the nexus of several tribes' traditional lands. Crater Lake, Huckleberry Mountain—located west of Crater Lake National Park—and the surrounding lands are revered as a sacred site and served as a social gathering place for the numerous tribes that relied on local plants for sustenance. Tribal oral traditions, ceremonial activity, and ritual features found within the park boundary connect contemporary tribal members with the Creator and their ancestors. The park's present-day boundaries include land within the former Klamath Reservation and the area surrounding the lake was used for hunting, fishing, and other traditional resource procurement before the park's establishment, and that use continues to this day.

The proposed actions described in the plan are conceptual and appropriate for a high-level comprehensive trail planning effort; exact locations, construction materials, and implementation strategies for trail segments included in the action alternatives have not been finalized. Consultation required under section 106 of the National Historic Preservation Act will continue on a project-level basis when additional details about trail development and specifics related to construction activities that may affect cultural resources are available. Therefore, the topic of ethnographic resources is dismissed from additional analysis within this document. Tribal consultation associated with actions proposed in this plan is ongoing.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The actions proposed in this analysis would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Any temporary restriction on trail use would be equally applied to all visitors, regardless of race or socioeconomic standing. Costs associated with access to the trail system, i.e., entrance and camping fees, would be equally applied to all visitors as well. Therefore, this topic was dismissed from further consideration.

Indian Trust Resources

No Indian trust resources are located within the park, and the lands comprising the area are not held in trust by the Secretary of the Interior for the benefit of American Indians. Therefore, Indian trust resources were dismissed as an impact topic.

General Wildlife

The abundant and diverse vegetation in the park constitutes a large block of relatively undisturbed habitat that supports various populations of native wildlife species, including reptiles, amphibians, birds, mammals, and invertebrates. The park has significant populations of Roosevelt elk, black-tailed deer, and coyote. Periodic sightings of black bear, pine marten, weasel, porcupine, and mountain lion are reported in the summer months. A variety of small animals is present in the park backcountry, including transient bird species.

The construction and use of new trails by visitors would result in the loss of wildlife habitat and could potentially fragment some wildlife habitat and populations. Additionally, the presence of construction workers and equipment noise may initially disturb some wildlife. In particular, nesting birds could be impacted by vegetation clearing during trail construction and the presence of construction workers. However, impacts to nesting birds, as well as other wildlife, would be minimized through the implementation of mitigation measures and best management practices identified in chapter 2 as well as management strategies identified in appendix A. For example, wildlife surveys would be conducted by qualified biologists along proposed sections of trail, and resource management personnel would be notified/consulted when there is the potential to disturb sensitive wildlife species. Timing of construction activities outside of nesting season could mitigate impacts and may eliminate the need for nesting bird surveys. Furthermore, construction would last less than a few weeks in any given spot, and use of mechanized equipment would not be allowed in recommended wilderness without completion of a minimum requirements analysis.

With implementation of mitigation measures and best practices listed in chapter 2, natural areas surrounding new and existing trail corridors would remain in their current condition and would continue to offer habitat for wildlife. Proposed activities are intended to maintain habitat conditions at the stand scale. On a landscape scale, the new trails proposed in this plan would have only a very small effect on wildlife, as new trails and supporting infrastructure would result in loss of less than 16 acres, or 0.01%, of available habitat in the park from removal of vegetation. While visitor use of trails would create some impacts on wildlife, for example disturbance and flushing of animals, these impacts would be very limited because the vast majority of visitors would stay on trails and because

no motorized use by visitors would be allowed. None of the impacts described above would affect wildlife at the population level. Furthermore, implementation of mitigation measures and best management practices listed in chapter 2 and management strategies identified in appendix A would minimize adverse impacts to wildlife. Therefore, the topic of general wildlife was not carried forward for further analysis. If new wildlife species were listed as threatened or endangered, the National Park Service would reinitiate consultation with the US Fish and Wildlife Service (USFWS) on potential effects on newly listed species.

Threatened and Endangered Species

The National Park Service accessed the most recent USFWS list of species that are listed and protected under the federal Endangered Species Act that may occur in the park (USFWS 2021). The species considered in this document are provided in table C-1 below.

Table C-1. Federally Endangered, Threatened, and Candidate Species That May Occur in Crater Lake National Park (as of August 26, 2021)

Common Name	Scientific Name	Federal Status	Species or Habitat in Planning Area	Proposed or Designated Critical Habitat Present in Planning Area
Northern Spotted Owl	*Strix occidentalis caurina*	T, CH	Yes	No
Yellow-billed cuckoo (Western DPS)	*Coccyzus americanus occidentalis*	T, PCH	No	No
Lost River sucker	*Deltistes luxatus*	E, CH	No	No
Shortnose sucker	*Chasmistes brevirostris*	E, CH	No	No
Bull trout	*Salvelinus confluentus*	T, CH	Yes	Yes
Oregon spotted frog	*Rana pretiosa*	T, CH	No	No
Applegate's milk vetch	*Astragalus applegatei*	E	No	n/a
Whitebark pine	*Pinus albicaulis*	PT	Yes	n/a

T = Threatened, CH = Critical Habitat, E = Endangered, PT = Proposed Threatened, PCH = Proposed Critical Habitat, C = Candidate

The northern spotted owl and whitebark pine are known to occur within the planning area and are evaluated in detail in this environmental assessment.

Bull trout (and its critical habitat) are known to occur within the planning area. In 1999, the US Fish and Wildlife Service listed all populations of bull trout within the coterminous United States as a threatened species pursuant to the Endangered Species Act. Neither of the alternatives proposed in this plan/EA would result in impacts of any new measurable or perceptible consequence to bull trout or designated bull trout critical habitat, and therefore this topic was not carried forward for detailed analysis.

Under alternative 1, the proposed Ponderosa Pine Trail would run immediately adjacent to Annie Creek, which is designated Critical Habitat for the bull trout. Bull trout have been extirpated from Annie Creek. Trail construction would remove vegetation and expose soil that would temporarily increase the potential for erosion, sedimentation, and subsequent habitat alterations. However, best

management practices for erosion control listed in chapter 2 would be implemented during construction to capture sediment, and a vegetation buffer between Annie Creek and the Ponderosa Pine Trail would be maintained except at designated creek access points. Therefore, the anticipated impacts from the construction, maintenance, and use of the Ponderosa Pine Trail would not be of any new measurable or perceptible consequence to bull trout or designated bull trout critical habitat.

Under alternative 1, the proposed Grayback Trail would cross Sun Creek and Lost Creek, which are occupied by bull trout. Both creeks are closed to fishing. Hiking, stock use, biking, and dog walking are currently allowed on the Grayback Road, and these uses would continue on the Grayback Trail. Increased use of the Grayback Trail by hikers could lead to the development and use of spur trails to either creek, increasing the potential for sediment delivery from areas that have a hydrologic connection to streams. Sediment in excess of normal conditions can result in gill trauma to adult bull trout, adversely impact embryo survival and subsequent fry emergence success, and change the abundance or type of food organisms (Muck 2010). However, the increased sediment delivery from hikers on nearby informal trails would be anticipated to remain minimal in comparison to natural sediment levels experienced during spring runoff. The impacts of sediment delivery from existing disturbed areas that have a hydrologic connection to streams would be reduced by implementing management strategiesdescribed in appendix A, such as keeping hikers on the single trail alignments and allowing the nearby braided informal trails to naturally stabilize and revegetate. If warranted, the National Park Service would implement additional management strategies described in appendix A to reduce the extent of visitor-created trails and minimize increases in trail width. Therefore, the actions under alternative 1 would not result in any new measurable or perceptible consequence to bull trout.

Under alternative 2, the Grayback Trail would repurpose the existing Grayback Road and be open to hiking. Impacts to bull trout under alternative 2 from designation of the Grayback Trail would be even less than those under alternative 1, as biking, horseback riding, and dog-walking would not be allowed. Therefore, the anticipated impacts of repurposing the existing Grayback Road would be so small that they would not be of any new measurable or perceptible consequence to bull trout.

The five other listed species in the above table (i.e., shortnose sucker, Lost River sucker, Applegate's milk-vetch, Oregon spotted frog, and yellow-billed cuckoo) occur in habitats not found in the planning area and thus will not be analyzed further in this environmental assessment. If the occurrence of one or more of these species in the project area was documented or if new species are listed, the National Park Service would reinitiate consultation with the US Fish and Wildlife Service on potential effects on those species.

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APPENDIX D: ACCESSIBILITY REQUIREMENTS FOR NEW OR ALTERED TRAILS IN THE NATIONAL PARK SERVICE

Section 504 of the Rehabilitation Act of 1973 states that no otherwise qualified individual with a disability in the United States "be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance or under any program or activity conducted by any Executive agency."

Crater Lake National Park seeks to ensure that it is providing an inclusive trails program by providing a range of accessible experiences parkwide. Achieving accessibility in outdoor environments presents challenges and constraints posed by terrain, the degree of development, construction practices and materials, and other factors.

National parks and other outdoor areas developed by the federal government are subject to the requirements outlined in the Architectural Barriers Act (ABA) Accessibility Standards. These provisions address access to trails, picnic and camping areas, viewing areas, and other components of outdoor developed areas on federal sites when newly built or altered. Exceptions are provided in situations where terrain and other factors make compliance impracticable.

The following sections contain standards for scoping and design and exceptions related to trail development in the ABA Standards. Additional requirements may apply for adjoining facilities such as parking and restrooms.

- F201.4 Application
- F244 Camping Facilities
- 1011 Outdoor Constructed Features
- 1017 Trails
- 1019 Conditions for Exception

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APPENDIX E: CRATER LAKE NATIONAL PARK TRAILS PROGRAM STANDARD OPERATING PROCEDURES

Crater Lake National Park staff developed these standard operating procedures (SOPs) to guide trail construction and maintenance activities in the park in 2018, prior to completion of the trail management plan/EA. This document is included as an appendix to this plan/EA because new trails would be built according to the design standards and/or condition descriptions for distinct trail classes described herein. Furthermore, trail crews will carry out maintenance according to the specified trail class, using guidance outlined in these SOPs.

SECTION 1. INTRODUCTION AND PURPOSE

Trail standards are the criteria for the minimum quality set for trails[1] in various use classes. The primary standard used for trails at Crater Lake National Park (CRLA) is one of environmental integrity. Problems and projects should be approached from an environmental perspective that allows natural processes to prevail. No work is undertaken that unacceptably impacts the resources. All trail work must be approached with aesthetics in mind so that the finished product will be pleasing to the eye and, above all, unobtrusive to the natural setting. Keeping existing trails well maintained enhances the visitor's experience, protects park resources, and reinforces the values of the National Park Service (NPS) and Crater Lake National Park.

Work described in this document will serve as the scope of work for compliance with the National Environmental Protection Act (NEPA). *Any work not specified in this appendix will require separate NEPA compliance.*

This document, the Crater Lake National Park *Trails Standard Operating Procedures* (Trails SOP), defines the standards and methods for the maintenance of standard terra[1] trails in Crater Lake National Park. These standards outline the types of cyclic upkeep necessary to maintain the function and safety of CRLA trails in accordance with their defined classification ranking, as outlined in the National Quality Standards for Trails (see appendix A). CRLA trails are classified according to their user groups, accessibility, terrain, and general character. These classifications permit quantification of trail features and associated actions necessary to maintain trails.

This document of general trails maintenance guidelines is intended to have a five-year life span, at the end of which a new document should be drafted. This document is intended to be accompanied by an annual list of specific trails maintenance projects, to be reviewed on the Planning, Environment and Public Comment (PEPC) site prior to the start of the summer fieldwork season.

The purpose of this document is to identify which maintenance activities and procedures are considered part of normal maintenance for existing trails. Any and all trail maintenance activities outside the scope of this document should be submitted in the park PEPC program. These routine activities will take place on existing trails and will not alter the character of Crater Lake National

1. For the purpose of this document, a "trail" is defined as: "A cleared travel corridor leading from one point to another." (*Lightly on the Land,* The Student Conservation Association, Second Edition, Pg. 18)

Park or its trail system. Normal cyclic maintenance permits annual upkeep, stabilization, and spot-improvements to trails. These maintenance activities are completed such that the trail class remains unchanged. Normal maintenance also includes minor repairs and rehabilitation activities performed in response to acute deterioration of trails resulting from weather or geophysical events. Activities that extend beyond routine maintenance require subsequent management approval and NEPA compliance.

A list of work sites and/or trails will be submitted for review in PEPC prior to the field season each year. The deadline for that submittal is February 1st. Ensuring the following mitigation measures are in place is the responsibility of the project leader. The project leader will be defined in PEPC when the list of project areas is entered.

To ensure that maintenance of the trail system protects natural and cultural resources unimpaired for future generations and provides for a high-quality visitor experience, a consistent set of mitigation measures would be applied to all management actions.

Cultural Resources

- Known archeological resources will be avoided during project implementation. Archaeological monitoring is required when working near sensitive archeological resources. Provision for inadvertent discovery applies. If concealed archeological resources are encountered during project activities, work will stop and all necessary steps will be taken to protect them. The park Cultural Resource Management staff will be notified immediately. Archeological surveys will be completed before projects are permitted to begin.
- All workers will be informed of the criminal penalties for illegally collecting artifacts or intentionally damaging any archeological or historic property. Workers also will be informed of the correct procedures should previously unknown resources be uncovered during construction activities. Data recovery excavations will be carried out under NPS guidance to mitigate adverse effects as outlined in the section on environmental consequences.

Wilderness

- The use of mechanized equipment in Crater Lake National Park's recommended wilderness is not permitted under this Trails SOP.
- Each project in recommended wilderness using mechanized equipment will require a Minimum Requirement Analysis (MRA). The project leader is responsible for initiating this process and ensuring that compliance is completed prior to the start of the project.
- Each year a Minimum Requirements Worksheet will be attached to the PEPC project for work done on trails located in the CRLA recommended wilderness area.

Visitor Experience/Viewshed

- The project leader will work to minimize cut edges from downed trees and branches visible from trails (e.g., flush cutting stumps; flush cutting branches against main stem).
- Special consideration will be given to visitor viewshed and aesthetics; tree and brush removal will be done selectively to maintain a naturalistic character such as preventing the creation of a linear trail edge.

- Projects with larger visitor impacts will be done outside of peak visitation season. (Example: work on the Cleetwood Cove Trail will be done prior to boat tours starting and after Labor Day weekend because of the high volume of people using that trail in July and August.)

Natural Resources

- The project leader will prepare an annual work plan and present it to the CRLA Management Team to identify any impacts outside of the scope of this plan.
- Ground disturbance will be contained to the trail prism area as defined in the Trail Management Objectives (TMO's), a buffer of two feet on either side of the trail tread where crews stand to work on the trail, place tools, or pile debris during construction.
- Any equipment that comes in contact with vegetation or soil used in the park will be washed prior to subsequent use. The designated cleaning location is the wash bay at Park headquarters.
- Gravel and soil sources will be certified weed-free and come from inside the park if at all possible. The project leader should give ample lead time to botany staff to facilitate inspections of change in where materials are sourced. Inspections occur once in June when weeds are in bloom and once more in August.
- All projects should be reviewed by the terrestrial ecologist to determine potential impacts to wildlife.
- Any project occurring within 1.2 miles of northern spotted owl (NSO) habitat will need to be surveyed for northern spotted owl if there is a significant amount of vegetation removal (e.g., putting in a new trail, cleaning out snags in backcountry campsites, removing trees and snags for a trail reroute). A minimum of two summers will be needed for habitat disturbance projects (six surveys/year for two years).
- During the spotted owl breeding season (March 1 – August 10), projects with potential noise disturbance (e.g., chain saw, power wheel barrows, compaction devices, field crews > 3 people, field crews in one location for long periods of time) but very limited or no vegetation removal (live trees or standing snags) would not be conducted in those portions of treatment units that are within 0.25 miles of an active spotted owl nest site or activity center. A minimum of two months will be needed to complete noise disturbance surveys (six surveys, each a week apart). Active/inactive nesting status would be determined via standard protocol surveys (USFWS 2011). In addition, no vegetation removal would occur within potential spotted owl habitat before protocol surveys are completed.
- All operations will cease if wildlife are observed to be disturbed or displaced by trail work after the initial assessments have been conducted, and the terrestrial ecologist should be notified immediately.
- Appropriate resource management personnel should be contacted immediately if nesting owls are observed near the project area after the initial assessments have been conducted. All project work should cease until notified by the terrestrial ecologist.
- All US Fish and Wildlife Service (USFWS) recovery plans and sampling protocols for wildlife species listed as threatened or endangered should be followed prior to implementing project work. As of 9/28/2015, this only pertains to northern spotted owls and bull trout.

- Areas planned for reroutes longer than 1,320 linear feet and/or vegetation destruction need to be surveyed by the botany staff for rare species. The project leader will coordinate with the park botanist to ensure surveys have been conducted, results communicated, mitigations are in place, and any appropriate plant salvage and/or collection has occurred.
- Special mitigations will be adhered to when working in Whitebark Pine habitat, such as not cutting or removing Whitebark Pine (including seedlings and saplings) without prior consultation with the botany staff.
- Cutting and removal of five needle pines and hardwood species will be minimized wherever possible.

Legal Requirements

Trail construction and maintenance in national parks are subject to a variety of federal laws and regulations.

- **National Environmental Policy Act –** The National Environmental Policy Act (1969) requires that federal agencies consider environmental impacts resulting from any major federal action including the construction of infrastructure such as roads, trails, and buildings through the environmental assessment and the environmental impact statement processes. Trail projects in Crater Lake National Park are subject to NEPA review. The National Environmental Policy Act also permits "categorical exclusion," of actions that do not have an individual or cumulative significant impact on the environment and thus are not subject to further environmental review (42 U.S.C. §4321 et seq. [1969]).

- **National Historic Preservation Act (NHPA) –** Section 106 of the National Historic Preservation Act (1966) requires that federal agencies consider impacts to historic properties and artifacts. CRLA trail projects are subject to Section 106, and special attention must be paid when excavation takes place as part of trail construction and maintenance. CRLA trails employees work with park staff to ensure adherence to Section 106 regulations.

- **The Wilderness Act –** The 1964 Wilderness Act established the National Wilderness Preservation System and identified the National Park Service as one of the four federal agencies responsible for protecting and preserving the nation's wilderness resource. The Wilderness Act prohibits construction of roads or structures and the public use of motorized equipment and mechanical transport in designated wilderness areas, but provides for exceptions for certain administrative activities through a "minimum requirement" process.

- The Wilderness Act states "In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as 'wilderness areas,' and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness

character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness; and no Federal lands shall be designated as 'wilderness areas' except as provided for in this Act or by a subsequent act." Sec. 2. (a) of the Wilderness Act.

"All management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative actions, projects, or programs undertaken by the Service or its agents and affecting wilderness character, resources, or the visitor experience are necessary, and if so how to minimize impacts. The minimum requirement concept will be applied as a two-step process that determines:

Whether the proposed management action is appropriate or necessary for administration of the area as wilderness and does not cause a significant impact to wilderness resources and character, in accordance with the Wilderness Act; and

The techniques and types of equipment needed to ensure that impacts on wilderness resources and character are minimized" (NPS *Management Policies 2006*, "Chapter 6: Wilderness Preservation and Management," 6.3.5 Minimum Requirement).

- **Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) (1968) –** The Americans with Disabilities Act and the Architectural Barriers Act guide construction and alterations of public facilities. Specifically, the Architectural Barriers Act provides regulations for federally financed facilities, including trails. The Access Board requires that federal facilities are accessible where reasonable and practicable. In trail construction, managers are to maximize all opportunities to construct new trails or make upgrades to trails compliant with accessible guidelines. The Access Board also recognizes situations where landscape, environment, or cultural resources limit the feasibility of constructing and accessible trail.

  Routine maintenance of trails is also exempt from the ABA's technical provisions such that tasks such as brushing and erosion control can be undertaken without scoping so long as no significant alterations to the trail are undertaken. The Crater Lake Trails Program adheres to ABA requirements to the extent possible as permitted by the rugged and remote terrain of Crater Lake National Park.

- **Other Legal Considerations –** Other federal and state laws impact CRLA trail logistics, placement, and access. NPS *Management Policies 2006*, The Organic Act, and Crater Lake-specific policies impact the Crater Lake Trails Program. Particularly when considering any trail activity in parts of the park adjacent to lands managed by other entities, consideration must be given to rights-of-way, easements, private property, wetlands impact, etc. The Crater Lake Trails Program considers these implications and coordinates with other park work groups, agencies, and governing bodies to ensure compliance.

SECTION 2. TRAIL CLASSIFICATION SYSTEM

Crater Lake National hiking trail system can be divided into five distinct classes based on user type, need for access, and terrain; this system is based on the 2011 Federal Trail Data Standards, National Trail Management Classes. Class 5 trails are the most developed and provide access to the most important visitor facilities. Class 1 trails are trails/roads that have been abandoned by the park but are still used on a limited basis (i.e., by fire crews or natural resource staff for ease of travel in the backcountry). Table E-1 highlights the differences between the constructed features of the given trail classes.

For the purposes of this document, the designed construction standards and/or condition descriptions of the distinct trail classes will determine the extent to which improvements will be made during routine maintenance and repair.

Trail Classes are general categories reflecting trail development scale, arranged along a continuum. The Trail Class identified for a trail prescribes its development scale, representing its intended design and management standards. Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, or other factors, provided that the deviations do not undermine the general intent of the applicable Trail Class" (Federal Trail Data Standards (FTDS) Version 1, 10/16/2008).

Table E-1. National Trail Management Classes

Trail Attributes	Trail Class 1 Primitive / Undeveloped	Trail Class 2 Simple/Minor Development	Trail Class 3 Developed / Improved	Trail Class 4 Highly Developed	Trail Class 5 Fully Developed
Tread and Traffic Flow	Tread intermittent and indistinct. May require route finding. Native materials only. (User-created trail or social trails)	Tread discernible and continuous, but narrow and rough. Constructed tread 18"-36" of native materials. (Maintained trails utilizing abandoned fire roads)	Tread obvious and continuous. Constructed tread 24"-48" of native materials. Width accommodatesunhindered, one-lane travel.	Tread wide and relatively smooth with few irragularities. Constructed tread 36"-72" of native and/or imported materials. ADA guidelines where applicable.	Constructed tread at least 60" wide of a hardened surface such as asphalt. Designed to meet ADA guidelines.
Obstacles	Obstacles common. Downed trees and vegetation NOT cleared from trail corridor.	Obstacles occasionally present. Downed trees and vegetation cleared from trail corridor infrequently.	Obstacles infrequent. Vegetation cleared from trail corridor.	No protrusions higher than 2" and no gaps wider than 1/2". Grades typically <10%. Vegetation cleared from trail corridor.	No protrusions higher than 2" and no gaps wider than 1/2". Grades typically <5%. Vegetation cleared from trail corridor.
Constructed Features	No constructed features.	Structures protect trail infrastructure and resources. Drainage is functional. Primitive foot crossings or fords.	Trail structures may be common and substantial. Trail bridges as needed for resource protection and appropriate access. Generally native materials in Wilderness.	Structures frequent and substantial. Substantial bridges are appropriate at water crossings. Trailside amenities may be present.	Structures frequent and substantial. Substantial bridges are appropriate at water crossings. Trailside amenities may be present.
Signs	None.	Signs for basic direction.	Regulations, resource protection, and user reassurance. Directional signs at junctions. Mileages listed at trailheads for frontcountry trails only.	Wide variety of directional, regulatory, and interpretive signs. Mileages listed at trailheads.	Wide variety of directional, regulatory, and interpretive signs. Mileages listed at trailheads.

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Crater Lake National Park Trail Design Standards

The following are design standards and/or condition descriptions for the five distinct trail classes.

Class 5 Trails. Visitor facility areas: Rim Village promenade, Sinnott Memorial (Victor Rock) walkway, Watchman Corrals, and other paved sidewalks.

Class 5 Standards. Class 5 trails are designed to provide universal access between the Parks most highly used visitor facilities. Trails and trail features are designed to comply with the *Architectural Barriers Act Accessibility Standards* published by the United States Access Board.

Tread is paved asphalt or other hardened surface, at least 60" wide with gravel shoulders. Trail is built using turnpike or bench cut construction, and grades are 5% or less. Outslope on the trail is 2% or less. Trail tread is elevated through wet areas; ditches and culverts are used to provide the necessary trail drainage. Fabric underlayment and well-drained, sub-grade materials are used to mitigate poor soil types.

Bridge structures are constructed of engineered steel or fiberglass materials for stingers and milled cedar planks for the decking and railings painted CRLA brown. Handrails are made using stone and mortar bases with rot-resistant rails painted CRLA brown. Benches are built of stone and mortar bases with milled cedar seat and backrest. Retaining walls and other constructed features are built to match the historic architecture of the park. All stone and mortar work is to fallow guidelines laid out in the *Preservation Guide For Stone Masonry and Dry-Laid Resources* manual. Fill slopes and retainers are revegetated using appropriate site-specific, native genotypes and evidence of constructed and imported features is hidden.

The trail corridor is cleared of all vegetation 8' high, as well as 2' beyond the width of the trail tread. Trees more than 6 inches in diameter located on the edge of the trail are limbed, not removed, to provide clearance, so long as no more than half the total height of the tree is cleared of limbs. The park botanist will be consulted prior to any action being taken when any sensitive or nonnative plants are present in the trail corridor.

Trail maps and information, as well as regulatory information, are posted at all trail heads. Trailheads are signed in both directions on the road 500 feet before the parking area. Trail junctions have signs indicating directions to other trails and facilities and include mileages. All sign design and installation is in accordance with the *Crater Lake National Park Trail Signs Plan* and match the historic architecture of the park.

Class 4 Trails. Frontcountry trails: Cleetwood Cove Trail, Godfrey Glen Nature Trail, Pinnacles Trail, Plaikni Falls Trail, and Sun Notch Trail.

Class 4 Standards. Class 4 trails enable visitors universal access to recreational hiking in the natural environment, and connect important visitor facilities in the park's frontcountry. Trails are designed to comply with the *Architectural Barriers Act Accessibility Standards*.

Tread is 36"—72" wide, built using full bench cut construction. Where the tread width is less than 60" for long sections, passing spaces (minimum 60"x 60") are provided at a minimum of every 200'. Running slope on Class 4 trails is 5% or less, although steeper sections exist over shorter runs: 8% for up to 200', 10% for 30', and 12.5% for 10'. Crowned or outsloped tread surface is maintained up to 2%; 15% grade and 5% cross slope are allowed for runs up to 5' to allow for proper drainage. Trail

tread is elevated through wet areas, and ditches and culverts are used to provide the necessary trail drainage and mitigate dewatering the native vegetation. Retaining walls and crib walls are used to stabilize tread.

No checks or steps are present that create barriers in the hiking surface. Retaining structures—rock, log, gabion or other design—may be used to reduce the trail running grade, support the edge of the trail, and to support switchbacks. Bridge structures are constructed of engineered steel or fiberglass materials for stingers and milled cedar planks for the decking and railings painted CRLA brown. Handrails are made using stone and mortar bases with rot-resistant rails painted CRLA brown. Benches are built of stone and mortar bases with milled cedar seat and backrest. Retaining walls and other constructed features are built to match the historic architecture of the park. All stone and mortar work is to follow guidelines laid out in the *Preservation Guide For Stone Masonry and Dry-Laid Resources* manual. Fill slopes and retainers are revegetated using appropriate site-specific, native genotypes and evidence of constructed and imported features is hidden. Social trails causing resource damage are covered with loose forest litter such as branches, rocks, and needles.

The trail corridor is cleared of all vegetation 8' high, as well as 2' beyond the width of the trail tread. Trees more than 6 inches in diameter located on the edge of the trail are limbed, not removed, to provide clearance, so long as no more than half the total height of the tree is cleared of limbs. The park botanist will be consulted prior to any action being taken when any sensitive or nonnative plants are present in the trail corridor.

Trail maps and information, as well as regulatory information, are posted at all trail heads. Trailheads are signed in both directions on the road 500 feet before the parking area. Trail junctions have signs indicating directions to other trails and facilities and include mileages. All sign design and installation is in accordance with the *Crater Lake National Park Trail Signs Plan* and match the historic architecture of the park.

Class 3 Trails. Frontcountry and backcountry trails: Annie Creek Canyon Trail, Annie Spring Trail, Bert Creek Trail, Boundary Springs Trail, Bybee Horse Camp Trail, Castle Crest Wildflower Trail, Crater Peak Trail, Discovery Point Trail, Dutton Creek Trail, Fumarole Bay Trail, Garfield Peak Trail, Lady of the Woods Trail, Mount Scott Trail, Pacific Crest National Scenic Trail, Rim Trail, Stuart Falls Trail, Union Peak Trail, Watchman Lookout Trail, and Wizard Island Trail.

Class 3 Standards. Class 3 trails provide recreational hiking opportunities in the frontcountry, accessing scenic views and destinations. Class 3 trails also provide for backcountry recreational hiking and stock use.

These trails are generally built with native tread 24"—48" wide, and roots are removed from tread surface. Running slope on class 3 trails is 12% or less when possible to maximize the accessibility of the trail and provide the most sustainable hiking surface. Steeper sections of trail exist when the natural environment or destination requires it.

Trail construction is full bench construction along curvilinear alignment, with grade reversals and out-sloping tread providing cross-slope drainage. Across flat, wet ground and poor soils, turnpike construction is underlain with engineering fabric and filled with native crush and gravel (fabric is not used in the park's recommended wilderness areas). Turnpike may be unbound, rock, gabion, or log bound. Ditching, culverts, and open rock culverts are installed as needed to provide drainage and mitigate dewatering the native vegetation.

Frontcountry bridges are constructed of fiberglass or steel stringers with an outer log façade with 4" x 36" milled cedar decking and 4x4 bull rails. Backcountry water crossings will be fords or footlog style bridges utilizing native materials.

Frontcountry (no stock) trail corridors are cleared of all vegetation 8' high, as well as 1' beyond the width of the trail tread. Trees more than 6 inches in diameter located on the edge of the trail are limbed, not removed, to provide clearance, so long as no more than half the total height of the tree is cleared of limbs. The park botanist will be consulted prior to any action being taken when any sensitive or nonnative plants are present in the trail corridor. Fill slopes and retaining structures are covered with vegetation and evidence of constructed and imported features is hidden when possible. Social trails causing resource damage are covered with loose forest litter such as branches, rocks, and needles.

Backcountry (no stock) trail corridors are cleared of all vegetation 8' high, as well as 1' beyond the width of the trail tread. Trees more than 6 inches in diameter located on the edge of the trail are limbed, not removed, to provide clearance, so long as no more than half the total height of the tree is cleared of limbs. The park botanist will be consulted prior to any action being taken when any sensitive or nonnative plants are present in the trail corridor. Backcountry (stock) trail corridors are cleared of all vegetation 10' high, as well as 2' beyond the width of the trail tread. Large-diameter trees located on the edge of the trail are limbed, not removed, to provide clearance, so long as no more than half the total height of the tree is cleared of limbs.

Trail maps and information, as well as regulatory information, are posted at all trailheads. Trailheads are signed in both directions on the road 500 feet before the parking area. Trail junctions have signs indicating directions to other trails and facilities but may not include mileages. All sign design and installation is in accordance with the *Crater Lake National Park Trail Signs Plan* and match the historic architecture of the park.

Class 2 Trails. Backcountry trails utilizing abandoned fire roads: Bald Crater Loop Trail, Lightning Springs Trail, and Pumice Flat Trail.

Class 2 Standards. Class 2 trails utilize abandoned fire roads as a trail tread. These trails are connector trails to access the Pacific Crest Trail and other backcountry destinations. Tread is usually wider than trail standards and in-sloped, creating an unsustainable surface. Road structures such as culverts may be present along the routes and are maintained only to protect the trail tread. Vegetation and trees are not cleared to normal standards to allow the corridor to shrink to normal trail standards. Where possible, trail tread will be reduced by removing excess tread surface area. Drainage structures such as water bars and check bars are abundant to attempt to control water erosion and for resource protection.

Trail maps and information, as well as regulatory information, are posted at all trail heads, but directional signage along the trails is minimized. All sign design and installation is in accordance with the *Crater Lake National Park Trail Signs Plan*.

Class 1 Trails. Abandoned trails or roads used only to access backcountry areas with ease. These trails/roads have not been rehabilitated to return then to a natural state, rather have been allowed to regrow naturally. Fire crews and Resource staff use these trails/roads for ease of access.

Class 1 Standards. Class 1 trails are abandoned trails or roads that provide visitors/staff access to backcountry areas or features in the park that are not publicized. These trails may require route finding. No formal construction or maintenance occurs on Class 1 trails. Constructed features are not maintained but may be removed if necessary and signage removed if present.

Trails in Recommended Wilderness. The following established trails pass through the proposed Crater Lake National Park wilderness and are maintained with non-mechanized tools:

- Pacific Crest National Scenic Trail
- Boundary Springs Trail
- Bald Crater Loop Trail
- Bert Creek Trail
- Bybee Horse Camp Trail
- Crater Peak Trail
- Dutton Creek Trail
- Lightning Springs Trail
- Mount Scott Trail
- Pumice Flat Trail
- Stuart Falls Trail
- Union Peak Trail

A Minimum Requirement Analysis is required for all trail work using mechanized equipment on wilderness trails.

An accompanying programmatic Minimum Requirement Analysis may be completed to streamline compliance for routine maintenance on wilderness trails including maintaining drains, repairing tread surface, brushing and clearing downed trees with hand tools and/or use of a grip hoist pulley machine, and use of hand tools and/or pulley systems for bridge repair and maintenance. Chainsaws are not used in these zones; crosscuts saws are the preferred and recommended tool for tree bucking and felling.

A separate Minimum Requirement Analysis is required for routine maintenance work on recommended wilderness trails that require the use of chainsaws, helicopter material flights, and importing of tread material. This type of work is outside the scope of these SOPs.

SECTION 3. MAINTENANCE PROCEDURES

SECTION 3.1 BRUSHING

All brushing activities will comply with the NPS *Guide to Sustainable Mountain Trails* (2007) and the USFS *Trail Construction and Maintenance Notebook* (2007).

3.1.1 Corridor Clearing

Brush, branches, and downed trees may interfere with pedestrian traffic and limit hikers' visibility of one another and wildlife. All trees and brush more than 12" above ground would be cut to a 2- to 4-inch stump from within 4' of the centerline of the trail tread (figure D-1). All brush greater than 6 inches tall will be cut to a 2- to 4-inch stump within 1' of the trail tread. Trees would be cut low to the ground with hand saws, chainsaws, or crosscut saws. Brush would be removed with loppers or handsaws. Special consideration will be given to visitor viewshed and aesthetic; tree and brush removal will be done selectively to maintain a natural characteristic and prevent the creation of a linear brush line. No ground soil is disturbed in this process.

Limbs that must be removed from trees would be cut flush with the trunk, leaving no stubs, and shall be undercut to prevent tearing of the bark. Trees that are limbed over 50% of their height should be removed completely. Trees with a diameter of 6 inches or less will be removed from the trail corridor (4 feet from centerline of the trail tread).

The park botanist will be consulted prior to any action being taken on sensitive species (see section 4 for a list) or in areas of invasive plants.

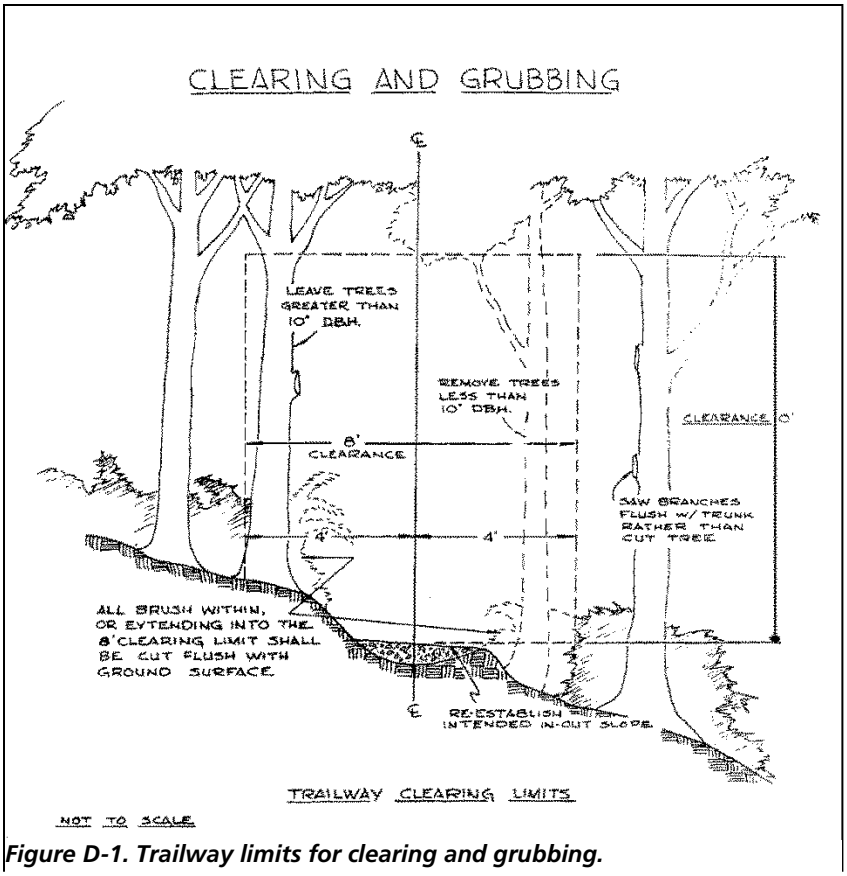

Figure D-1. Trailway limits for clearing and grubbing.

3.1.2 Backslope Clearing

The backslope of bench cut trail will be cleared of all brush that interferes with the flow of traffic. On trails 24" wide or narrower, the backslope may be cleared to mineral soil to prevent overgrowth and lengthen the maintenance cycle. In areas where the surface vegetation is creeping down the backslope or into the tread, the vegetation will be cut off the backslope and dispersed or used for covering social trails.

3.1.3 Tread Encroachment

Vegetation and root matter that creeps into the trail tread will be removed. Vegetated berms on the downslope of the trail will be grubbed and removed with hand tools. Organic matter will be separated from the tread material and removed before the tread is reshaped and compacted.

3.1.4 Downed and Leaning Tree Removal

Trees that have fallen on backcountry trails and are blocking pedestrian traffic shall be removed once per season. Trees are bucked out of the trail corridor 4 feet from the centerline of the trail and 10 feet overhead. Backcountry trails are only cleared with handsaws and crosscut saws. Trees fallen on high use frontcountry trails will be removed immediately by the trail crew. Trees are bucked out of the trail corridor 3 feet from centerline of the trail or 1 ½ feet from the trail edge on wider trails and 8 feet above the trail. Leaning or fallen trees blocking an 8'-10' trail height corridor will be removed or trimmed to provide clearance. Special consideration will be given to the use of hand tools in wilderness areas.

Those trees showing visible signs of deterioration, damage (i.e., splits, uplifted roots, excessive leaning), may be considered for removal. Prior to felling any tree impeding or threatening a trail or facility, the trails supervisor will consult with the Terrestrial Division staff regarding compliance.

3.1.5 Slash Dispersal

Slash collected during felling, limbing, and brush cutting operations is either back hauled or dispersed out of sight of the trail. Backhauled vegetation that is free of dirt and roots is taken to the Pole Creek Maintenance Yard for disposal in the wood pile. Slash may be hand carried, wheelbarrowed, or machine hauled to the trailhead and trucked to the brush piles.

Slash collected in areas that are not feasible for backhauling because of the distance from the trailhead is dispersed out of sight of the trail and scattered to reduce piling and disturbance to vegetation and wildlife.

SECTION 3.2 TREAD MAINTENANCE

This section governs the methods of tread repair and maintenance; material grading and replacement, preparation of native soil and imported sub-grades, importation of aggregates, and compaction. All tread maintenance activities will comply with the NPS *Guide to Sustainable Mountain Trails* (2007) and the USFS *Trail Construction and Maintenance Notebook* (2007).

3.2.1 Tread Surface

The goal of surface maintenance, replenishment, and compaction is to provide the park's trails with a firm, tractionable, and maintainable surface free from washouts, puddling, loose gravel accumulation or any deviation in grade or outslope beyond the trail design standards.

Tread material in backcountry and frontcountry settings is primarily native soil. Regrading the existing tread surface to design standards for outslope and tread width will minimize the need to

import new tread material. Durable tread material will be imported from maintenance pits located inside the park and approved be the park botanist prior to use. Trailside barrow pits will not be used on frontcountry trails. For backcountry barrow pits, only uprooted large tree wells will be used.

Surface material used on CRLA trails is typically either native material or fine crush gravel from the Anderson Pit. Materials removed from the Anderson Pit will be approved by the park botanist prior to use. The application of surface materials provides the walking surface for the trail and is approximately 2" thick. Native tread occurs in situ, comes from nearby construction of backslope or comes from maintenance pits. Imported tread material is delivered using gravel bags, power or manual wheelbarrows, or some combination of these vessels.

Maintenance to tread materials involves the raking and reshaping of existing materials and/or the importation of new volumes. The combination of use, settling, and erosion requires improvements to tread periodically on most trails. Maintaining trail tread ensures longevity and safety of the trail. Trail tread is to be shaped for appropriate sheet flow and drainage, including outslope, in slope (into ditches), and crowning (figure D-2).

3.2.2 Base/Subgrade Materials

Whenever possible, native materials at the site of the trail construction or repair will be used as the trail's base. Ideally, these materials are free of clays, organic matter, excessive moisture, or other structurally unsound material. The depth of base materials will vary significantly by location but is ideally no less than 2" thick. Also, when needed, gravel (1" minus or similar) may be imported (using the same tools and techniques for import of tread material) to establish a sounder base in areas with moist and unstable soils. Gravel acquisition sites and policies are addressed in Section 3.2.1.

Crushed aggregates, native rock, will be added to the subsurface layers of the trail to compensate for material lost because of erosion and subsidence.

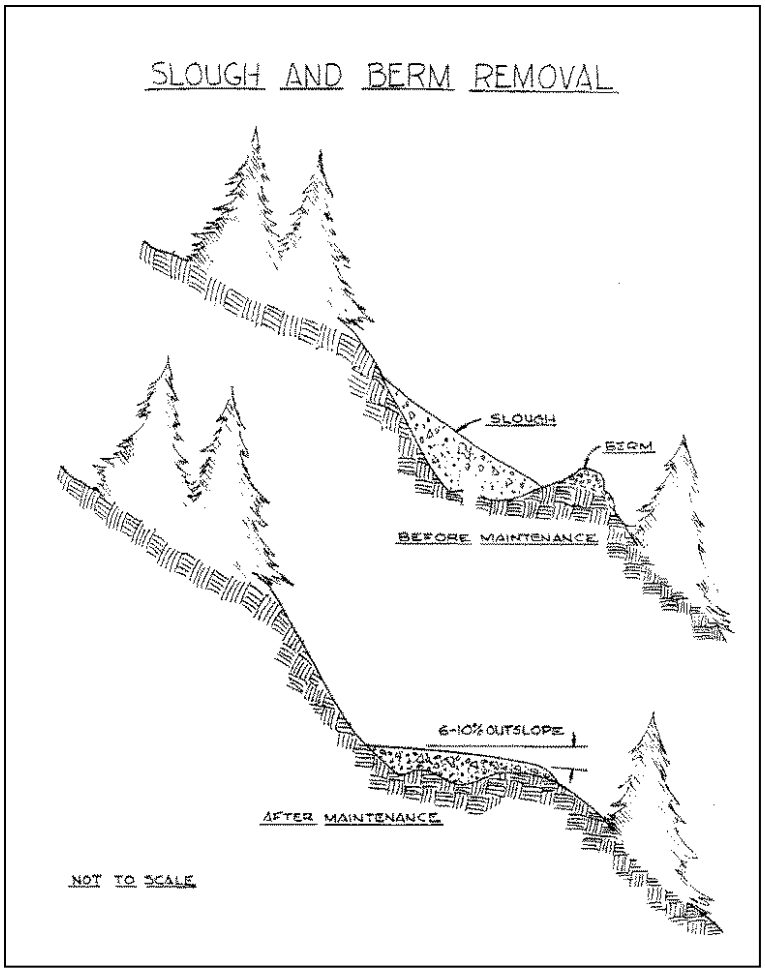

Figure D-2. Slough and berm removal to maintain outslope.

3.2.3 Surface Preparation

Scarifying or rough grading to the lower depth of surface irregularities will be done across the entire travel surface width in the area to be worked. Excess subgrade material exposed in the rough grading process will be redistributed along the trail or transported and stockpiled for future trail projects.

In areas where removal and stockpiling of subsurface material is not feasible, the material will be sidecast or dispersed. All cast soil should be spread evenly with careful consideration given to its final location, so as not to bury and/or cover vegetation growing along the trail corridor. Proper disposal minimizes the visual impacts to visitors and disturbance to the natural environment. No materials will be cast or dispersed into riparian areas.

This work will be done with power wheelbarrow equipment on Class 4 and Class 5 trails built to withstand such traffic. Hand picks and grubbing tools will be used as needed on all other trails. Trail width shall conform to the trail design standard.

3.2.4 Compacting

Mechanical compaction is only done on frontcountry trails and is achieved using a vibratory plate compactor. Hand-held plate compactors will be used when mechanical compaction is not possible. Whenever possible the moisture content will be brought to optimum levels by the addition of water or by the drying of existing material. Water may be added to stockpiles or directly to the surface material if waiting for rain is neither feasible nor prudent.

Water for compaction and revegetation shall be obtained from park spigots for frontcountry work and ample flowing streams for backcountry work. When water shortages and conservation practices are in effect, water use on trails will not take place.

3.2.5 Slope Maintenance

All slopes adjoining trails or on which trails sit collect and direct water flow. All slopes function best and avoid collapse if built to no more than a 45% slope. Backslopes and trail tread slope will be designed to adequately handle foreseeable water volumes within that specific area. Backslopes will be maintained to allow for unrestricted drainage to an established drainage structure or by outsloping the trail tread to achieve sheet flow over the trail. This will include yearly periodic grading, shaping, and clearing to maintain a smoothly uniform drainage system that is free from obstruction, ponding, or areas of settlement. Backslopes and downslopes shall, with rare exception, be comprised of local, native material. Fill slopes may be native material or imported gravel based on trail class and location.

Additionally, effective delineation of the downslope is important to keep hikers on the actual trail and to prevent the perception that one is to walk where the downslope begins. Reshaping downslope sections and fill slopes may be periodically necessary to clarify the proper trail tread location.

SECTION 3.3 TRAIL STRUCTURE MAINTENANCE

The goal of structural trail maintenance and repair is to provide the park's trails with safe and maintainable hiking surfaces, while at the same time protecting natural resource. Trail Design Standards and Trail Management Objectives (TMOs) determine the user type, use level, and construction techniques are needed to bear the intended use. (Appendix F of this trails management plan includes TMOs for existing trails in the CRLA trail system.)

Maintenance or repair activities that address these elements are as follows: surface and base materials, engineered cloths and hardening structures; subsurface drainage (e.g., use of crush), downslopes and stabilization structures including crib walls, gabions, turnpikes, etc. Surface materials and maintenance are addressed in Section 3.2 of this document.

Drainage structures including drains, ditches, culverts, etc., are another integral part of trail structure. Common drainage structures found on CRLA trails and maintenance of these structures is covered in Section 3.4 of this document.

All trail structure maintenance activities will comply with the NPS *Guide to Sustainable Mountain Trails* (2007) and the USFS *Trail Construction and Maintenance Notebook* (2007).

3.3.1 Turnpikes and Causeways

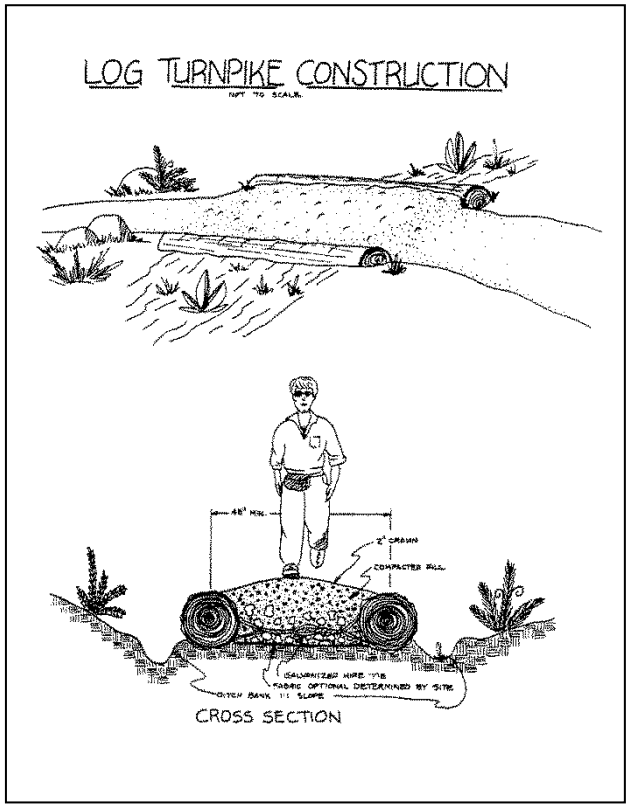

Figure D-3. Log turnpike construction.

Turnpikes and causeways elevate the trail above the surrounding landscape, often serving to keep the tread drier than the surrounding terrain (figure D-3). Turnpikes, in particular, are bound by logs or stones and may employ the use of lateral ditches and cross drains. Original construction of bound turnpikes may require transport of materials using either human-power or machinery depending on the trail class. Hardware such as rebar or spikes may also be used in the construction of these structures. Upkeep of turnpikes and causeways may occasionally require complete replacement as rocks and logs disconnect from the structure through either erosion or rotting. Basic maintenance includes removal of organic material and soil from wooden surfaces, replacing hardware protruding from the structure, and reshaping the tread surface and approaches. Work under this document only pertains to existing structures. Areas needing turnpikes or causeways would be a separate project with specific compliance.

3.3.2 Retaining Walls

Retaining walls can be built using a variety of different techniques and materials and are used to keep materials in place that might otherwise quickly erode (e.g., downslope areas with sandy soils). Whenever possible, less obtuse solutions for effective trail construction should be employed and more significant construction of these types of structures should be used whenever conditions demand or Trail Class absolutely require such structures.

Crater Lake trails use log crib walls and rock retaining walls (mortared and dry masonry) in a variety of locations throughout the park. Generally, these structures are to be built durably using adequately sized materials (e.g., seasoned logs measuring greater than 8”). Retaining structures are also to be built such that they are not a focal point, but rather blend in to the landscape as much as possible. Local materials should be used whenever possible; however, no live trees will be harvested.

On the Cleetwood Cove Trail, the current treated wood cribbing will be replaced with rot-resistant wood cribbing on the downhill side of the trail and dry-stack stone retaining walls on the uphill side of the trail. The wood cribbing has proven to be a viable and long-term solution for erosion on steeper sections of this trail.

Maintenance of retaining wall structures includes replacing loose or rotten materials, restoring the fill material behind the wall, and checking for erosion under the wall. Rock structures that have become loose and wobbly should be dismantled and rebuilt using the same materials if possible (figure D-4).

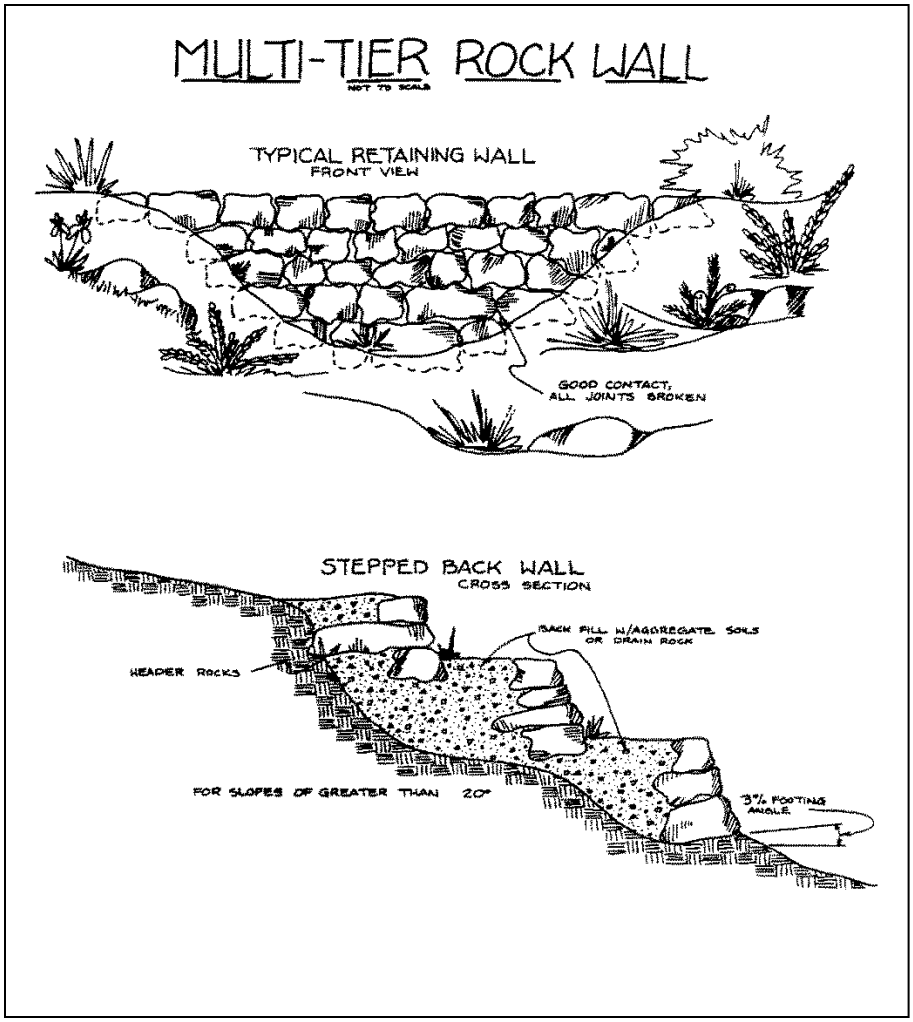

Figure 4. Multi-tier rock wall

3.3.3 Bridges

The goal of bridge maintenance and repair is to provide the traveling public with safe and adequately maintained bridges. This Trails SOP only applies to trail bridges currently being used by the park; any replacement of a bridge will require additional compliance.

Repair needs shall be identified during annual condition assessment inspections and repairs made on a scheduled or as-needed basis. All components of the bridge, including approaches, abutments, stringers, decking, hardware, towers, and railings will be inspected for functionality. Rotten materials will be noted, assessed, and replaced as needed.

The park's trail bridges are designed to bear the appropriate visitor traffic and snow load. Accordingly, any repair shall not reduce the bearing capacity of the structure. Park engineers will be consulted as needed to determine if changes may impact the load-bearing capacity of the structure.

Abutments and pilings may be protected as needed to prevent stream erosion occurring alongside the bridge structure. Rock will not be gathered from within the streams. Work will not change the stream flow or create new channels.

Wood components of the bridges will be treated with wood preservative (i.e., linseed oil) or paint on frontcountry bridges and left natural on backcountry bridges. Sill logs will be replaced when rot has

significantly reduced the structural integrity. Sills that have been eroded may be elevated or stabilized with rock, gravel, or replacement sills. Rotten decking will be replaced as needed, and hazards will be removed. Log handrails and bull rails will be reinforced or reattached with new hardware as needed, and they will be replaced when they are no longer functional.

SECTION 3.4 TRAIL DRAINAGE MAINTENANCE

This section governs the methods of repair, installation and maintenance of drainage systems and their components. The goal of drainage system repair and maintenance, including installation of components such as water bars, is to provide trails with management of water flow type, volumes, and rates affecting CRLA trails.

Routine maintenance shall occur annually to prevent build-up of sediments, debris, and encroaching vegetation as well as to provide site-specific structural inspections. Additionally, maintenance of failing structures must be undertaken as needed. Native rock or wood is used for these structures and is gathered locally; no live trees are used.

3.4.1 Open Drains, Grade Dips, and Swales

Interruptions to the prevailing grade of the trail tread permits fall-line bound water to exit the trail surface. Simple open drains are shallow trenches, 6-12 inches deep, placed in the tread perpendicular to (or near-perpendicular to) the tread, which permit the water to depart the trail. Grade dip structures "reverse" the prevailing grade of the trail, temporarily halting the flow of water and directing the water off the tread and should be a part of initial construction. At times, drains and dips may require hardening, including the installation of native material such as crush, rip rap, or large stones (figure D-5). Drains and grade dips may require periodic cleaning, tread work, and reshaping using hand tools.

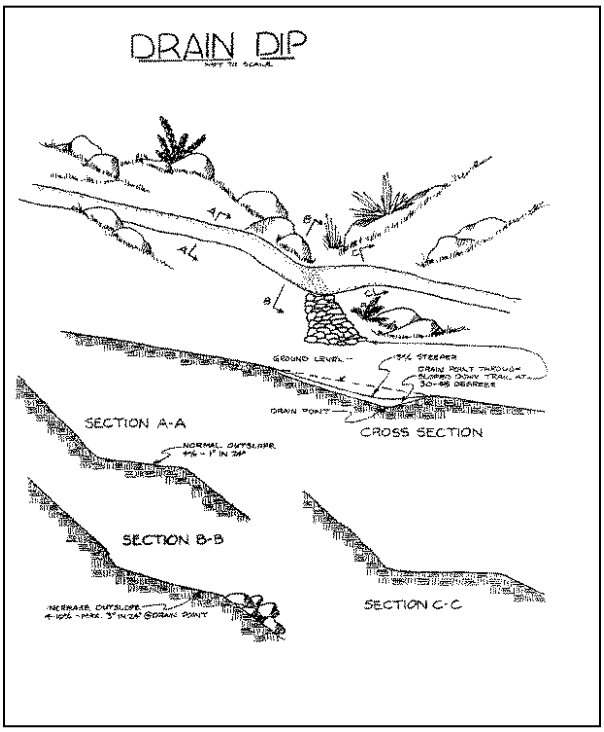

Figure D-5. Drain Dip

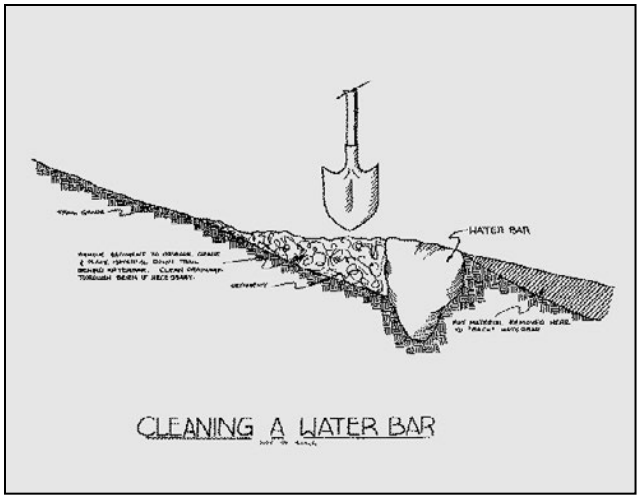

Figure D-6. Cleaning a Water Bar

3.4.2 Water Bars

Water bars use either rocks or wood to form an "apron" that catches water and directs it off the trail. Water bars tend to require maintenance as tread material erodes around either the wood or rocks out of which the "bar" is constructed. Installing additional material, maintaining the appropriate shape of the drain/apron, and clearing ditches associated with water bars are all parts of routine upkeep (figure D-6).

3.4.3 Ditches

Ditches located alongside trails are used to catch water traveling on either side of the trail in an effort to keep the water from pooling/running on the trail tread. Where a side slope is present, ditches are most often placed on the uphill side of the trail to catch water as it sheds downhill and direct water to established drains or culverts along the trail. Ditching may also be installed to catch water as it sheet flows off the side of a trail built with a 2% outslope or exits a drain. Ditches should be constructed such that they are ample in volume (up to 2' wide and 18" deep). As pertinent, ditches may be hardened with crush or other material and/or revegetated with plants to allow roots to add stability to the ditch's backslope. Ditches require routine maintenance to clear organic and soil debris that sloughs into the ditches periodically. Ditching is rarely used in sustainable trail construction.

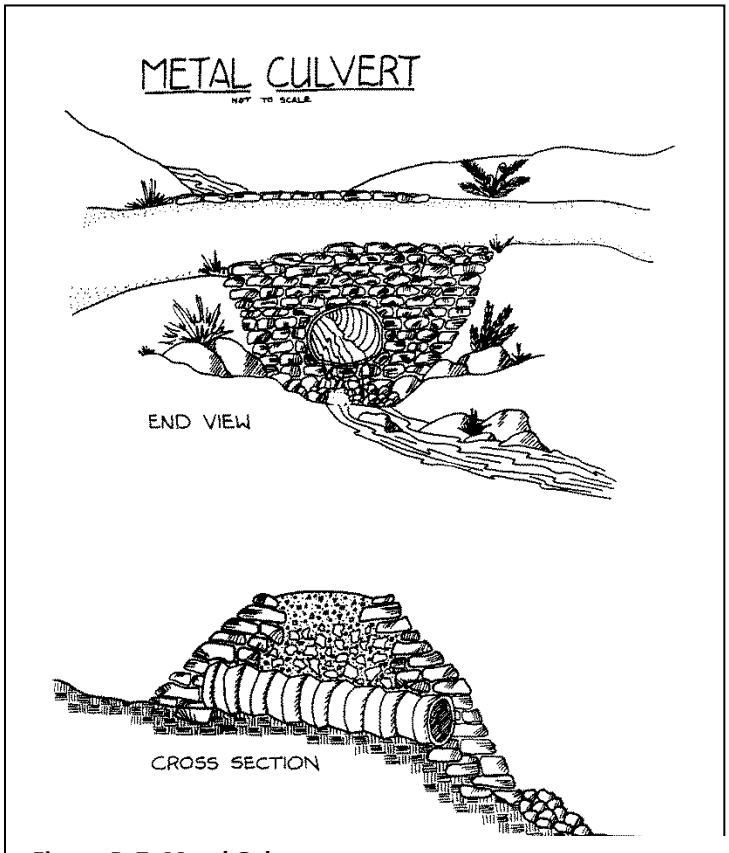

Figure D-7. Metal Culvert

3.4.4 Culverts

Culverts can be open (trail tread is interrupted) or closed (trail travels over culvert relatively uninterrupted) and can be made of metal culvert material, rocks, or wood (figure D-7). All culverts require seasonal cleaning both in and around the entrance and exits to the culverts. Closed culverts

are present primarily on trails that utilize abandoned fire roads. Where possible and sustainable, these culverts will be removed and replaced with a bridge or other suitable structure that does not interfere with the stream flow. This action is outside of the scope of the compliance of this document and is only included for clarification.

SECTION 3.5 TRAIL SIGNAGE MAINTENANCE

This section governs the maintenance and repair of signs and markers at trailheads and along the park's trails. The goal of sign and marker maintenance and repair is to provide the park's visitors with appropriate directional information, maps, as well as safety and regulatory information.

Repair and maintenance to these elements shall be done on a periodic basis to stay accurate and accessible. As the trail system changes, accurate signs will replace outdated ones. Changes will be recorded in the *Crater Lake National Park Trail Signs Plan*.

3.5.1 Signs and Markers

Temporary signs in addition to those in the *Trail Signs Plan*, will meet the following standards: signs shall be made of cedar or redwood and sand blasted with the approved Crater Lake Historic font painted NPS brown with NPS white lettering. Posts shall be untreated 4x4's painted NPS brown and have tops beveled to shed water.

Installation of new signs inside of historic districts requires a separate project specific NEPA review. Replacement of existing signs will be in-kind with no change in appearance.

SECTION 4. RARE AND SENSITIVE PLANT SUMMARY

Selected Rare and Sensitive Plants of Crater Lake National Park

This is a list of selected rare and sensitive plants that one may encounter while conducting trail work throughout the park. The park has additional rare plants that are currently unknown in distribution – many of these are found in wetland/riparian/otherwise wet areas. If park staff are working in a wet area, it is always possible to encounter these additional rare plants (mostly sedges, grasses, etc.).

This is a quick summary of the rare and sensitive plants that may be encountered during work along existing trails:

Common Name	Scientific Name	Notes
Whitebark Pine	*Pinus albicaulis*	Proposed for listing as Threatened under ESA
Crater Lake Rockcress	*Boechera horizontalis*	Federal Species of Concern, State Candidate
Pumice Grape-fern	*Botrychium pumicola*	State listed Threatened
Mt. Mazama Collomia	*Collomia mazama*	Rare
Mt. Shasta Arnica	*Arnica viscosa*	Rare
Shaggy Hawkweed	*Hieracium horridum*	Rare
Western White Pine	*Pinus monticola*	Park Sensitive

Additional information about each of these species follows.

Whitebark Pine

Where found: Elevations above 6500'. Along the Garfield Peak, Mt. Scott, Watchman Lookout, Rim, Crater Peak, and Union Peak Trails. Five-needle pine: pick off a bundle of needles, should contain five needles.

Crater Lake Rockcress

Where found: High elevations around the Rim and in pullouts/roadsides along Rim Drive. Along the Mt. Scott and Garfield Trails; potentially along the Rim Trail. Distinct horizontal (90° from stem) seed pods.

Pumice Grape-fern

Where found: Pumice meadows around the Rim. No known trailside locations. Can be found along roadsides and pullout locations along Rim Drive. Very small and easy to overlook.

Mt. Mazama Collomia

Where found: In meadows and under forest canopy in the west side of the park. Along the PCT, Lightning Springs Trail, Red Blanket Canyon Trail, Dutton Creek Trail, Bert Creek Trail, and possibly the Bald Crater Loop Trail. It is usually shorter than your knee and has blue pollen.

Mt. Shasta Arnica

Where found: Rocky, high elevation areas around Rim Drive including along roadsides and pullouts. Along the Union Peak Trail and possibly the Rim and Fumarole Bay trails. Sticky leaves and stems.

Shaggy Hawkweed

Where found: Along the Mt. Scott, Union Peak, and Crater Peak Trails; possibly the Watchman Lookout and Garfield Peak Trails, too. Found along Rim Drive along rock walls, roadsides, and pullouts. Soft, hairy leaves.

Western White Pine

Where found: Encountered frequently throughout the park. Can be found along the PCT and the Boundary Springs, Cleetwood Cove, Bald Crater Loop, Crater Peak, Plaikni Falls, Annie Creek, Dutton Creek, Bert Creek, Union Peak, Stuart Falls, Pumice Flat Trails. Another five-needle pine.

SECTION 5. REFERENCES FOR THE TRAILS PROGRAM APPENDIX

Americans With Disabilities Act of 1990. Public Law 101-336. 108th Congress, 2nd session (July 26, 1990).

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National Park Service (NPS)
2005 General Management Plan, Crater Lake National Park
2006 NPS *Management Policies 2006*
2007 *Guide to Sustainable Mountain Trails*
2009 Saguaro National Park's 2009 Comprehensive Trails Management Plan
2009 John Day Fossil Beds National Monument's 2009 General Management Plan
2010 "Sign Plan, Crater Lake National Park"
2012 Denali National Park Trails Program: Routine Maintenance, Repair and Operating Standards, September 2012
2012 Merced River Plan
2014 Sequoia and Kings Canyon National Park's 2014 Wilderness Stewardship Plan
2018 Cleetwood Cove Trail Engineering Study
2019 Crater Lake National Park Public Use Stats: https://irma.nps.gov/Stats/FileDownload/310

National Historic Preservation Act (NHPA)
1966 Section 106.

Transportation Research Board, Highway Capacity Manual, Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis.

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1982 Forest Service, *Pacific Crest Trail Comprehensive Plan – Appendix C,* Pacific Crest Trail Conference, January 1982.
2007 USDA, *Trail Construction and Maintenance Handbook,* U.S. Forest Service.

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2012 "Boats, Beaches, and River Banks: Visitor evaluations of Recreation on the Merced River in Yosemite Valley," Final Study Report Contract number P2030100050 OMB Control Number: 1024-0224 Doug Whittaker, Ph.D. and Bo Shelby, Ph.D. Confluence Research and Consulting. July 2012.

The Wilderness Act of 1964, Section 4(C), Minimum Tool Use.

SECTION 6: NATIONAL QUALITY STANDARDS FOR TRAILS

National Quality Standards for Trails

National Quality Standards are national criteria that establish the level of quality in terms of health and cleanliness, resource setting, safety and security, responsiveness, and condition of facilities for National Forest System trails managed at a full-service level.

Apply the National Quality Standards for Trails in planning, constructing, and managing National Forest System trails and related trail projects. (FSH 2353.15)

1. The National Quality Standards for Trails establish desired outcomes for National Forest System trails managed at a full-service level. These standards also form the baseline for estimating the cost of managing NFS trails. The National Quality Standards for Trails consist of five key measures: health and cleanliness, safety and security, condition of facilities, responsiveness, and resource setting.

2. The complete set of National Quality Standards for Trails is contained in FSH 2353.15, exhibit 01.

3. Critical National Quality Standards are identified with an asterisk. If any of these standards is not met, the resulting conditions pose a high probability of immediate and permanent injury to persons or property. If any of the critical standards cannot be met due to budget or other constraints, take action as soon as practicable to correct or mitigate the problem. Corrective or mitigating measures may include closing the trail, portions of the trail, or associated trail structures to public use.

4. Take mitigating steps if conditions, facilities, or services addressed by noncritical standards decline to the point where visitor's health or safety is threatened. Examples include repairing the trail, portions of the trail, or associated trail structure or removing trail structures that are in disrepair and no longer needed.

5. The National Quality Standards for Trails apply to NFS trails and associated trail structures. The National Quality Standards for Trails do not apply to trailheads. Trailheads, which are constructed with the primary purpose of providing visitor amenities, are typically considered developed sites. Trailheads constructed with the primary purpose of resource protection are typically considered concentrated use areas within General Forest Areas.

National Quality Standards for Trails

FSH 2309.18., Section 15

Key Measure: HEALTH AND CLEANLINESS

1. Visitors are not exposed to human waste along trails.
2. The trail and trailside are free of litter.
3. The trail and trailside are free of graffiti.

Key Measure: RESOURCE SETTING

1. *Effects from trail use do not conflict with environmental laws (such as the Endangered Species Act, National Historic Preservation Act, and Clean Water Act).[1]
2. Resource management adjacent to and along the trail corridor is consistent with ROS objectives and desired conditions of adjacent management areas.
3. Trail opportunities, trail development, and trail management are consistent with Recreation Management System (ROS, SMS, and BBM) objectives and the applicable land management plan.
4. The trail, use of the trail, and trail maintenance do not cause unacceptable damage to other resources.
5. Trail use does not exceed established trail capacity.

Key Measure: SAFETY AND SECURITY

1. *Hazards do not exist on or along the trail.[1]
2. Applicable laws, regulations, and special orders are enforced.

Key Measure: RESPONSIVENESS

1. *When a trail is signed as accessible, it meets current agency policy and accessibility guidelines.[1]
2. Information is posted in a clear and professional manner.
3. Visitors are provided opportunities to communicate their expectations for and satisfaction with NFS trails.

Key Measure: CONDITION OF FACILITIES

1. Annual/Routine Maintenance. The trail and its structures are serviceable and in good repair throughout their designed service life.
2. Deferred Maintenance. Trails that are in disrepair due to lack of scheduled maintenance, are in violation of applicable safety codes or other regulatory requirements (such as applicable accessibility guidelines), or are beyond their designed service life are repaired, rehabilitated, replaced, or decommissioned, as appropriate.
3. Capital Improvement. New, altered, or expanded trails meet Forest Service design standards and are consistent with standards and guidelines in the applicable land management plan.

[1] Indicates a Critical National Quality Standard. If it cannot be met, action must be taken as soon as practicable to correct or mitigate the problem. Refer to FSH 2309.18, section 15.

SECTION 7: EXISTING TRAIL SYSTEM AS OF 2020

Existing Trails	Year Built	Road Bed	Stock Allowed	Dogs Allowed	Bicycles Allowed	ABA Accessible	Camping Allowed
Annie Creek Canyon Trail	1963						
Annie Spring Trail	2002			X			
Bald Crater Loop Trail	1981	X	X				Dispersed
Bert Creek Trail	1981		X				Dispersed
Boundary Springs Trail	1972	X					Dispersed
Bybee Horse Camp Trail	1974		X				Backcountry Camp
Castle Crest Wildflower Trail	1940						
Cleetwood Cove Trail	1958						
Crater Peak Trail	1930	X					Dispersed – Limited
Discovery Point Trail	1932						
Dutton Creek Trail	1930						Dispersed – Limited
Fumarole Bay Trail	1934						
Garfield Peak Trail	1931						
Godfrey Glen Trail	1939			X		X	
Lady of the Woods Trail	1930			X			
Lightning Springs Trail	1940	X	X				Dispersed – Limited
Mount Scott Trail	1933						
Pacific Crest National Scenic Trail	1930	X	X	X			Dispersed and BC Camps
Pinnacles Trail	1991	X				X	
Plaikni Falls Trail	2010					X	
Pumice Flat Trail	1930	X					Dispersed – Limited
Rim Trail	1994	X					Backcountry Camp only

Existing Trails	Year Built	Road Bed	Stock Allowed	Dogs Allowed	Bicycles Allowed	ABA Accessible	Camping Allowed
Sinnott Memorial Trail	1931						
Stuart Falls Trail	2004		X				Dispersed
Sun Notch Trail	2012					X	
Union Peak Trail	1930/2003						Dispersed
Watchman Lookout Trail	1932						
Wizard Island Trail	1934						

*The Grayback Nature Trail is not a part of this Trails SOP because it still being used as a road on a limited basis. So, as long as vehicular traffic is allowed, maintenance still falls under the Roads Department.

SECTION 8: TRAIL CLASSES FOR CRATER LAKE TRAILS AS OF 2020

Existing Trails	Trail Class	Frontcountry	Backcountry	Motorized Equipment Use (power wheel barrow, chainsaw, or tractor)
Annie Creek Canyon Trail	3	X		X
Annie Spring Trail	3		X	
Bald Crater Loop Trail	2		X	
Bert Creek Trail	3		X	
Boundary Springs Trail	3		X	
Bybee Horse Camp Trail	3		X	
Castle Crest Wildflower Trail	3	X		X
Cleetwood Cove Trail	4	X		X
Crater Peak Trail	3		X	
Discovery Point Trail	3	X		X
Dutton Creek Trail	3		X	
Fumarole Bay Trail	3	X		X
Garfield Peak Trail	3	X		X
Godfrey Glen Trail	4	X		X
Lady of the Woods Trail	3	X		X
Lightning Springs Trail	2		X	
Mount Scott Trail	3		X	
Pacific Crest National Scenic Trail	3		X	
Pinnacles Trail	4	X		X
Plaikni Falls Trail	4	X		X
Pumice Flat Trail	2		X	
Rim Trail	3	X	X	X
Sinnott Memorial Trail	5	X		X
Stuart Falls Trail	3		X	
Sun Notch Trail	4	X		X
Union Peak Trail	3		X	
Watchman Lookout Trail	3	X		X
Wizard Island Trail	3	X		X

Class 1 Trail: Primitive / Undeveloped
Class 2 Trail: Simple / Minor Development
Class 3 Trail: Developed / Improved
Class 4 Trail: Highly Developed
Class 5 Trail: Fully Developed

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APPENDIX F: TRAIL MANAGEMENT OBJECTIVES FOR EXISTING TRAILS

INTRODUCTION

Trail management objectives (TMOs) are fundamental building blocks for trail management. TMOs synthesize and document the intended purpose and management of a trail and provide basic reference information for subsequent trail planning, management, condition surveys, and reporting. This appendix compiles available TMOs for existing trails in the Crater Lake trails system.

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: **Annie Creek Canyon Trail** | Trail Number: **64245**

Trail Beginning Termini: Behind Mazama Campground Amphitheater | Beg. Milepost: 00+00

Trail Ending Termini: Same | End. Milepost: 88+20

Trail Inventory Length: 1.8 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)		WROS (Wilderness)	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] _____
- [ ] _____
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Annie Creek Canyon Trail **Trail Number:** 64245

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski			
X	Snowshoe			
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with Mazama Campground and Annie Creek Canyon Spur Trail.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Annie Creek Canyon Spur Trail **Trail Number:** 64245-1322872

Trail Beginning Termini: Top of upstream switchbacks near Loop C **Beg. Milepost:** 00+00

Trail Ending Termini: Bridge on Munson Valley Road near Annie Spring **End. Milepost:** 23+30

Trail Inventory Length: 0.44 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)
- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [X] Semi-Primitive Motorized
- [ ] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)
- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)
- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Annie Creek Canyon Spur Trail **Trail Number:** 64245-1322872

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
X	Pets Allowed			
	Accessible			
X	Cross-Country Ski			
X	Snowshoe			
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with Annie Creek Canyon Trail, Annie Spring Trail (connecting to the PCT), and Mazama Campground.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Annie Spring Trail | **Trail Number:** 64246

Trail Beginning Termini: Gravel Turnout at Annie Creek Bridge on Munson Valley Road | **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the Pacific Crest Trail | **End. Milepost:** 39+42

Trail Inventory Length: 0.75 Miles | **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | **Section Beg. Termini:** | **Beg. Milepost:**

Section End. Termini: | **End. Milepost:**

Designed Use Objectives

(Check one)

Trail Type

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] _____
- [ ] _____

- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____

- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Annie Spring Trail **Trail Number:** 64246

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
X	Pets Allowed			
	Accessible			
X	Cross-Country Ski			
X	Snowshoe			
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the Pacific Crest Trail and the Annie Creek Canyon Spur Trail.

Spur trail to spring is historic.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Bald Crater Loop Trail **Trail Number:** 64252

Trail Beginning Termini: Junction with Pacific Crest Trail (south Jct.) **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with Pacific Crest Trail (north Jct.) **End. Milepost:** 719+75

Trail Inventory Length: 13.63 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

(Check one)

Trail Type

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class

- [ ] 1 (Primitive/Undeveloped)
- [X] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)

- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)

- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.25	Tread Repair
0.25	Drainage Cleanout
1	Logging Out
0.25	Brushing
0	Snow Removal
0.25	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Bert Creek Trail **Trail Number:** 64263

Trail Beginning Termini: At end of FS Road 660 **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the Bald Crater Loop Trail **End. Milepost:** 69+20

Trail Inventory Length: 1.31 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [X] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.25	Tread Repair
0.25	Drainage Cleanout
1	Logging Out
0.25	Brushing
0	Snow Removal
0.25	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Bert Creek Trail **Trail Number:** 64263

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*	From Date (mm/dd)	To Date (mm/dd)
X Hiker / Pedestrian	06/01	10/31
X Pack & Saddle	06/01	10/31
Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
Pets Allowed		
Accessible		
Cross-Country Ski		
Snowshoe		
Snowmobile		
Watercraft-NonMotorized		
Watercraft - Motorized		

Prohibited Use

(Check if applicable)	From Date (mm/dd)	To Date (mm/dd)
X All Motorized Use		
(Or, fill in all that apply)		
Hiker / Pedestrian		
Pack & Saddle		
X Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
X Pets		
Cross-Country Ski		
Snowshoe		
X Snowmobile		
X Watercraft - NonMotorized		
X Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*	Accept	Discourage	Eliminate
Hiker / Pedestrian			
Pack & Saddle			
Bicycle			
Motorcycle			
All Terrain Vehicle (ATV)			
4WD Vehicle > 50"			
Pets Allowed			
Accessible			
X Cross-Country Ski	X		
X Snowshoe	X		
Snowmobile			
Watercraft - NonMotorized			
Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- X Shared System (shared with other system road or trail)
- Accessible per Current Agency Guidelines
- X Mechanized Tools or Equipment Prohibited
- X T&E or Sensitive Species Present (Plant / Wildlife)
- Heritage Resource Present
- X Easement across Non-NPS Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the Bald Crater Loop Trail.

Trailhead and half the trail on Rogue River - Siskiyou National Forest.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Boundary Springs Trail **Trail Number:** 64248

Trail Beginning Termini: NPS Boundary on the Boundary Springs Trail **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the Bald Crater Loop Trail **End. Milepost:** 138+43

Trail Inventory Length: 2.62 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

(Check one)

Trail Type

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)

- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)

- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Boundary Springs Trail **Trail Number:** 64248

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- X Shared System (shared with other system road or trail)
- Accessible per Current Agency Guidelines
- X Mechanized Tools or Equipment Prohibited
- X T&E or Sensitive Species Present (Plant / Wildlife)
- Heritage Resource Present
- X Easement across Non-NPS Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the Bald Crater Loop Trail.

Both trailheads are located on Rogue River - Siskiyou National Forest.

Superintendent: Name Craig Ackerman Signature

Title Superintendent Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Bybee Creek Horse Camp Trail **Trail Number:** 64247

Trail Beginning Termini: At junction with Pacific Crest Trail, north of Lightning Springs Tr. Jct. **Beg. Milepost:** 00+00

Trail Ending Termini: End of trail at Bybee Horse Camp **End. Milepost:** 16+68

Trail Inventory Length: 0.32 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)
- [ ] Hiker / Pedestrian
- [X] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.25	Tread Repair
0.25	Drainage Cleanout
1	Logging Out
0.25	Brushing
0	Snow Removal
0.25	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Bybee Creek Horse Camp Trail **Trail Number:** 64247

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
X	Pack & Saddle	06/01	10/31
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
X	Pets Allowed	X		
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- X Shared System (shared with other system road or trail)
- Accessible per Current Agency Guidelines
- X Mechanized Tools or Equipment Prohibited
- T&E or Sensitive Species Present (Plant / Wildlife)
- Heritage Resource Present
- Easement across Non-NPS Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the Pacific Crest Trail.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Castle Crest Wildflower Trail | Trail Number: 64249

Trail Beginning Termini: At trailhead on East Rim Drive, 1 mile from Headquarters | Beg. Milepost: 00+00

Trail Ending Termini: Same | End. Milepost: 22+31

Trail Inventory Length: 0.42 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)		WROS (Wilderness)	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)
- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
3	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
1	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Castle Crest Wildflower Trail **Trail Number:** 64249

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Historic trail

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Castle Crest Wildflower Spur Trail - 52115 **Trail Number:** 64249

Trail Beginning Termini: At trailhead on East Rim Drive, 1 mile from Headquarters **Beg. Milepost:** 00+00

Trail Ending Termini: At crosswalk on Munson Valley Road at Park Headquarters **End. Milepost:** 19+95

Trail Inventory Length: 0.38 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)
- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [X] Semi-Primitive Motorized
- [ ] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)
- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)
- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
3	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
1	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Castle Crest Wildflower Spur Trail **Trail Number:** 64249

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Cleetwood Cove Trail **Trail Number:** 64250

Trail Beginning Termini: East Rim Drive, 5 miles from North Junction **Beg. Milepost:** 00+00

Trail Ending Termini: At restrooms bottom of trail **End. Milepost:** 55+68

Trail Inventory Length: 1.1 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [X] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[X]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

72	Tread Width (inches)
10	Target Grade (%)
15	Short Pitch Maximum (%) (up to 200' lengths)
3	Target Cross-Slope (%)
10	Clearing Width (feet)
10	Clearing Height (feet)
6	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
1	Tread Repair
1	Drainage Cleanout
1	Logging Out
0.33	Brushing
1	Snow Removal
1	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Cleetwood Cove Trail **Trail Number:** 64250

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
	Cross-Country Ski			
X	Snowshoe		X	
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
X	Existing Permit or Agreement (Trail-Specific / Area)
X	Administrative tractor use allowed.

Remarks / Reference Information

Only access to the lake for concession and other park operations.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Crater Peak Trail **Trail Number:** 64251

Trail Beginning Termini: Vidae Falls Picnic Area on East Rim Drive **Beg. Milepost:** 00+00

Trail Ending Termini: Summit of Crater Peak **End. Milepost:** 171+08

Trail Inventory Length: 3.24 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)
- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)
- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)
- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Crater Peak Trail **Trail Number:** 64251

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: **Discovery Point Trail** | Trail Number: **64253**

Trail Beginning Termini: West end of Rim Village Promenade | Beg. Milepost: 00+00

Trail Ending Termini: West Rim Drive at Discovery Point Pullout | End. Milepost: 49+88

Trail Inventory Length: 0.95 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness (ROS)		Wilderness (WROS)	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
6	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.5	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Discovery Point Trail **Trail Number:** 64263

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*	From Date (mm/dd)	To Date (mm/dd)
X Hiker / Pedestrian	06/01	10/31
Pack & Saddle		
Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
Pets Allowed		
Accessible		
Cross-Country Ski		
Snowshoe		
Snowmobile		
Watercraft-NonMotorized		
Watercraft - Motorized		

Prohibited Use

(Check if applicable)	From Date (mm/dd)	To Date (mm/dd)
X All Motorized Use		
(Or, fill in all that apply)		
Hiker / Pedestrian		
X Pack & Saddle		
X Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
X Pets		
Cross-Country Ski		
Snowshoe		
X Snowmobile		
X Watercraft - NonMotorized		
X Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*	Accept	Discourage	Eliminate
Hiker / Pedestrian			
Pack & Saddle			
Bicycle			
Motorcycle			
All Terrain Vehicle (ATV)			
4WD Vehicle > 50"			
Pets Allowed			
Accessible			
X Cross-Country Ski	X		
X Snowshoe	X		
Snowmobile			
Watercraft - NonMotorized			
Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- X Shared System (shared with other system road or trail)
- Accessible per Current Agency Guidelines
- Mechanized Tools or Equipment Prohibited
- X T&E or Sensitive Species Present (Plant / Wildlife)
- X Heritage Resource Present
- Easement across Non-NPS Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Historic trail

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: **Dutton Creek Trail** | Trail Number: **64254**

Trail Beginning Termini: Munson Valley Rd. near Rim Village | Beg. Milepost: 00+00

Trail Ending Termini: Junction with the Pacific Crest National Scenic Trail | End. Milepost: 125+20

Trail Inventory Length: 2.37 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.#: | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Dutton Creek Trail **Trail Number:** 64254

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Trail follows historic wagon road corridor.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Fumarole Bay Trail **Trail Number:** 64255

Trail Beginning Termini: At docks on Wizard Island **Beg. Milepost:** 00+00

Trail Ending Termini: At Fumarole Bay (End of Trail sign) **End. Milepost:** 21+46

Trail Inventory Length: 0.40 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)

- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [X] Semi-Primitive Motorized
- [ ] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)

- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
5	Target Grade (%)
11	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Fumarole Bay Trail **Trail Number:** 64255

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/15	09/30
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
X	Cross-Country Ski		
X	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
	Cross-Country Ski			
	Snowshoe			
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Only way to access Wizard Island is by boat tour.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CLRA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Garfield Peak Trail **Trail Number:** 64257

Trail Beginning Termini: Rim Village (east of the Lodge) at end of paved sidewalk **Beg. Milepost:** 00+00

Trail Ending Termini: Summit of Garfield Peak **End. Milepost:** 81+08

Trail Inventory Length: 1.54 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.5	Tread Repair
0.5	Drainage Cleanout
1	Logging Out
0.5	Brushing
1	Snow Removal
0.5	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Garfield Peak Trail **Trail Number:** 64257

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
	Cross-Country Ski			
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)
X	Water system located along trail (NPS administrative function)

Remarks / Reference Information

Historic Trail

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Godfrey Glen Trail | Trail Number: 64258

Trail Beginning Termini: Munson Valley Road - Godfrey Glen Parking Area | Beg. Milepost: 00+00

Trail Ending Termini: Same | End. Milepost: 58+73

Trail Inventory Length: 1.1 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.#: | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [X] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [X] Accessible (ABA)
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

60	Tread Width (inches)
3	Target Grade (%)
12.5	Short Pitch Maximum (%) (up to 10' lengths)
2	Target Cross-Slope (%)
9	Clearing Width (feet)
8	Clearing Height (feet)
6	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
1	Tread Repair
1	Drainage Cleanout
1	Logging Out
1	Brushing
1	Snow Removal
1	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Godfrey Glen Trail **Trail Number:** 64258

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*	From Date (mm/dd)	To Date (mm/dd)
X Hiker / Pedestrian	06/01	10/31
Pack & Saddle		
Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
Pets Allowed		
X Accessible	06/01	10/31
Cross-Country Ski		
Snowshoe		
Snowmobile		
Watercraft-NonMotorized		
Watercraft - Motorized		

Prohibited Use

(Check if applicable)	From Date (mm/dd)	To Date (mm/dd)
X All Motorized Use		
(Or, fill in all that apply)		
Hiker / Pedestrian		
X Pack & Saddle		
X Bicycle		
Motorcycle		
All Terrain Vehicle (ATV)		
4WD Vehicle > 50"		
Pets		
Cross-Country Ski		
Snowshoe		
X Snowmobile		
X Watercraft - NonMotorized		
X Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*	Accept	Discourage	Eliminate
Hiker / Pedestrian			
Pack & Saddle			
Bicycle			
Motorcycle			
All Terrain Vehicle (ATV)			
4WD Vehicle > 50"			
X Pets Allowed	X		
X Accessible	X		
X Cross-Country Ski	X		
X Snowshoe	X		
Snowmobile			
Watercraft - NonMotorized			
Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- Shared System (shared with other system road or trail)
- X Accessible per Current Agency Guidelines
- Mechanized Tools or Equipment Prohibited
- T&E or Sensitive Species Present (Plant / Wildlife)
- Heritage Resource Present
- Easement across Non-NPS Land (Existing / Needed)
- Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Lady of the Woods Trail | Trail Number: 64259

Trail Beginning Termini: South end of the Steel Information Center | Beg. Milepost: 00+00

Trail Ending Termini: Same | End. Milepost: 35+63

Trail Inventory Length: 0.68 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
	Urban		WROS 1
	Rural		WROS 2
	Roaded Modified		WROS 3
	Roaded Natural		WROS 4
X	Semi-Primitive Motorized		WROS 5
	Semi-Primitive NonMotorized		WROS 6
	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] _____
- [ ] _____
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 10' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
1	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Lady of the Woods Trail **Trail Number:** 64259

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
X	Pets Allowed	X		
X	Accessible		X	
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

- [ ] Shared System (shared with other system road or trail)
- [ ] Accessible per Current Agency Guidelines
- [ ] Mechanized Tools or Equipment Prohibited
- [ ] T&E or Sensitive Species Present (Plant / Wildlife)
- [X] Heritage Resource Present
- [ ] Easement across Non-NPS Land (Existing / Needed)
- [ ] Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Lightning Springs Trail **Trail Number:** 64260

Trail Beginning Termini: West Rim Drive (across from Wizard Island Overlook) **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the Pacific Crest Trail **End. Milepost:** 227+11

Trail Inventory Length: 4.3 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [X] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)

- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)

- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
11	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Lightning Springs Trail **Trail Number:** 64260

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
X	Pack & Saddle	06/01	10/31	
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Open to stock use from PCT to within 1/4 of trailhead at hitchrail.

Shared system with the Pacific Crest Trail.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: **Mount Scott Trail** | Trail Number: **64262**

Trail Beginning Termini: East Rim Drive | Beg. Milepost: 00+00

Trail Ending Termini: At Fire Lookout and summit | End. Milepost: 115+30

Trail Inventory Length: 2.18 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)		WROS (Wilderness)	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
10	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
1	Snow Removal
0.33	Condition Survey
1	Sign install/removal

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NPS - Trail Management Objectives

Trail Name: Mount Scott Trail **Trail Number:** 64262

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)
X	Fire lookout located at summit

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Pacific Crest National Scenic Trail **Trail Number:** 64264

Trail Beginning Termini: South boundary of the Park **Beg. Milepost:** 00+00

Trail Ending Termini: North boundary of the Park **End. Milepost:** 183+976

Trail Inventory Length: 34.85 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# [ ]

Section Beg. Termini: **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS
- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

Wilderness WROS
- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)
- [ ] Hiker / Pedestrian
- [X] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
5	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Pacific Crest National Scenic Trail **Trail Number:** 64264

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
X	Pack & Saddle	06/01	10/31
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
X	Pets Allowed	X		
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)
X	National Scenic Trail designation

Remarks / Reference Information

INCAA done on a rotating basis, one section per year, with section 2 split into two sections at Lightning Springs Jct.

Extends outside of Park boundary.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Pinnacles Trail | Trail Number: 64266

Trail Beginning Termini: End of Pinnacle Road. | Beg. Milepost: 00+00

Trail Ending Termini: At Park boundary and monument sign. | End. Milepost: 20+30

Trail Inventory Length: 0.38 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [X] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] _____
- [ ] _____

- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____

- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

48	Tread Width (inches)
3	Target Grade (%)
12.5	Short Pitch Maximum (%) (up to 10' lengths)
2	Target Cross-Slope (%)
8	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
1	Tread Repair
1	Drainage Cleanout
1	Logging Out
1	Brushing
0	Snow Removal
1	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Pinnacles Trail **Trail Number:** 64266

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
X	Accessible	06/01	10/31
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
X	Bicycle	X		
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
X	Accessible	X		
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
X	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
X	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Connects with Forest Service Trail and trailhead.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Plaikni Falls Trail **Trail Number:** 227970

Trail Beginning Termini: Pinnacles Road, 1.5 miles from East Rim Dr. Jct. **Beg. Milepost:** 00+00

Trail Ending Termini: End of trail at the waterfall. **End. Milepost:** 52+82

Trail Inventory Length: 1 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [X] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [X] Accessible (ABA)
- [ ] _____
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

60	Tread Width (inches)
3	Target Grade (%)
12.5	Short Pitch Maximum (%) (up to 10' lengths)
2	Target Cross-Slope (%)
9	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
1	Tread Repair
1	Drainage Cleanout
1	Logging Out
1	Brushing
1	Snow Removal
1	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Plaikni Falls Trail **Trail Number:** 227970

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
X	Accessible	06/01	10/31
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
X	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Pumice Flat Trail **Trail Number:** 64267

Trail Beginning Termini: Lodgepole Picnic Area **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the Pacific Crest Trail **End. Milepost:** 144+00

Trail Inventory Length: 2.7 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [X] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)
- [ ] Urban
- [ ] Rural
- [ ] Roaded Modified
- [ ] Roaded Natural
- [ ] Semi-Primitive Motorized
- [X] Semi-Primitive NonMotorized
- [ ] Primitive

WROS (Wilderness)
- [ ] WROS 1
- [ ] WROS 2
- [ ] WROS 3
- [ ] WROS 4
- [ ] WROS 5
- [ ] WROS 6

Designed Use

(Check one)
- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [X] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Pumice Flat Trail **Trail Number:** 64267

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the PCT and the Stuart Falls Trail.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Rim Trail (Section 2) - 1323451 **Trail Number:** 64278

Trail Beginning Termini: At the Discovery Point Viewpoint on West Rim Drive. **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the PCT **End. Milepost:** 400+31

Trail Inventory Length: 7.58 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# 2

Section Beg. Termini: At North Junction **Beg. Milepost:** 243+35

Section End. Termini: Junction with the Pacific Crest Trail **End. Milepost:** 400+31

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
N/A	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Rim Trail (Section 2) - 1323451 **Trail Number:** 64278

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the PCT. Also known as the PCT Alternate Route.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Rim Trail (Section 1) - 1323450 **Trail Number:** 64278

Trail Beginning Termini: At the Discovery Point Viewpoint on West Rim Drive. **Beg. Milepost:** 00+00

Trail Ending Termini: Junction with the PCT **End. Milepost:** 400+31

Trail Inventory Length: 7.58 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# 1

Section Beg. Termini: At the Discovery Point Viewpoint on West Rim Drive. **Beg. Milepost:** 00+00

Section End. Termini: At North Junction. **End. Milepost:** 243+35

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ]
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

36	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
7	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Rim Trail (Section 1) - 1323450 **Trail Number:** 64278

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Also known as the PCT Alternate Route

Utilizes West Rim Drive in short sections.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Stuart Falls Trail **Trail Number:** 64279

Trail Beginning Termini: Junction of PCT, 5.5 miles from Hwy 62 Trailhead **Beg. Milepost:** 00+00

Trail Ending Termini: South boundary of the Park **End. Milepost:** 146+02

Trail Inventory Length: 2.77 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[ ]	Semi-Primitive Motorized	[ ]	WROS 5
[X]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)
- [ ] Hiker / Pedestrian
- [X] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
8	Clearing Width (feet)
10	Clearing Height (feet)
8	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Stuart Falls Trail **Trail Number:** 64279

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
X	Pack & Saddle	06/01	10/31
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Shared system with the Pacific Crest Trail and continues on as a Forest Service trail (Red Blanket Trail).

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: **Sun Notch Trail** | Trail Number: **64280**

Trail Beginning Termini: East Rim Drive | Beg. Milepost: 00+00

Trail Ending Termini: Same | End. Milepost: 34+20

Trail Inventory Length: 0.65 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [ ] 3 (Developed/Improved)
- [X] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [ ] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [X] Accessiblity (ABA)
- [ ] _____
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

48	Tread Width (inches)
3	Target Grade (%)
12.5	Short Pitch Maximum (%) (up to 10' lengths)
2	Target Cross-Slope (%)
8	Clearing Width (feet)
8	Clearing Height (feet)
6	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
1	Tread Repair
1	Drainage Cleanout
1	Logging Out
1	Brushing
1	Snow Removal
1	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Sun Notch Trail **Trail Number:** 64280

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
X	Accessible	06/01	10/31
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
X	Cross-Country Ski	X		
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

	Shared System (shared with other system road or trail)
X	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR | Park: Crater Lake National Park | Division: Maintenance

Trail Name: Watchman Lookout Trail | Trail Number: 64282

Trail Beginning Termini: West Rim Drive at the Watchman Corrals | Beg. Milepost: 00+00

Trail Ending Termini: Fire Lookout and summit | End. Milepost: 43+63

Trail Inventory Length: 0.83 Miles | Trail Mileage Source: [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# | Section Beg. Termini: | Beg. Milepost:

Section End. Termini: | End. Milepost:

Designed Use Objectives

(Check one)

Trail Type:
- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

(Check one)

Trail Class:
- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

ROS (Non-Wilderness)		WROS (Wilderness)	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

60	Tread Width (inches)
8	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
9	Clearing Width (feet)
8	Clearing Height (feet)
6	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.5	Tread Repair
0.5	Drainage Cleanout
1	Logging Out
0.5	Brushing
1	Snow Removal
0.5	Condition Survey
1	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Watchman Lookout Trail **Trail Number:** 64282

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/01	10/31
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
	Cross-Country Ski		
	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
	Cross-Country Ski			
X	Snowshoe	X		
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
X	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)
X	Active fire lookout at summit of trail.

Remarks / Reference Information

Shared system with the Rim Trail.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

NPS - Trail Management Objectives

Region: PWR **Park:** Crater Lake National Park **Division:** Maintenance

Trail Name: Wizard Island Trail **Trail Number:** 64283

Trail Beginning Termini: Docks on Wizard Island **Beg. Milepost:** 00+00

Trail Ending Termini: Summit of Wizard Island **End. Milepost:** 54+46

Trail Inventory Length: 1.03 Miles **Trail Mileage Source:** [X] Wheel [ ] GPS [ ] Map [ ] Unknown

TMO Trail Section

Sec.# **Section Beg. Termini:** **Beg. Milepost:**

Section End. Termini: **End. Milepost:**

Designed Use Objectives

Trail Type (Check one)

- [X] Standard Terra Trail
- [ ] Snow Trail
- [ ] Water Trail

Trail Class (Check one)

- [ ] 1 (Primitive/Undeveloped)
- [ ] 2 (Simple/Minor Development)
- [X] 3 (Developed/Improved)
- [ ] 4 (Highly Developed)
- [ ] 5 (Fully Developed)

ROS/WROS Class (Check one)

Non-Wilderness ROS		Wilderness WROS	
[ ]	Urban	[ ]	WROS 1
[ ]	Rural	[ ]	WROS 2
[ ]	Roaded Modified	[ ]	WROS 3
[ ]	Roaded Natural	[ ]	WROS 4
[X]	Semi-Primitive Motorized	[ ]	WROS 5
[ ]	Semi-Primitive NonMotorized	[ ]	WROS 6
[ ]	Primitive		

Designed Use

(Check one)

- [X] Hiker / Pedestrian
- [ ] Pack & Saddle
- [ ] Bicycle
- [ ] Motorcycle
- [ ] All Terrain Vehicle (ATV)
- [ ] Four-Wheel Drive Vehicle > 50"
- [ ] Pets Allowed
- [ ] Accessible
- [ ] Cross-Country Ski
- [ ] Snowshoe
- [ ] Snowmobile
- [ ] _____
- [ ] Watercraft - NonMotorized
- [ ] Watercraft - Motorized

Design Parameters

(Fill in all that apply)

24	Tread Width (inches)
5	Target Grade (%)
25	Short Pitch Maximum (%) (up to 200' lengths)
5	Target Cross-Slope (%)
6	Clearing Width (feet)
8	Clearing Height (feet)
5	Switchback Radius (feet)
	_____

Target Frequency

Per Year

(Fill in all that apply)

1	Trail Opening
0.33	Tread Repair
0.33	Drainage Cleanout
1	Logging Out
0.33	Brushing
0	Snow Removal
0.33	Condition Survey
0	Sign install/removal

NPS - Trail Management Objectives

Trail Name: Wizard Island Trail **Trail Number:** 64283

Travel Management Strategies FSM 2353.19

Managed Use

(Fill in all that apply)*

		From Date (mm/dd)	To Date (mm/dd)
X	Hiker / Pedestrian	06/15	09/30
	Pack & Saddle		
	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
	Pets Allowed		
	Accessible		
	Cross-Country Ski		
	Snowshoe		
	Snowmobile		
	Watercraft-NonMotorized		
	Watercraft - Motorized		

Prohibited Use

(Check if applicable)

		From Date (mm/dd)	To Date (mm/dd)
X	All Motorized Use		

(Or, fill in all that apply)

	Hiker / Pedestrian		
X	Pack & Saddle		
X	Bicycle		
	Motorcycle		
	All Terrain Vehicle (ATV)		
	4WD Vehicle > 50"		
X	Pets		
X	Cross-Country Ski		
X	Snowshoe		
X	Snowmobile		
X	Watercraft - NonMotorized		
X	Watercraft - Motorized		

Other Use

(Optional: Check any that apply)*

		Accept	Discourage	Eliminate
	Hiker / Pedestrian			
	Pack & Saddle			
	Bicycle			
	Motorcycle			
	All Terrain Vehicle (ATV)			
	4WD Vehicle > 50"			
	Pets Allowed			
	Accessible			
	Cross-Country Ski			
	Snowshoe			
	Snowmobile			
	Watercraft - NonMotorized			
	Watercraft - Motorized			

Special Considerations

(Check any that apply. Underline appropriate clarifier in parenthesis. Provide specifics and reference information below.)

X	Shared System (shared with other system road or trail)
	Accessible per Current Agency Guidelines
X	Mechanized Tools or Equipment Prohibited
X	T&E or Sensitive Species Present (Plant / Wildlife)
	Heritage Resource Present
	Easement across Non-NPS Land (Existing / Needed)
	Existing Permit or Agreement (Trail-Specific / Area)

Remarks / Reference Information

Only way to access Wizard Island is by boat tour.

Superintendent: Name Craig Ackerman Signature

Title Superintendent - CRLA Date

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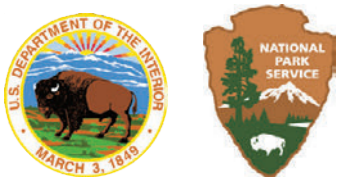

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

CRLA 106-177216
September 2021

National Park Service
U.S. Department of the Interior

Crater Lake National Park | Trail Management Plan / Environmental Assessment | September 2021