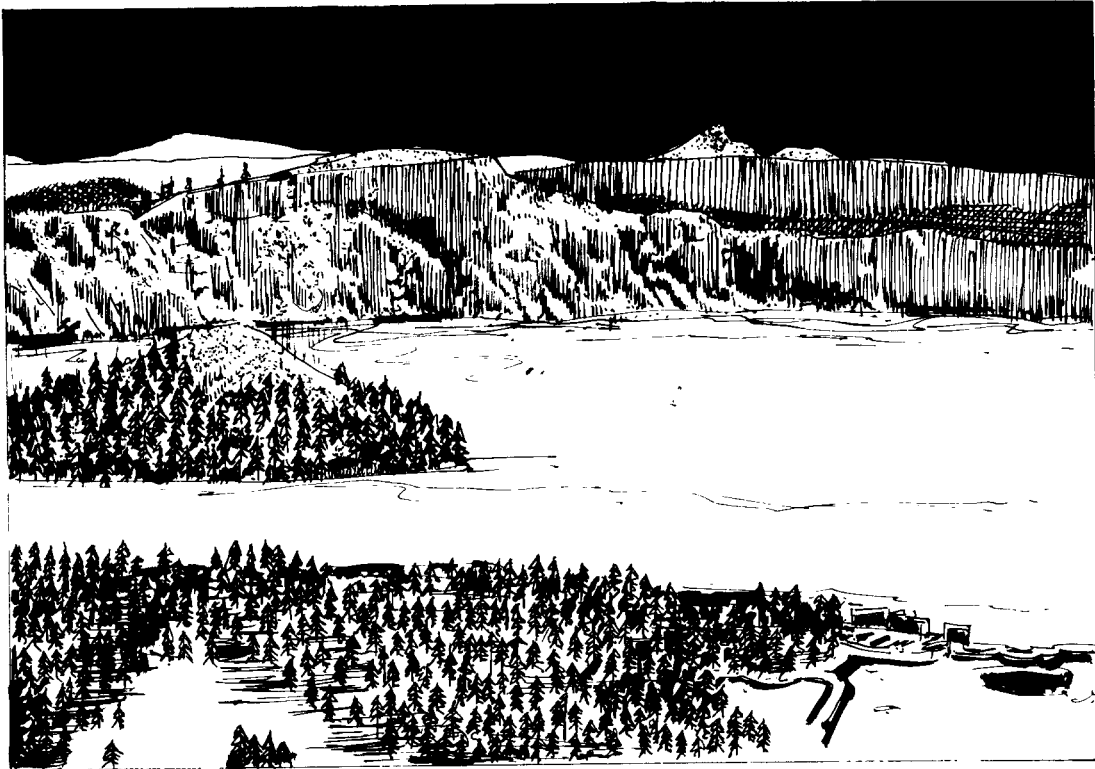


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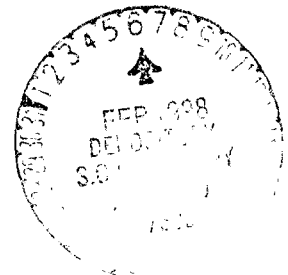
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Draft Visitor Services Plan Environmental Impact Statement



CRATER LAKE

National Park • Oregon



FROM THE SUPERINTENDENT

We are pleased to provide you with the *Draft Visitor Services Plan/Environmental Impact Statement* for the developed areas of Crater Lake National Park. We would like to hear your opinions concerning the proposed plan and the other alternatives that are described in this document.

This planning effort was initiated in September 1996, when a notice of intent to prepare an environmental impact statement appeared in the *Federal Register*. In October the National Park Service mailed a scoping letter to about 500 people to announce the planning effort. In late November draft alternatives were presented to the public in the form of an alternatives newsletter. A 30-day review and comment period ended December 31. During that time, public meetings were conducted at four locations in southwestern Oregon to further solicit input on the alternatives. The alternatives were subsequently modified to incorporate public input, a proposed action was selected, and the draft plan was written.

Concessioners provide commercial services to visitors in the national parks under contract with the National Park Service. The purpose of this *Draft Visitor Services Plan/Environmental Impact Statement* and the intent of the public review and comment on this document is to help the park define appropriate levels and kinds of commercial services and to set the terms for a new concession contract. This plan will also guide general levels and locations of interpretive facilities and services to be provided by the National Park Service.

Comments on the draft plan are encouraged and will be accepted by mail until January 26, 1998. Please send written comments to the following address:

Superintendent, Crater Lake National Park
P.O. Box 7
Crater Lake, Oregon 97604

We appreciate your helping to determine the future direction of visitor services and facilities at Crater Lake National Park. Your participation is most useful.

Albert J. Hendricks
Superintendent

Draft Visitor Services Plan Environmental Impact Statement

CRATER LAKE

National Park
Oregon

This *Draft Visitor Services Plan / Environmental Impact Statement* describes and analyzes five alternatives for the management and use of the developed areas of Crater Lake National Park. The alternatives described define appropriate levels and kinds of visitor services and set the basis for a new concession contract. **Alternative A (the proposed action)** is a mix of proposals that are intended to protect park resources and enhance the visitor experience. **Alternative B (no action)** would continue the existing conditions at the park and would allow for the completion of any facilities currently under construction. **Alternative C** would offer a more self-directed visitor experience that would be less facility-dependent and less structured than at present. **Alternative D** would enhance interpretation and provide a wider variety of commercial and NPS visitor services. **Alternative E** is primarily based on the planning direction presented in the *Record of Decision* for the 1995 *Development Concept Plan / Environmental Impact Statement*, which focused on concentrating visitor facilities at Rim Village. The major impact topics assessed are natural resources, including soils, geology, vegetation, water and air quality, wildlife, and threatened and endangered species; cultural resources, including prehistoric, ethnographic, and historic resources; and the visitor experience at the four main developed areas of the park. This document was prepared to evaluate the alternatives, assess the impacts of implementing each alternative, and to provide the public with an opportunity to comment. This plan will be on public review for 45 days. Comments should be received no later than January 24, 1998, and should be submitted to:

Superintendent
Crater Lake National Park
P.O. Box 7
Crater Lake, Oregon 97064

For additional information contact the park at the above address or by telephone (541) 594-2211



SUMMARY

The current 30-year concession contract at Crater Lake National Park expired in October 1997, and a new contract must be established for the provision of commercial services. The purpose of this *Draft Visitor Services Plan / Environmental Impact Statement* is to help the park define optimal levels and kinds of services and to set the terms for the new concession contract. This plan will also guide general levels and locations of interpretive services. The final plan will set the future direction for the new long-term concession contract and NPS interpretive services at Crater Lake National Park.

This document addresses the issues and concerns that were raised by the National Park Service and that were subsequently identified in response to public scoping and alternatives newsletters and through meetings with organizations and individuals. The issues and concerns include cultural and natural resource protection and the appropriate level and type of NPS and commercial visitor services and facilities.

This plan presents five alternatives, including a proposed action and no-action alternative, for visitor use and resource protection in the four main developed areas of the park — Rim Village, Mazama Village, Cleetwood, and Munson Valley.

Alternative A: Enhance Resource Protection and Visitors' Appreciation of the Park (Proposed Action)

Alternative A is a blend of actions intended to improve the protection of park resources while providing an enjoyable visitor experience. Proposals would enhance educational and interpretive opportunities to promote better visitor understanding, appreciation, and preservation of Crater Lake. NPS interpretive services would be emphasized, commercial services would be modified to better serve visitors, and some historic structures would be used more as they were initially intended.

There would be minor, short-term adverse natural resource impacts at Rim Village, Mazama Village, and Cleetwood as a result of construction activities. Long-term natural resource impacts at these areas would be insignificant; less than 1 acre of vegetation and wildlife habitat would be lost. Actions at Rim Village would generally benefit the designed landscape of the historic district. The addition of a visitor contact station and the removal and revegetation of the parking lot along the rim edge would have a minor effect on cultural resources; however, there would be beneficial impacts on several historic structures as a result of the restoration / rehabilitation of the comfort stations, Kiser Studio, Sinnott Memorial, cafeteria, and the community house. No impacts on historic resources would be expected at other areas.

Visitors would benefit from enhanced information and interpretive opportunities at the three aforementioned areas. The addition of a visitor contact station, restoration of the exhibit space in the Sinnott Memorial and the rehabilitation of the community house and Kiser Studio would all benefit the visitor experience at Rim Village. A modification in concession services at Rim Village coupled with redesign of some of the parking and road alignments would reduce congestion and facilitate pedestrian movement in the area. Visitors would continue to have opportunities for fine dining and overnight lodging at Crater Lake Lodge. The relocation of the restaurant and some retail merchandising services to Mazama Village coupled with the addition of a deli/fast food service at Rim Village would benefit visitors by providing these services in a couple of locations. Returning the cafeteria building to its 1928 configuration and appearance would benefit the designed landscape of

SUMMARY

the potentially eligible historic district. The relocation of the amphitheater to a more central location in the Mazama Village campground and the construction of an information kiosk would enhance visitor information and interpretive services at Mazama Village. Visitors seeking lodging and other services would benefit from the continued operation of the Mazama Village Motor Inn, a new restaurant, and enhanced sale items at the Mazama Village store. At Cleetwood, visitors would benefit from increased interpretation through more signs on the rim and lakeside and along the trail. Congestion would be relieved to a large degree through better scheduling and a slight reduction from current tour numbers, as well as through the restriping of the parking lot. The development of visitor and operational structures adjacent to the rim and lakeside could have adverse visual impacts. However, these impacts would be minimized through appropriate design. Boat tours would continue, which would benefit some visitors while adversely affecting the pristine lake viewing experience sought by others. This would be partially mitigated by retaining “no boat use hours” during early morning and late afternoon hours. Visitors taking the boat tour would benefit from interpretation on the boat and at Wizard Island.

Alternative B: No Action

The National Park Service would continue to provide existing services and facilities at established developed areas. Any facilities currently being developed in the park would be completed.

There would be no significant changes to the natural resources at the park as a result of the no-action alternative. Current impacts on vegetation, soils, and geology at the developed areas would continue.

At Rim Village certain significant elements of the historic designed landscape (e.g., community house and Kiser Studio) would continue to deteriorate, which could adversely affect the potentially eligible historic district. No impacts on historic resources would be expected at other areas.

The visitor experience at Rim Village would remain the same. Visitors would continue to be adversely affected by vehicle and pedestrian congestion at the parking areas, and people seeking a visitor contact station would continue to have to rely on the undersized Kiser Studio, which is difficult to find. Visitors would continue to benefit from opportunities to purchase groceries or to eat at the restaurant or cafeteria. Visitors would also continue to have opportunities for fine dining and overnight lodging at Crater Lake Lodge. Overall, the visitor experience at Mazama Village would remain the same. Visitors would continue to benefit from opportunities to purchase food, other merchandise, and gasoline at the Mazama Village store. Visitors would also continue to benefit from opportunities to shower and do laundry. Seasonal lodging would continue to be available at the Mazama Village Motor Inn, which would benefit visitors seeking overnight accommodations. Visitors would continue to be inconvenienced by the lack of an information kiosk at Mazama Village. The visitor experience would remain the same at Cleetwood as would the level and types of services. However, an increase in the capacity of the parking lot from restriping could help reduce parking deficiencies during busy summer days. Some visitors would continue to benefit from opportunities to see the lake by boat and to receive NPS interpretation. The tour boats would continue to adversely affect the pristine lake viewing experience sought by others. The unattractive seasonal structure would remain at the trailhead, and visitors would continue to be exposed to inclement weather at the lakeshore. Visitors at Munson Valley would continue to benefit from opportunities for NPS contact and interpretive walks.

Alternative C: Provide Opportunities for Self-directed Visitor Experiences

Alternative C would offer a more self-directed visitor experience that would be less facility-dependent and less structured than at present. Visitors would be able to travel to various park features and obtain onsite interpretation.

There would be minor, short-term adverse natural resource impacts at Rim Village, Mazama Village, and Cleetwood as a result of construction activities. However, there would be long-term beneficial impacts with the restoration of 1.8 acres of vegetation and wildlife habitat.

Returning the Rim Village cafeteria building to its 1928 appearance and configuration would benefit the historic designed landscape of the potentially eligible historic district. The elimination of much of the existing parking would have an adverse effect on the designed landscape. No impacts on historic resources would be expected at other areas.

Visitors at Rim Village would benefit from a less congested experience, better opportunities for NPS contact, and increased interpretation. Most visitors would be inconvenienced by the relocation of a significant portion of food and merchandise services to Mazama Village. Overall, interpretive opportunities would remain the same at Mazama Village; however, visitors would benefit from improved orientation at a new self-service kiosk. The effects of expanding selections at the Mazama Village store and removing the shower and laundry facilities would vary depending on the individual. Many visitors would be inconvenienced by the elimination of these services and the moderately priced lodging. Eliminating boat tours at Cleetwood would adversely affect visitors seeking this type of experience. Also lost would be opportunities for visitors to see the caldera up close and to receive NPS interpretation while on the lake. However, many other visitors would benefit because the pristine lake environment would be enhanced.

Alternative D: Offer a Variety of NPS and Commercial Visitor Services

Under alternative D a variety of commercial visitor services would be offered, and interpretive services provided by the National Park Service would be enhanced.

There would be minor, short-term adverse natural resource impacts at Rim Village, Mazama Village, and Cleetwood as a result of construction activities. Long-term natural resource impacts at these areas would be relatively insignificant; there would be a loss of 10.2 acres of vegetation and wildlife habitat.

Removing the cafeteria and the community house, constructing a new visitor contact facility, removing Rim Village Drive and its rustic stone curbing, developing a new access road from the visitor center to the lodge, and constructing a small parking lot behind the visitor contact station and a new parking lot off the rim would have adverse impacts on historic resources at Rim Village.

Increased orientation and interpretation, the addition of a visitor contact station, restoration of the exhibit space in the Sinnott Memorial, and rehabilitation of the Kiser Studio would all benefit the visitor experience at Rim Village. A reduction in concession services at Rim Village coupled with redesign of some of the parking and road alignments would slightly reduce congestion and facilitate pedestrian movement in the area. Visitors would also benefit from more open space with the removal of the community house and cafeteria building. Visitors would also be able to rent recreation equipment out of the new facility. At Mazama Village visitors would benefit from improved orientation and a new self-service kiosk, and the relocated amphitheater would provide visitors with

SUMMARY

easier access to programs. Visitors seeking lodging would benefit from the continued operation of the Mazama Village Motor Inn, the development of 40 new year-round lodging units, and the addition of two group sites at the campground. Visitors would also benefit from a new year-round cafeteria and the continued provision of food and merchandise sales and services at the camper store. The addition of rental equipment at the Mazama Village store would also benefit visitors.

Restriping the parking lot at Cleetwood would alleviate parking deficiencies to some degree. Development along the rim and the lakeside, including two new structures, a shade facility, and a new dock and bulkhead, would have adverse visual impacts. However these impacts would be minimized through appropriate design. Boat tours would continue, which would benefit some visitors while adversely affecting the pristine lake viewing experience sought by others. Improvements to the trailhead and the trail, including the installation of a metal staircase prior to the slide chute, would improve visitor safety. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island.

Alternative E: Focus Visitor Facilities at Rim Village

Alternative E would offer the kinds and levels of visitor services and facilities presented in the *Record of Decision* for the 1995 *Development Concept Plan / Environmental Impact Statement*. This alternative is aimed at making the park a destination for extended visitor use. The main focus of visitor services, experiences, and facility development would be at Rim Village.

There would be minor, short-term adverse natural resource impacts at Rim Village, Mazama Village, and Cleetwood as a result of construction. Long-term natural resource impacts at these areas would be relatively insignificant; there would be the loss of 8.3 acres of vegetation and wildlife habitat.

Historic resources in the potentially eligible Rim Village Historic District would be adversely affected by the development of a new activity center at Rim Village, the construction of a new access road that would connect the parking structures with the lodge, and the removal of the community house, cafeteria building, and historic comfort stations.

Visitors at Rim Village would benefit from more activities, a full range of services, and increased levels of interpretation at a new activity center. Crater Lake Lodge would continue to provide seasonal overnight accommodations and fine dining. Vehicle congestion at Rim Village would be greatly reduced; however, some visitors might be adversely affected by increased levels of pedestrian traffic, which would probably result from the concentration of activities and services. The visitor experience at Mazama Village would be the same as in alternative D except there would be a new restaurant instead of a new cafeteria. Enlarging and restriping the parking lot at Cleetwood would somewhat alleviate parking deficiencies and would eliminate parking along Rim Drive. Development along the rim and the lakeside, including new permanent structures for visitors and operations could have adverse visual impacts. However these impacts would be minimized through appropriate design. Boat tours would continue, which would benefit some visitors while adversely affecting the pristine lake viewing experience sought by others. Improvements to the trailhead and trail would benefit visitors by making both areas more visually appealing and safer. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and Wizard Island.

The Next Step

The public review and comment period for this draft document will be 45 days. Comments on the draft plan will be summarized, and appropriate changes will be made to the document to respond to public comments. Various elements of the proposed action and other alternatives might be modified to address comments. A *Final Visitor Services Plan / Environmental Impact Statement* will then be issued, which will become an approved plan 30 days after a record of decision is issued. The final plan will include agency and organization letters and responses to all substantive comments.

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Community House

PURPOSE OF AND NEED FOR THE ACTION

INTRODUCTION

The current 30-year concession contract at Crater Lake National Park will expire in October 1997, after which a new contract must be established for the provision of commercial services. The purpose of this *Draft Visitor Services Plan / Environmental Impact Statement* is to help the park define appropriate levels and kinds of services and to set the terms for the new concession contract. This plan will also guide general levels and locations of interpretive services.

A 1994 wilderness proposal recommended 98% of Crater Lake National Park for wilderness designation. Because wilderness designation generally precludes commercial visitor services and some of the interpretive services provided by the National Park Service, this plan only applies to areas excluded from the 1994 wilderness proposal. All but 840 acres of these areas consist of road corridors, utility lines, and administrative sites that lack water, power, or related infrastructure. The scope of this planning effort is therefore confined to the four developed areas in the park that currently provide facilities and some level of visitor services — Rim Village, Mazama Village, Cleetwood, and park headquarters at Munson Valley (see Project Area map).

RELATIONSHIP OF THIS PLAN TO THE NEW CONCESSION CONTRACT

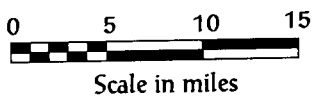
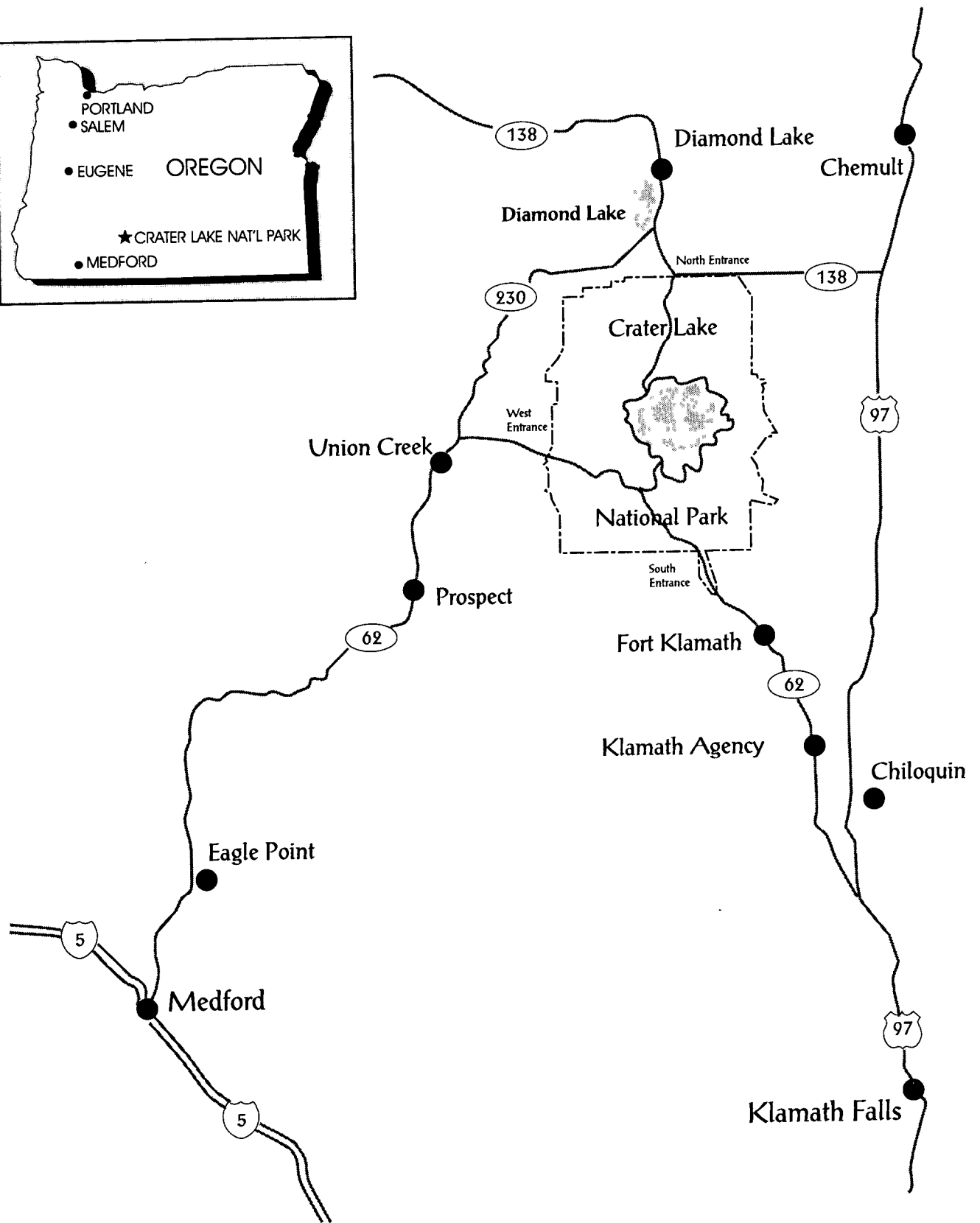
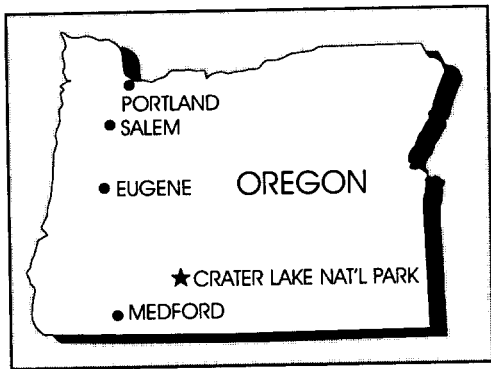
The 30-year concession contract with Crater Lake Lodge, Inc., expired on October 31, 1997. The National Park Service is developing a prospectus for a new long-term contract that would require the concessioner to implement the provisions of this visitor services plan. However, the Park Service would retain the right under

the concession contract to amend this plan in the future as it deemed appropriate. The adoption of the visitor services plan (decision document), not the award and execution of the new concession contract, is the federal action that would result in the environmental impacts described in this document. Execution of the

new concession contract will implement and authorize concession projects proposed in this plan. Additionally, the concession contract awardee would be subject to actions to be called for in other ongoing NPS planning activities when they are finalized and adopted.

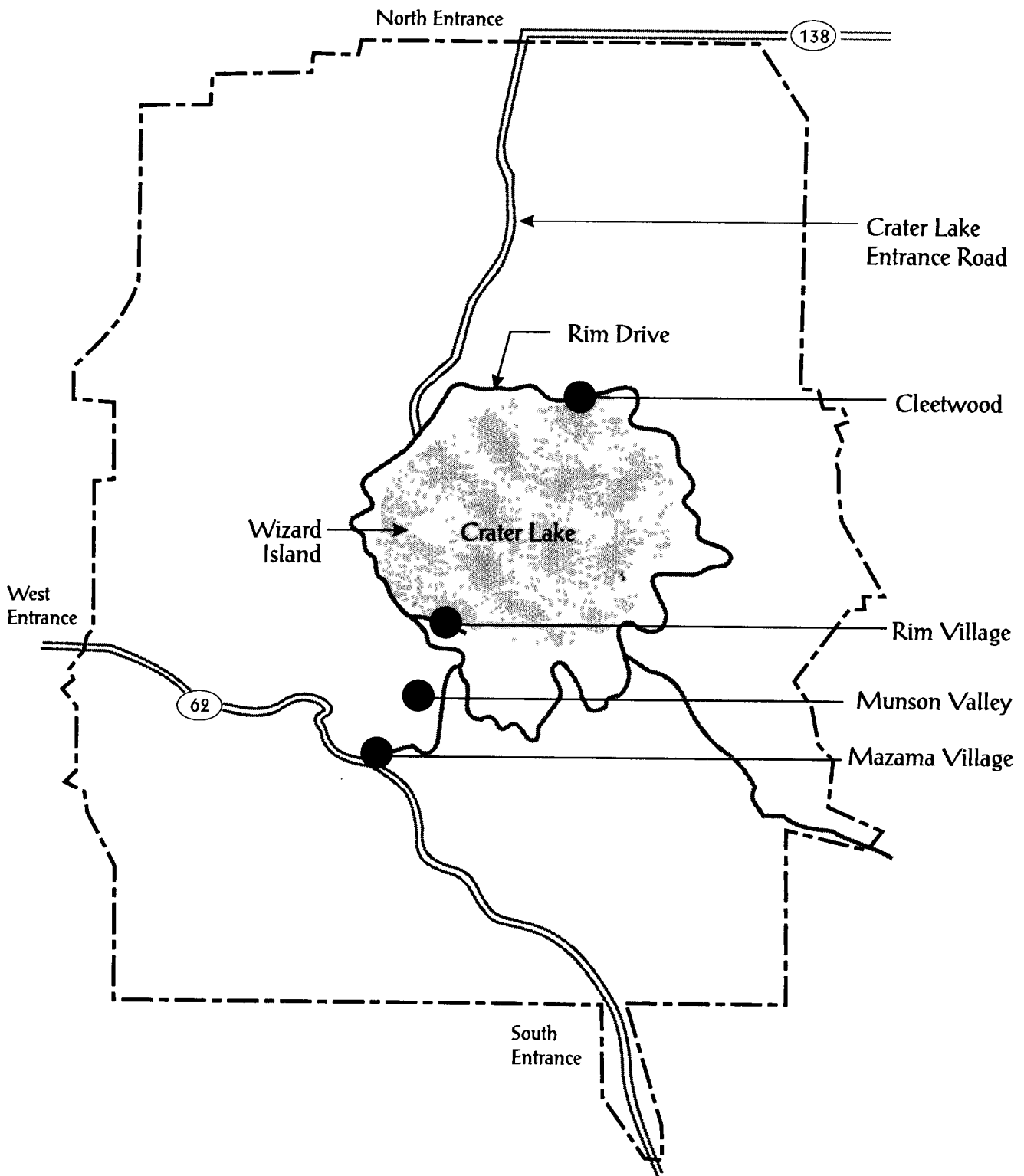
OVERVIEW OF THE PARK AND ITS DEVELOPED AREAS

Crater Lake National Park is in southwest Oregon in the south-central portion of the Cascade Range (see Vicinity map). Crater Lake is the deepest lake in the United States and is renowned for its clarity and the intense blue color of its water. The waters are surrounded by the jagged, steep-walled cliffs of the caldera left by the climactic eruption and collapse of Mt. Mazama about 7,700 years ago. These cliffs rise from 500 to 2,000 feet above the lake's surface. The intensity of the water's color combined with the physical relief and coloration of the caldera's rim creates spectacular scenery.



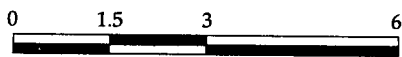
Vicinity

Crater Lake National Park
 U.S. Department of the Interior
 National Park Service
 106 • 20114 • DSC • NOV 97



Legend

----- Park Boundary



Scale in Miles



Project Area

Crater Lake National Park

U. S. Department of the Interior

National Park Service

106 • 20115 • DSC • NOV 97

The park's southern entrance station at Mazama Village is 76 miles from Medford and 56 miles from Klamath Falls and can be reached by Oregon State Route (OR) 62. The park can also be reached from the north by OR 138. Both the south and north access roads lead to Rim Drive, a 33-mile roadway that circles the caldera rim. Pullouts along Rim Drive provide scenic lake views. Winter access is maintained only from the south and west on OR 62 through the Munson Valley headquarters area and up to Rim Village. Road closures, particularly between headquarters and the rim, are common during the winter because of frequent snow storms.

Rim Village, at an elevation of 7,100 feet on the south edge of Crater Lake, has functioned as a year-round operation since 1948, although services are limited in the winter. Seasonal interpretive activities are provided from a small visitor contact facility near the rim and at the Sinnott Memorial overlook. The Sinnott Memorial is 25 feet below the rim on a precipitous cliff overlooking the lake. It has architectural significance because it is constructed mostly of large uncoursed rock that blends into the rim wall. The Sinnott Memorial offers visitors a spectacular view of Crater Lake and is an ideal place to interpret the lake and caldera. Seasonal hotel accommodations are available at Crater Lake Lodge. Food services, gift sales, a picnic area, geology talks (summer only), and interpretive exhibits are also available at Rim Village. Related support facilities include parking for approximately 450 cars and concession employee housing.

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

Cleetwood is on the north shore of Crater Lake and is accessed from Rim Drive. It is about 6 miles east of the north junction where Rim Drive intersects the north entrance road. Cleetwood contains a parking area, a nonpermanent ticket sales structure, and a portable restroom at the rim. A trail descends the side of the caldera to the lake. The concessioner offers commercial boat tours of the lake, accompanied by NPS interpreters. Support facilities at lake level include a dock, a bulkhead and gangway, a nonpermanent boat operations building, restrooms, and minimal storage facilities for NPS and concession equipment. A gasoline fuel system at Cleetwood consists of an underground storage tank at the rim, a single-wall fuel line that leads to an aboveground storage tank at lakeside, and an underground line from the aboveground tank to a fuel pump, which is used to fuel the boats.

Park Headquarters is about 3 miles south of Rim Village and serves as the center of NPS administration, maintenance, and housing. It also serves as the year-round visitor interpretation and orientation point. Park headquarters is in a historic complex of buildings at the central portion of the Munson Valley development area. Visitor information services and interpretive exhibits are provided in this complex at the Steel Information Center. Primary park administrative services are in the Sager building. Storage and maintenance facilities are also in the park headquarters area.

VISITOR USE TRENDS AND DEVELOPED AREA HISTORY

Crater Lake National Park is a vital element in a diverse regional recreation complex. Many visitors stop at the park as part of a north-south trip to various parks and scenic areas in Oregon and northern California. In southern Oregon Crater Lake has historically been the leading visitor draw. Approximately 60% of the park's visitors are from Oregon and California. Annual park visitation reached a plateau of a half a million in the early 1960s, but can fluctuate as much as 25% from year to

year. In 1996 park visitation was in excess of 525,000. However, the park is principally a day use area, with the majority of visitor use (greater than 75%) occurring between Memorial Day and Labor Day. Day use accounts for about 80% of visitation with two-thirds of the day users spending less than four hours in the park. Three quarters of all visitation comes during a five-hour period in the middle of the day (10 AM to 3 PM) and occurs predominately from Rim Village to Mazama Village. Less than 15% of park visitors remain overnight, and less than 5% stay two or more nights. However, during the two peak months of July and August, camping and overnight lodging facilities operate near capacity.

The development and level of concessioner and NPS visitor services and facilities have generally mirrored and been tailored to visitation levels and visitor characteristics.

Visitor access through what is now the Mazama Village and the Munson Valley headquarters area to Rim Village was facilitated by the development of a road in 1905. In the subsequent decades the road was ultimately upgraded to a paved surface to the rim and lodge. Designated parking in Rim Village along the road to the lodge (Rim Village Drive) first occurred in 1926 and was a desired component of the visitor experience.

In 1907, as a result of the signing of the first concession contract, two campgrounds were developed in the park. Camps Arant and Crater were constructed at Annie Springs and at Rim Village, respectively. The Annie Spring campground remained in existence until 1969, and Rim campground, with 54 sites, evolved into a popular overnight facility that remained until 1975. The latter campground was a favorite among visitors because they could sleep among the trees and wake up to a beautiful sunrise over the lake. However, the short summer season on the rim and the impact of the campground on the natural resources of the area ultimately led to its abandonment.

The central portion of Crater Lake Lodge was completed in 1915 to provide for visitor overnight accommodations. A large wing to the lodge was added on in the 1920s to further meet visitor overnight needs. It was a major attraction to visitors with its spectacular views of the lake and rustic architecture. However, the quality of lodging and dining varied over the years depending on the concessioner and the terms of the concession contract.

The cafeteria building, rental cabins, community house, Kiser Studio, promenade, and Sinnott Memorial were constructed in the 1920s and 1930s to provide for increased overnight and day use visitation. The rental cabins were removed in 1985.

The cafeteria building was built in 1928 to house food services and camper supplies. The cafeteria building was expanded in the 1950s and again in the 1970s to accommodate a perceived market for additional food, gift, and sundry sales. The community house was built as a social gathering place for campground and lodge visitors. It was used for interpretive exhibits, informal evening get togethers, and as an auditorium for evening interpretive programs, dances, and other forms of entertainment. Kiser Studio was constructed in 1921 and served as the headquarters and salesroom for the renowned photographer, artist, and conservationist, Fred Kiser. He rendered and sold hand-colored photographs of the park and the northwest at the studio. In 1928 it became the visitor contact station at Rim Village and has housed a variety of exhibits over the years. The Sinnott Memorial was built over Victor Rock, a popular lake viewing site. It was constructed of large rocks that blended in well with the caldera wall and was a prototype of rustic architecture in the national park system. It has been used as a museum, a contact station, and a viewing point. Visitors continue to be attracted to the Sinnott Memorial because of its pleasing and unusual architecture and the outstanding view of the lake it provides. The promenade, consisting of the stone parapet and path along the caldera wall, the associated connecting trails, and the native vegetation landscaping, was developed in the early 1930s. It was a designed

landscape that reduced the random wandering and trampling of vegetation by visitors. However, it also served as a means of restoring the area to a more natural appearance, provided a pleasing landscape for visitors to enjoy as they walked about the village and viewed the lake, and was a means of connecting the various visitor facilities in the developed area.

Mazama campground was established in the mid-1950s and was expanded in the early 1960s. It is a pleasant, shady campground that visitors enjoy. A campground amphitheater is used for evening interpretive programs. A seasonal 40-unit motel was constructed in Mazama Village in 1989 to replace the lodging that was eliminated with the removal of the cold water cabins south of the Rim Village cafeteria. Although the motel lacked the spectacular views of the lake like those available from the lodge, visitors had a pleasant setting to spend the night and were within a short driving distance from views of the lake and the amenities of Rim Village. A conveniently situated camper store built in 1991 provides food, camper supplies, public showers and laundry, and gasoline. The camper store was primarily built to provide services for visitors staying overnight at Mazama Village in the campground and motel. However, certain camper store amenities were located at Mazama Village to make sure that they did not intrude on the central features of the park.

The park headquarters area in Munson Valley was primarily developed during the 1930s and 1940s to provide park administration and housing. When the park headquarters buildings were rehabilitated in the 1980s, the ranger dormitory was remodeled and became the Steel Information Center to provide year-round visitor contact and interpretation for the park.

Boat tours on the lake were initiated in 1907 to provide an opportunity for visitors to better experience the lake and caldera. The boat tours were initially conducted below Rim Village to Wizard Island and Phantom Ship. Several different trail alignments from Crater Lake Lodge and the cafeteria building were constructed to the lakeshore and the boat tours in the 1900s and 1920s. At the start of the boat operation there was one boat with a couple of tours per day. Several rowboats for visitor fishing and travel to Wizard Island were added in the early 1920s. NPS naturalists provided the first interpretive boat tours in 1931. They were all day excursions that included docking at Wizard Island and hiking to the top of the volcanic cone. The boat tour enterprise was relocated to the Cleetwood area in 1960 on completion of a new south-facing trail. The new trail allowed for the expansion of seasonal use of the trail and boat tours and provided for a more enjoyable visitor walk because it was less steep, shorter, and safer. By 1972 four boats were in operation but the rowboats were phased out because of the hazardous wind conditions at the north end of the lake. The number of boat tours has increased from five in 1976 to the current level of nine plus a Wizard Island pickup. In addition, parking, restroom, storage, and limited food service facilities were developed in the 1960s to meet the greater levels of visitor use and to enhance the visitor experience.

Two other concession services that warrant addressing are recreation equipment rental and transportation to the park. The rental of cross-country skis and snowshoes at the cafeteria building was attempted several times but was relatively unsuccessful because of the limited number of nonequipped visitors. In the early 1900s concession transportation to the park from Medford and Klamath Falls was a necessary and convenient service provided to visitors arriving in southern Oregon by train. This service continued until the late 1970s when extensive availability and use of the automobile and bus by visitors usurped this means of transportation.

PLANNING BACKGROUND

This visitor services plan is the latest in a series of planning efforts that date back to the 1977 *General Management Plan*. Each plan has been undertaken to enhance the visitor experience and resource protection at the developed areas of Crater Lake National Park.

The 1977 plan provided a framework for future use and development in the park. General proposed actions related to the current planning effort included relocating about 185 parking spaces near the rim to behind the cafeteria building (not implemented) and relocating camper services from Rim Village to Mazama campground.

In 1984 the National Park Service prepared an *Environmental Assessment / Interim Development Concept Plan / Amendment to the General Management Plan* for the redevelopment of the Mazama campground / Rim Village corridor. This plan led to the development of a camper services building with a store, laundry, showers, and gas station, as well as 40 seasonal lodging units for overnight visitors at Mazama Village.

In response to public comments and changing public needs and desires, the National Park Service revised many decisions made in the 1984 plan amendment and prepared a new *Development Concept Plan / Environmental Assessment* in 1988. The basic concept of all alternatives in the 1988 plan was that Rim Village would remain the focal point for overnight lodging, day use, visitor services, and interpretation.

The 1988 plan approved the following actions:

- ◆ Restore and rehabilitate portions of the landscape at Rim Village to enhance visitor enjoyment and support pedestrian use.
- ◆ Build a new year-round activity center and a 60-room hotel at the site of the cafeteria.
- ◆ Replace some parking at Rim Village with a three-story underground parking facility about 0.25 mile below Rim Village. Limited parking would remain behind the activity center, and 100 spaces would remain at Crater Lake Lodge.
- ◆ Construct a new road to connect Crater Lake Lodge with the new parking facility.
- ◆ Build maintenance facilities, a year-round office facility, and some warehouse space for the concessioner at Munson Valley to provide support services for Rim Village.
- ◆ Provide concession employee housing at Munson Valley to meet the needs of the rehabilitated lodge and new activity center. The 1988 plan left open the possibility of considering alternative locations in and near the park for additional concessioner housing needs.
- ◆ Provide 40 additional guest rooms at Mazama Village as needed to meet demand.

In 1992 a House-Senate appropriation conference committee requested that the National Park Service review, among other things, improvements proposed in the 1988 plan. The resulting 1993 *Briefing Report* contained four significant recommendations. First, the potential site for year-round lodging was proposed at Mazama Village, and it was determined that a new hotel would not be built at Rim Village. Second, the Mazama Village area was recommended as a location for additional concessioner

housing. Third, the south entrance area of the park was recommended for concessioner housing to replace the Rim Dormitory. Fourth, modest concessioner support facilities were recommended for the Mazama Village area.

The 1993 report confirms that current winter activities are consistent with the protection of the resource and are appropriate for visitor enjoyment. In response to the conference committee's request, the report also announced the intent to prepare a winter use plan and environmental assessment that would outline the types of appropriate winter recreation opportunities at the park. The approved 1994 *Winter Use Plan* adopted a largely status quo alternative that endorsed the current mix of cross-country skiing throughout the park and snowmachine access from the north entrance to North Junction in the park.

In June 1995 the National Park Service completed the *Final Development Concept Plan / Amendment to the General Management Plan / Environmental Impact Statement*. However the document was never approved. Only those project items presented in the *Record of Decision*, which was signed October 30, 1995, were approved by the National Park Service. It acknowledged public concern about the scale, scope, and location of the proposed parking facility. Because parking needs are tied to the types and level of services provided at Rim Village, the National Park Service decided to prepare this visitor services plan to analyze appropriate levels of commercial and interpretive services, rim area parking needs, parking configurations, site options, and any shuttle bus system proposals. In addition, this plan will address commercial and interpretive services and facilities at Mazama Village and Munson Valley because these areas are so closely tied to Rim Village. A separate environmental impact statement initiated by the National Park Service in July 1996 for Cleetwood was combined with this plan because of the interrelationships between all of the park's developed areas.

The planning effort for this document was initiated in September 1996, when a notice of intent to prepare an environmental impact statement appeared in the *Federal Register*. In October the National Park Service mailed a scoping letter to about 500 people to announce the planning effort, to explain the rationale for conducting the study, and to define the major issues that need to be resolved. The letter also requested public comments about the scope of the project.

Management objectives to guide the development of alternatives were based on the park's purpose and the significance of its resources. The National Park Service subsequently formulated a range of draft alternatives to meet the management objectives and in response to public input. The alternatives were oriented around the balance between the visitor experience and resource protection and the need for appropriate commercial and interpretive services. The draft alternatives were presented to the public in late November in the form of an alternatives newsletter. The public had a 30-day review and comment period, which ended December 31. During that time, public meetings were conducted at four locations in southwestern Oregon to further solicit public input on the alternatives.

In January 1997 the planning team (represented by members from the park, the Seattle Support Office, and the Denver Service Center) met in Portland, Oregon, to select a proposed action.

This *Draft Visitor Services Plan / Environmental Impact Statement* is the next stage in the planning process and represents another opportunity for the public to evaluate and comment on the alternatives and proposed action.

PARK PURPOSE AND SIGNIFICANCE

Purpose

The **purpose** statement explains why Crater Lake National Park was established. The following statements were taken from the park's establishing legislation (16 USC 121).

Crater Lake National Park is a tract of land encompassing 183,244 acres "dedicated and set apart forever as a public park or pleasure ground for the benefit and enjoyment of the people of the United States" (16 USC 121). The act that established the park required that adequate measures be taken for the "preservation of the natural objects . . . the protection of the timber . . . the preservation of all kinds of game and fish." The act required that the park be available, under regulations established by the Department of the Interior, for use by "scientists, excursionists, and pleasure seekers."

The act that established the National Park Service requires that, among other things, the agency "promote and regulate the use of national parks . . . by such means and measures as conform to the fundamental purpose of said parks . . . which purpose is to conserve the scenery . . ." Crater Lake's enabling legislation provides for visitor accommodations by stating that "restaurant and hotel keepers, upon application to the Secretary of the Interior, may be permitted by him to establish places of entertainment within the Crater Lake National Park for the accommodation of visitors, at places and under regulations fixed by the Secretary of the Interior, and not otherwise."

Significance

Information concerning the **significance** of park resources is summarized to better identify, in broad terms, why visitor services have centered on the enjoyment of scenic beauty while also providing interpretation of the park's natural and cultural resources. Statements about the significance of park resources were gleaned from previous planning documents and are supported by a wealth of scientific studies, technical literature, and popular accounts.

MANAGEMENT OBJECTIVES

The National Park Service faces a tremendous challenge at Crater Lake to minimize the impact on the park's natural and cultural resources while providing for visitors' enjoyment of the park. This is especially acute in developed areas where visitors concentrate and where the kind and level of services available often dictate how much impact there will be on park resources. The following management objectives were devised to guide the development of alternatives in the *Visitor Services Plan*:

- ❖ Protect the natural features and resources for which the park was established.
- ❖ Minimize the impact of commercial visitor services on Crater Lake, and protect the park's significant cultural resources.
- ❖ Offer a high-quality visitor experience consistent with NPS and park management policies. Provide necessary and appropriate information, interpretation, and educational programs that orient the public to the park and foster understanding and appreciation of the park's natural and cultural resources.
- ❖ Make available necessary and appropriate commercial visitor services to meet the needs of visitors and to enhance their enjoyment of the park.

PURPOSE OF AND NEED FOR THE ACTION

Crater Lake is one of the most famous lakes on earth, principally because of the beauty imparted by its large size, blue color, mountain setting, and ever-changing character.

Crater Lake lies in a caldera that was left by the climactic eruption of Mount Mazama more than 7,700 years ago. The circular lake, which formed in the caldera primarily from snowmelt and rain, is about 6 miles across at its widest point and covers 21 square miles. Scientists consider Crater Lake and its surroundings a model for how small calderas evolve in geologic time. This deep, pure, stable caldera lake is fully encircled by nearly 26 miles of colorful lava cliffs that rise from 500 to 2,000 feet above the surface of the water. At a depth of 1,932 feet, Crater Lake is the deepest freshwater lake in the United States and the seventh deepest lake in the world. Crater Lake holds the world record for clarity among lakes and has been the object of scientific study for more than a century. The lake is unique for the scientific research related to its pristine waters, associated geothermal activities, and unusual aquatic organisms.

The mature forests that surround Crater Lake are largely preserved in their pristine condition, and nearly 180,000 acres (98%) of the park has been recommended for wilderness designation. Most forests have never been logged and harbor a variety of plant and animal life characteristic of higher elevations in the Cascade Range. Because extensive alteration of forestland has taken place elsewhere in the range, some of these plants and animals are rare.

Some of the nation's best examples of blending rustic architecture and other built features with a national park setting can be seen at Rim Village and at park headquarters in Munson Valley. This designed landscape was constructed over a 15-year period beginning in 1926. Most of its features are listed on the National Register of Historic Places.

ISSUES AND CONCERNS

RIM VILLAGE

The visitor experience has changed over time with the addition of more commercial services and facilities. Is the present level of commercial visitor services and staffing appropriate and/or beneficial to visitors? A reduction in commercial visitor services and staffing would avert the need to construct additional concession employee housing (Rim Dormitory is overcrowded and contributes to a high turnover rate for the employees). Reducing commercial services and staffing would also limit the need for parking and other facilities. For example, is it necessary to have the gift store at Rim Village, or could it instead be located at Mazama Village or outside the park?

There is no visitor center at Rim Village that provides barrier-free, year-round viewing and interpretation of Crater Lake.

Traffic at Rim Village in the middle of the day during the peak portion of the summer season encroaches on the visitor experience by interfering with viewing and visitor enjoyment of Crater Lake. Should the roads, parking areas, and walkways be redesigned to relieve congestion and enhance lake viewing? This issue is significant, especially if changing these facilities would require the removal or alteration of historic resources that are listed on the national register.

There is potential for oil and other pollutants to drain from the parking area on the rim into the caldera. None of the research to date indicates there has been an impact on the pristine quality of Crater Lake; however, monitoring of this situation should continue to ensure the resource is not being negatively affected.

MAZAMA VILLAGE

Are group campsites and additional motel units appropriate for Mazama Village? Should certain concession services currently provided at Rim Village be relocated to Mazama Village, or, if relocated, should these services be outside the park? Which concession services are involved?

CLEETWOOD

Boats on Crater Lake are perceived by some visitors as encroaching on the pristine nature of the lake, and a determination is needed regarding the appropriate level for tour boat service on Crater Lake. In other words, should tour boats be eliminated on Crater Lake or should there be changes in the length and routes or in the number of boat tours? What is the appropriate level of tour boat service on Crater Lake?

Determinations are also needed to identify what can be done to improve the visitor experience at Cleetwood, including whether new structures are needed at the rim and/or lakeside, and if changes are needed at the dock.

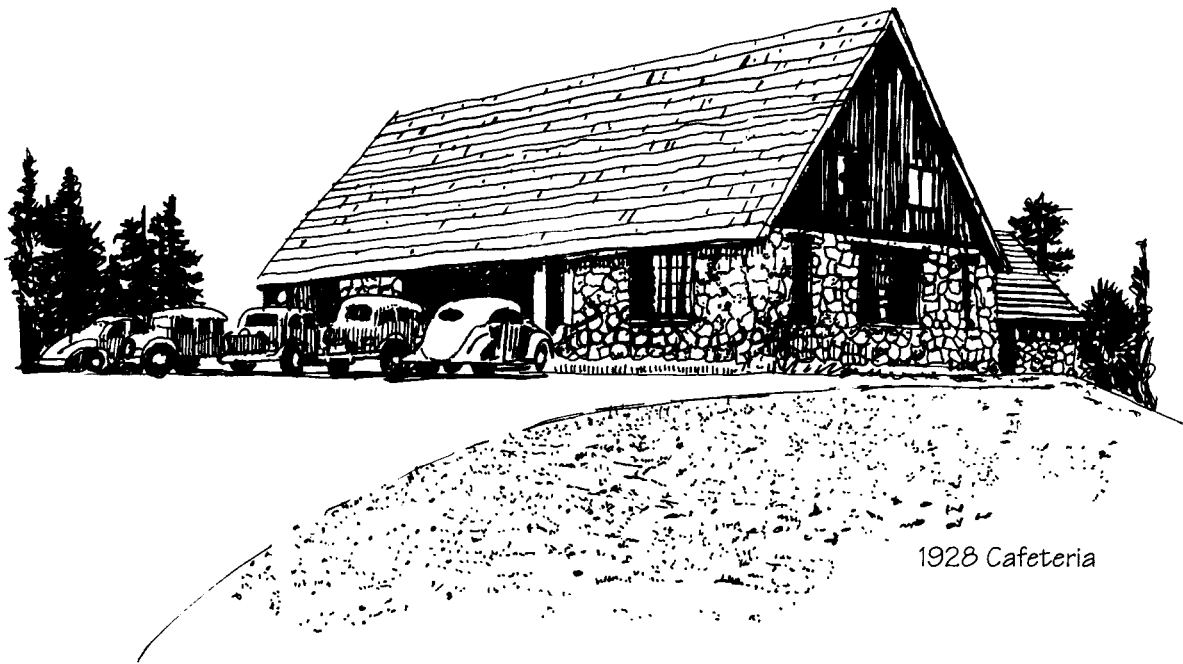
PURPOSE OF AND NEED FOR THE ACTION

The trail surface is eroding and some action is needed to slow this process. In addition, the trail passes through a slide chute that experiences periodic rockfall. It is necessary to determine what action is needed, if any, to lessen the hazard along this section of trail.

The fuel system that supplies gas for the tour boats has the potential to leak gasoline into the lake and caldera. Should the fuel system be removed, upgraded or modified?

ISSUES BEYOND THE SCOPE OF THIS PLAN

There is currently a proposal to develop a research institute / environmental education center in the park; however, this proposal is not being addressed in this document because it needs further evaluation and analysis.



1928 Cafeteria

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

The National Park Service has identified five conceptual alternatives for Crater Lake National Park. Alternative A (the proposed action) is a mix of proposals that are intended to protect park resources and enhance the visitor experience. Alternative B (no action) would continue the existing conditions at the park and would allow for the completion of any facilities currently under construction. Alternative C would offer a more self-directed visitor experience that would be less facility-dependent and less structured than at present. Alternative D would enhance interpretive services and provide a wider variety of commercial services. Alternative E is primarily based on the planning direction presented in the *Record of Decision* for the 1995 *Development Concept Plan / Environmental Impact Statement*. The *Record of Decision* required a further review of those directions based on the public comments received. The proposals in these five alternatives were first presented in the alternatives newsletter sent out in November 1996.

HOW ALTERNATIVES IN THIS PLAN RELATE TO THOSE PRESENTED IN THE 1996 ALTERNATIVES NEWSLETTER

Alternatives for visitor services and facilities, interpretation, and resource protection at the developed areas of Crater Lake National Park were first presented in a newsletter that was sent out in November 1996. Alternatives in the newsletter were assigned numbers 1–5. The order of the alternatives in this document has changed substantially from the newsletter, and the alternatives are now presented alphanumerically A–E. Alternative A most closely resembles newsletter alternative 2 but contains selected portions of other alternatives. Alternative B matches newsletter alternative 5; alternatives C, D, and E match newsletter alternatives 1, 3, and 4, respectively.

The appropriate types and levels of winter recreation activities are defined in the 1994 *Winter Use Plan* and are common to all the alternatives being considered.

Maps of the developed areas are presented for each alternative to aid in the understanding of the alternatives.

ALTERNATIVE A: ENHANCE RESOURCE PROTECTION AND VISITORS' APPRECIATION OF THE PARK (PROPOSED ACTION)

GENERAL CONCEPT

Alternative A is a blend of actions intended to improve the protection of park resources while providing enjoyable visitor experiences. This alternative would enhance educational and interpretive opportunities to promote better visitor understanding, appreciation, and ultimately, continued support for the preservation of Crater Lake. NPS interpretive services would be emphasized, commercial services would be modified to better serve visitors, and some historic structures would be used more as they were initially intended. Maps showing the actions proposed appear on the following pages.

DEVELOPED AREA ALTERNATIVES

A new visitor contact station would be built at Rim Village near the cafeteria building to provide information, orientation, interpretation, Natural History Association (NHA) sales, a post office, and year-round views of the lake. The community house would be rehabilitated and used for summer evening programs. The Sinnott Memorial would be used as it was designed — a place from which to present interpretive talks and exhibits about Crater Lake geology and ecosystems. The Kiser Studio would offer interpretive exhibits on the cultural resources of the studio and village. Additional interpretation and wayside exhibits would be developed in the village to enhance visitor understanding and appreciation of the park. During the summer fine dining and overnight accommodations would continue at Crater Lake Lodge. The cafeteria building would be converted to its original 1928 configuration and external appearance, and the nonhistoric additions to the building would be removed. The rehabilitated cafeteria would provide a deli/fast food service and limited sundry and gift sales related to Crater Lake. In the winter a minimal amount of prepackaged food and beverages would continue to be available for visitors.

Visitors would have access to essential interpretive and commercial services to meet immediate needs; however, other services that would otherwise detain visitors in Rim Village would be provided elsewhere. There would be a reduced demand for parking spaces because most visitors would spend less time at Rim Village. The parking lot in front of the cafeteria, next to the caldera rim, would be removed, and a new smaller parking lot would be built south of the cafeteria. The new lot would be connected to Rim Village Drive just east of the visitor contact station, thereby eliminating traffic in front of the cafeteria building and visitor contact facility. The area in front of the cafeteria building would be converted to pedestrian space. Visitors could use this space to walk from the visitor contact station and cafeteria building to the rim edge to view the lake and to walk along the promenade. Most parking would be retained along Rim Village Drive. Rim Dormitory would be removed and the site would be used for bus parking. The historic landscape of the 1930s would be restored along the caldera rim, recreating the designed environment of that era. The picnic area would be redesigned to improve access and circulation.

Mazama Village would become the focal point for most commercial visitor services. A new full-service restaurant would replace the Watchman restaurant at Rim Village. Locating a new restaurant at Mazama Village would be more convenient for the more than 500 overnight guests staying at the motor inn and campground. Retail merchandise space would be expanded at the Mazama Village store

by eliminating the coin-operated laundry. This would partially offset the unavailability of some gift sale items at the rim. The public showers and gasoline station would remain in their present location.

The amphitheater would be relocated to a more central area, and a new amphitheater parking lot would be constructed. The new amphitheater location would greatly reduce foot traffic through campsites and would make it easier for campers and motel guests to locate and access the facility. Visitor information and orientation would be available at a self-service kiosk near the Mazama Village store. The existing road system would remain.

The 40-unit Mazama Village Motor Inn would continue to provide summer season overnight lodging. Overnight camping would continue to be available at the 213-site Mazama campground. In response to public input regarding group camping, two group sites would be added west of the main campground road or at the Lost Creek campground. The park would study this issue further before making a determination as to the most suitable location.

Additional replacement housing for concession employees would be located outside the park. However, if studies determined that this was not feasible, the construction of up to 30 sites might be authorized for an employee RV/trailer facility near the Mazama Dormitory complex west of OR 62 or the number of beds at Mazama Dormitory would be increased to about 100. A small concessioner maintenance facility would also be constructed in the same area to serve the concession facilities at Rim Village and Mazama Village. The commercial laundry would be relocated to this facility.

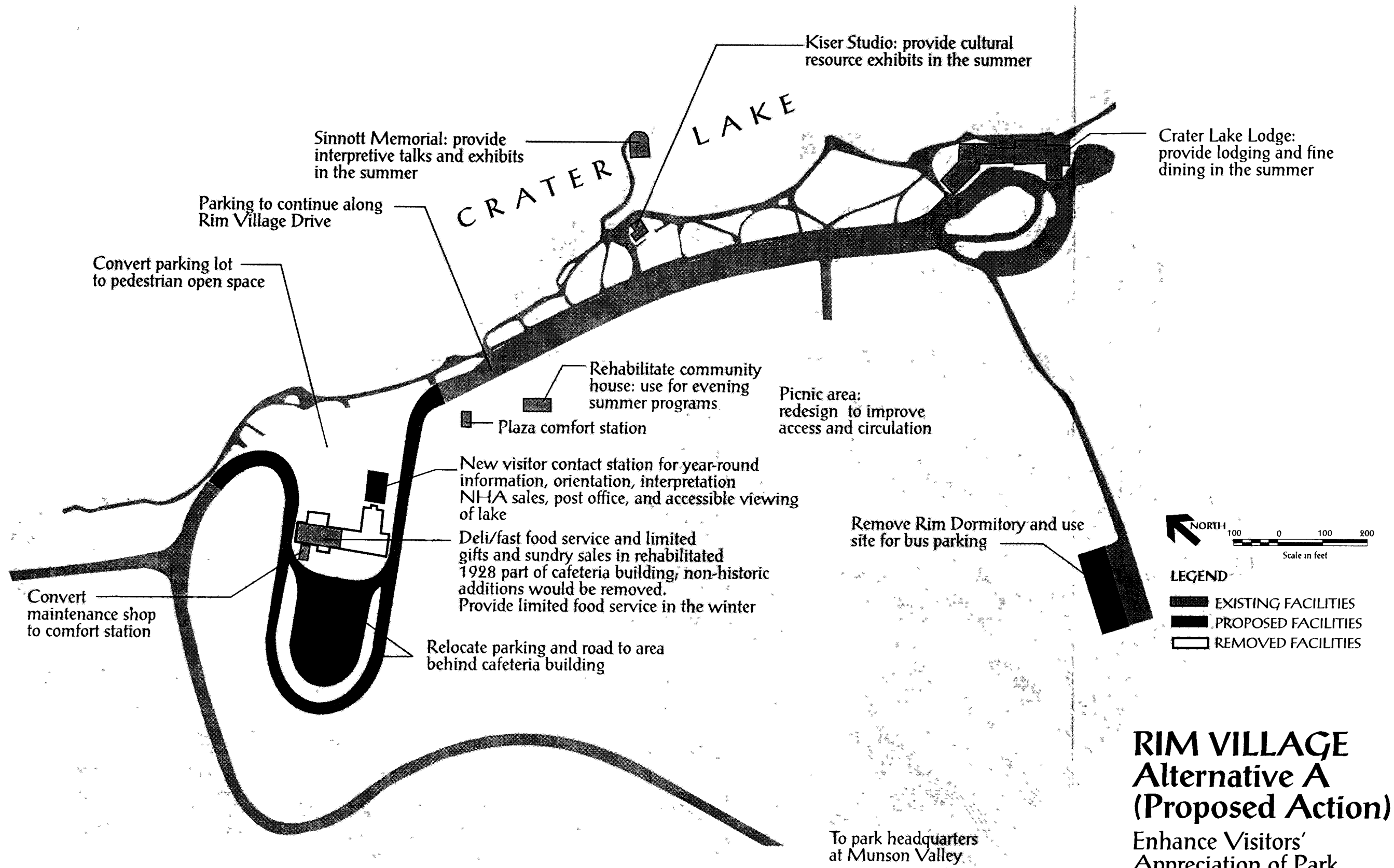
The frequency of boat tours at Cleetwood would be reduced from nine to seven per day, and an eighth tour would be provided when necessary to pick up visitors at Wizard Island. The tour lengths and routes would vary, as would the interpretive talks, which would enhance visitors' understanding of the lake and the caldera and would diversify the visitor experience. A reservation system would be implemented for the convenience of visitors who wanted to take a boat tour. The reduction of boat tours coupled with the reservation system would maintain a viable economic operation while reducing parking problems during peak hours. Adding an interpreter on Wizard Island and increasing interpretation throughout the area would further meet the interpretive, educational, and resource protection goals of this alternative. A pilot program to use electric powered boats or alternate fuel sources is an option that could be implemented when the technology becomes practical for use at Crater Lake.

The Cleetwood parking lot would be restriped to provide 120 spaces, but its overall size and configuration would remain the same. The unofficial overflow parking areas along Rim Drive would be eliminated.

The ticket sales office for boat tours would be housed in a permanent structure at the rim near the Cleetwood trailhead/parking area. The sale of limited snacks, beverages, and other merchandise items directly tied to the needs of boat tour participants would be permitted in the same building. A portion of this building would also be used for the storage of boat operations and maintenance equipment. This building would be designed to match the park's architectural theme; any electricity needed would be furnished through a solar photovoltaic system. The Cleetwood Trail would be modified to add variety and a greater level of interpretation to the visitor experience and for safety and erosion control purposes. A small permanent structure would be built at the lakeside for storage. The lakeside structure would have limited storage space for concession boat operations and maintenance needs. A small waiting area with an unobtrusive shade structure would be constructed on the lakeshore to provide visitors with protection from the sun and inclement weather. On the lakeshore the bulkhead would be improved and the dock replaced; however, no efforts would be made to ensure that it would be usable by boats at extreme water levels. The entire fuel delivery system for the tour boats is

scheduled to be replaced in 1998. The fuel supply system would consist of a screened, aboveground storage tank adjacent to the rim, a double-wall fuel line down the caldera wall, and a protected, screened aboveground storage tank at the lakeside. This would be connected to the dispensing unit by a double-wall fuel line running under the trail at the lakeside. All components of the fuel system would be upgraded to Oregon Department of Environmental Quality (ODEQ) and Environmental Protection Agency (EPA) standards.

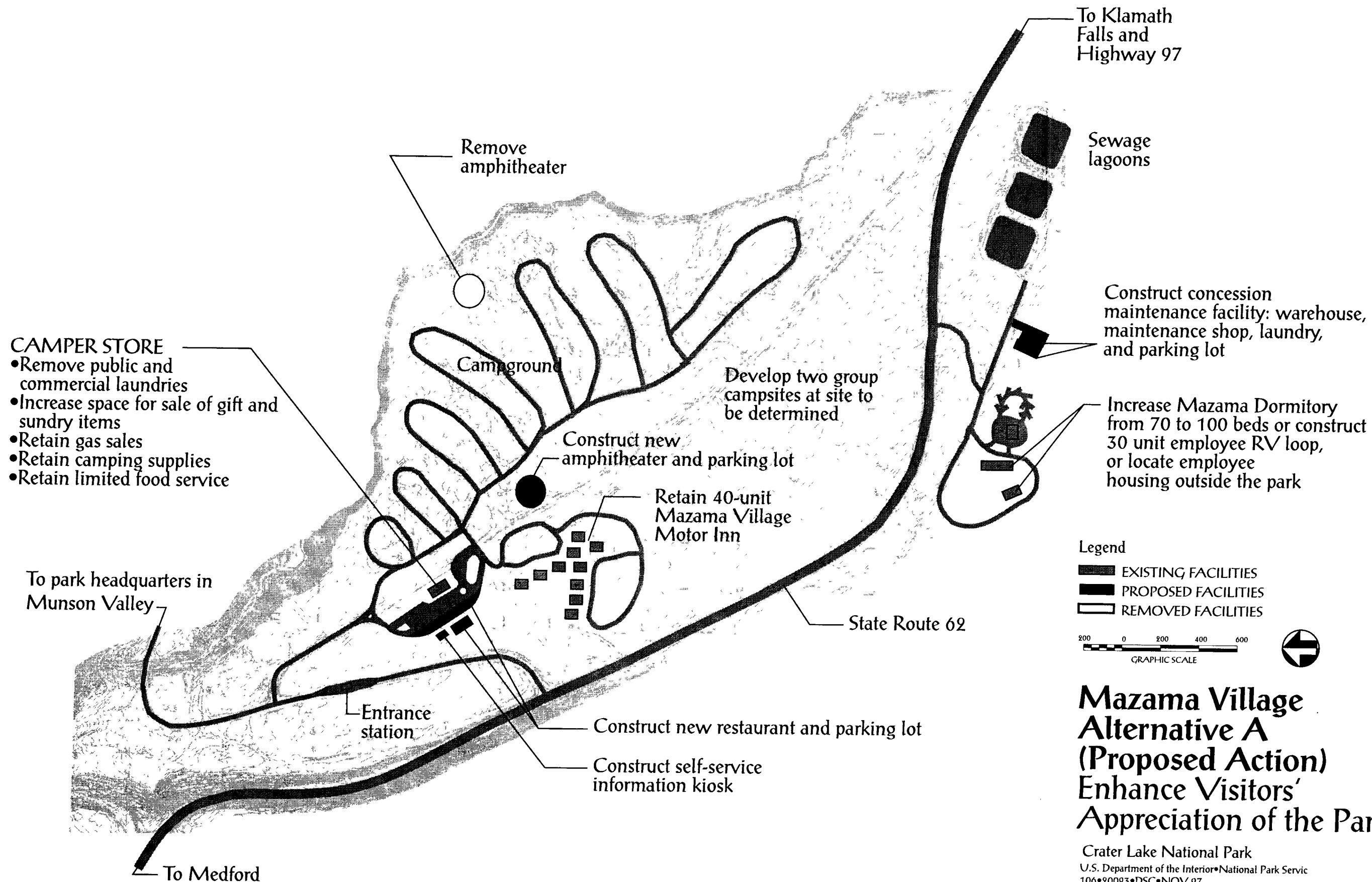
Munson Valley would remain the focal point for park administration and housing. There would be no visitor contact facility during the summer. In winter a backup visitor contact station with NHA sales items and a post office would be available when snow conditions make the Rim Village facility inaccessible.



RIM VILLAGE Alternative A (Proposed Action)

Enhance Visitors' Appreciation of Park

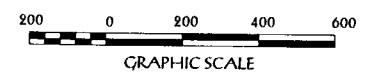
Crater Lake National Park
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- CAMPER STORE**
- Remove public and commercial laundries
 - Increase space for sale of gift and sundry items
 - Retain gas sales
 - Retain camping supplies
 - Retain limited food service

Legend

- █ EXISTING FACILITIES
- █ PROPOSED FACILITIES
- ▭ REMOVED FACILITIES



**Mazama Village
Alternative A
(Proposed Action)
Enhance Visitors'
Appreciation of the Park**

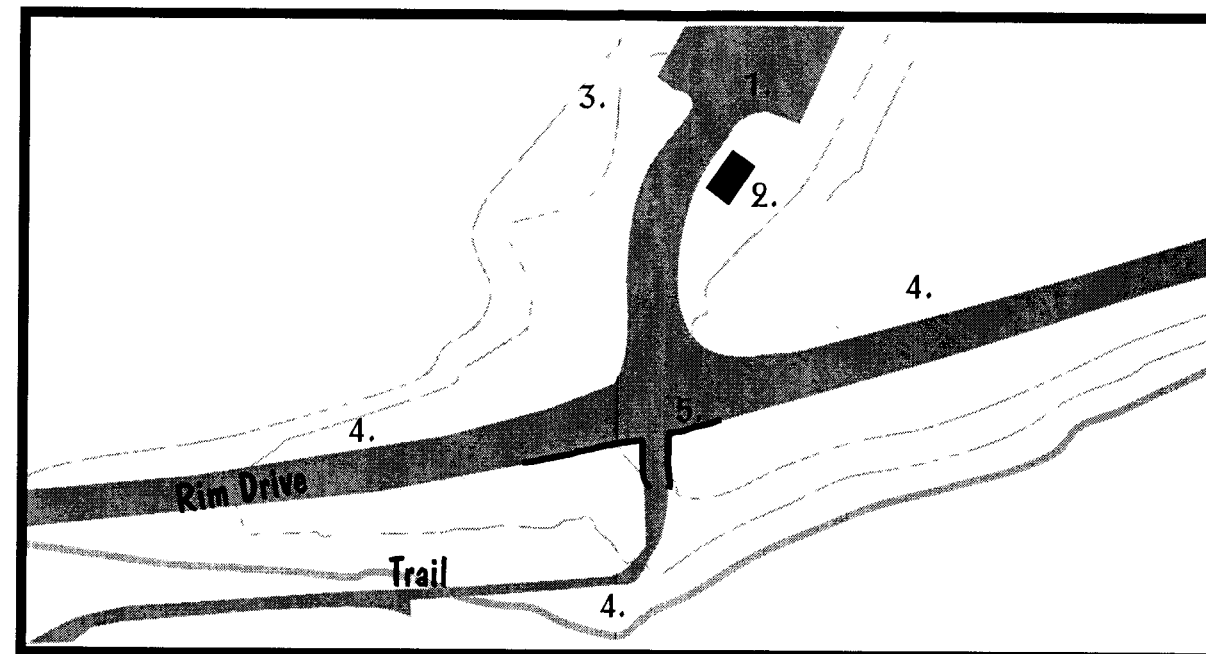
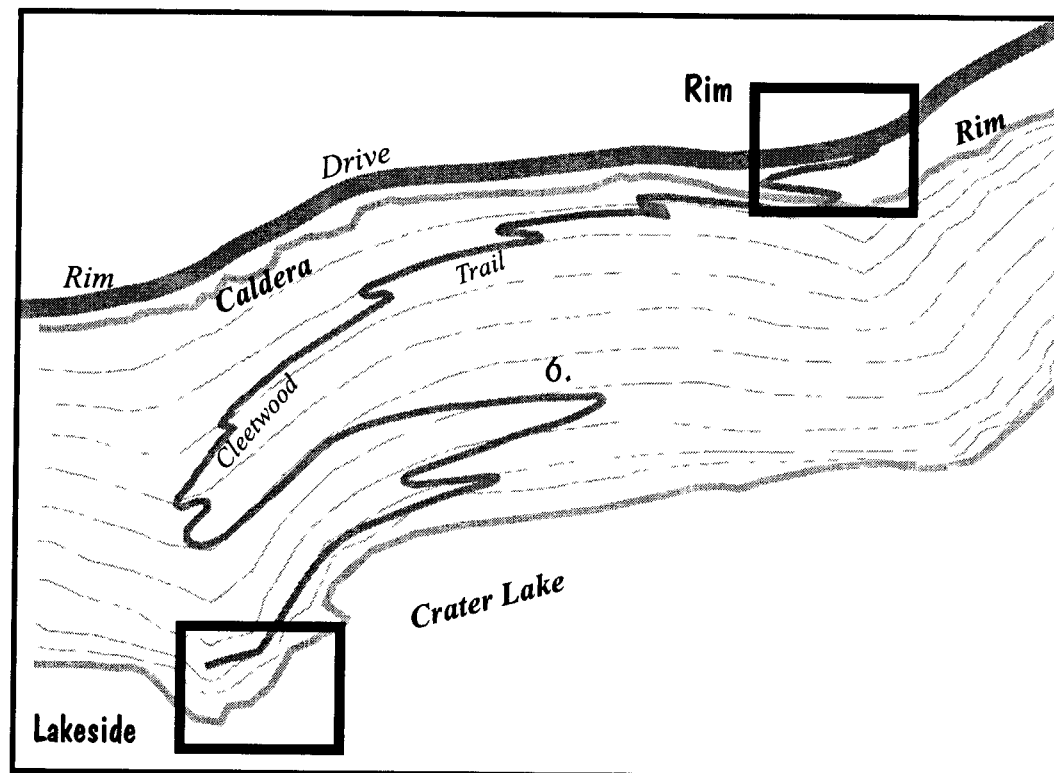
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Key Elements:

- * 7 (+1) Boat tours per day.
- * Small permanent structures at rim and lakeside
- * Replace dock and improve bulkhead

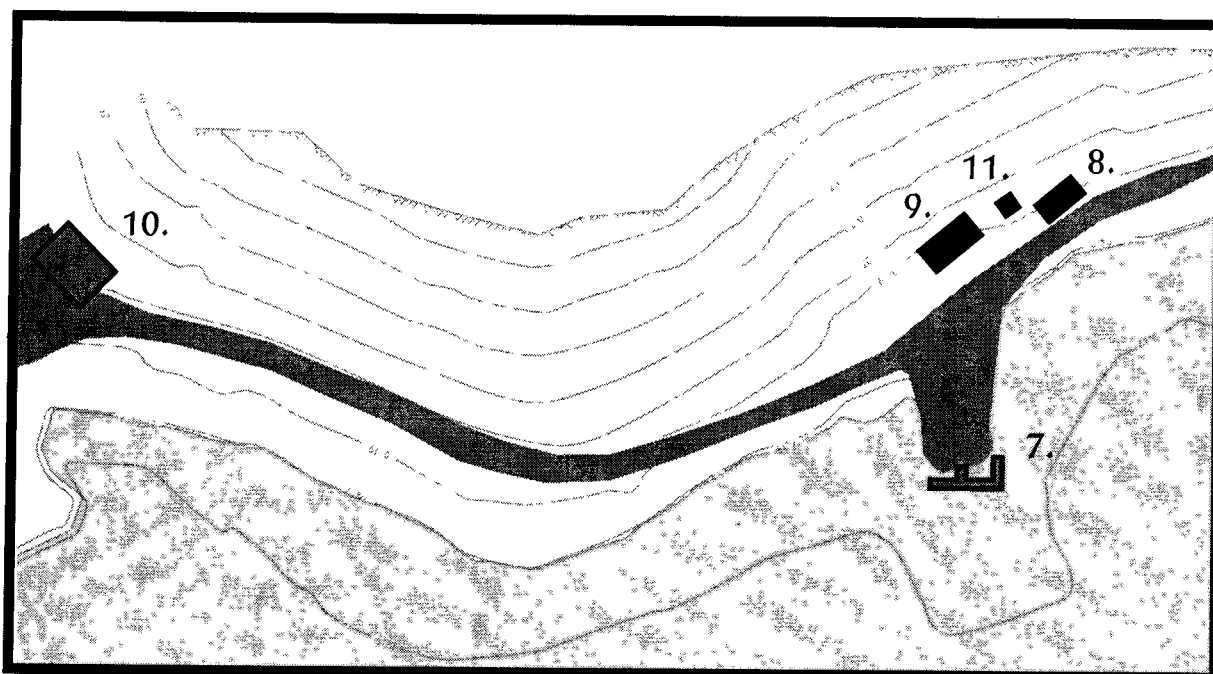
Trail Area

- 6. Rehabilitate trail and replace retaining walls as necessary for visitor safety and aesthetics. Add trail wayside exhibits.



Trailhead Site Plan

- 1. Restripe parking lot to provide 120 spaces
- 2. Construct permanent structure for storage of boat operations and maintenance equipment, and for sale of tickets, and limited food and sundry items. Construct composting toilet.
- 3. Retain existing picnic area
- 4. Improve signage along Rim Drive and Cleetwood Trail
- 5. Define trail entry and crosswalk



Lakeside Site Plan

- 7. Replace dock and improve bulkhead
- 8. Construct seasonal shade structure with seating for visitor comfort
- 9. Develop small permanent structure for storage of supplies and equipment for boat operations and maintenance needs.
- 10. Retain vault toilets.
- 11. Upgrade fuel system to meet ODEQ and EPA standards

Legend

-  EXISTING FACILITIES
-  PROPOSED FACILITIES



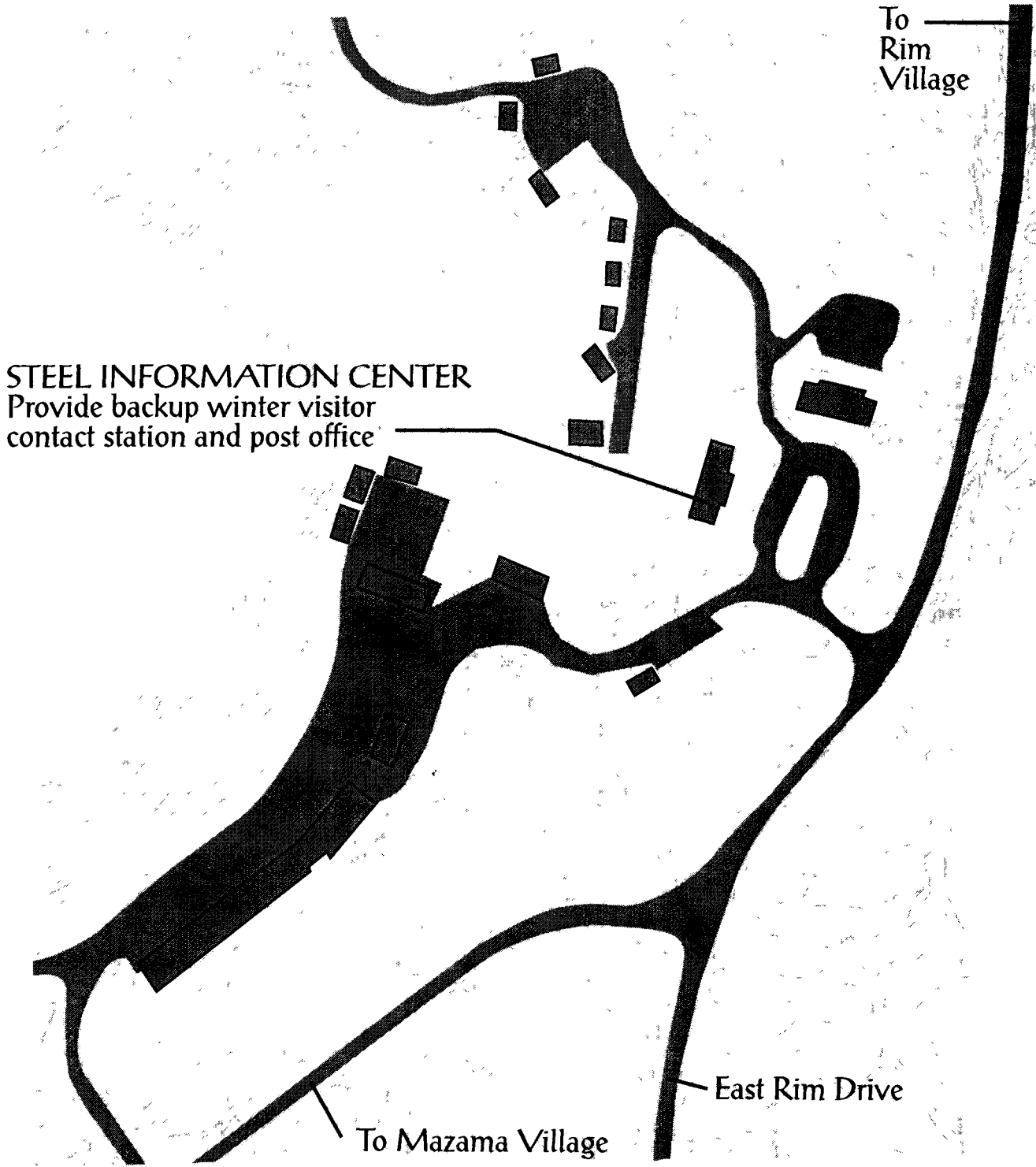
Not to scale

Cleetwood Alternative A (Proposed Action)

Enhance Visitors' Appreciation of the Park

Crater Lake National Park

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STEEL INFORMATION CENTER
 Provide backup winter visitor
 contact station and post office

To
 Rim
 Village

East Rim Drive

To Mazama Village

Legend

 Existing Facilities



**Munson Valley
 Alternative A
 (Proposed Action)**

Enhance Visitors' Appreciation
 of the Park

Crater Lake National Park

United States Department of the Interior
 National Park Service

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ALTERNATIVE B: NO ACTION

GENERAL CONCEPT

Under the no-action alternative the National Park Service would continue to provide existing services and facilities at established developed areas. Any facilities currently being developed in the park would be completed.

DEVELOPED AREA ALTERNATIVES

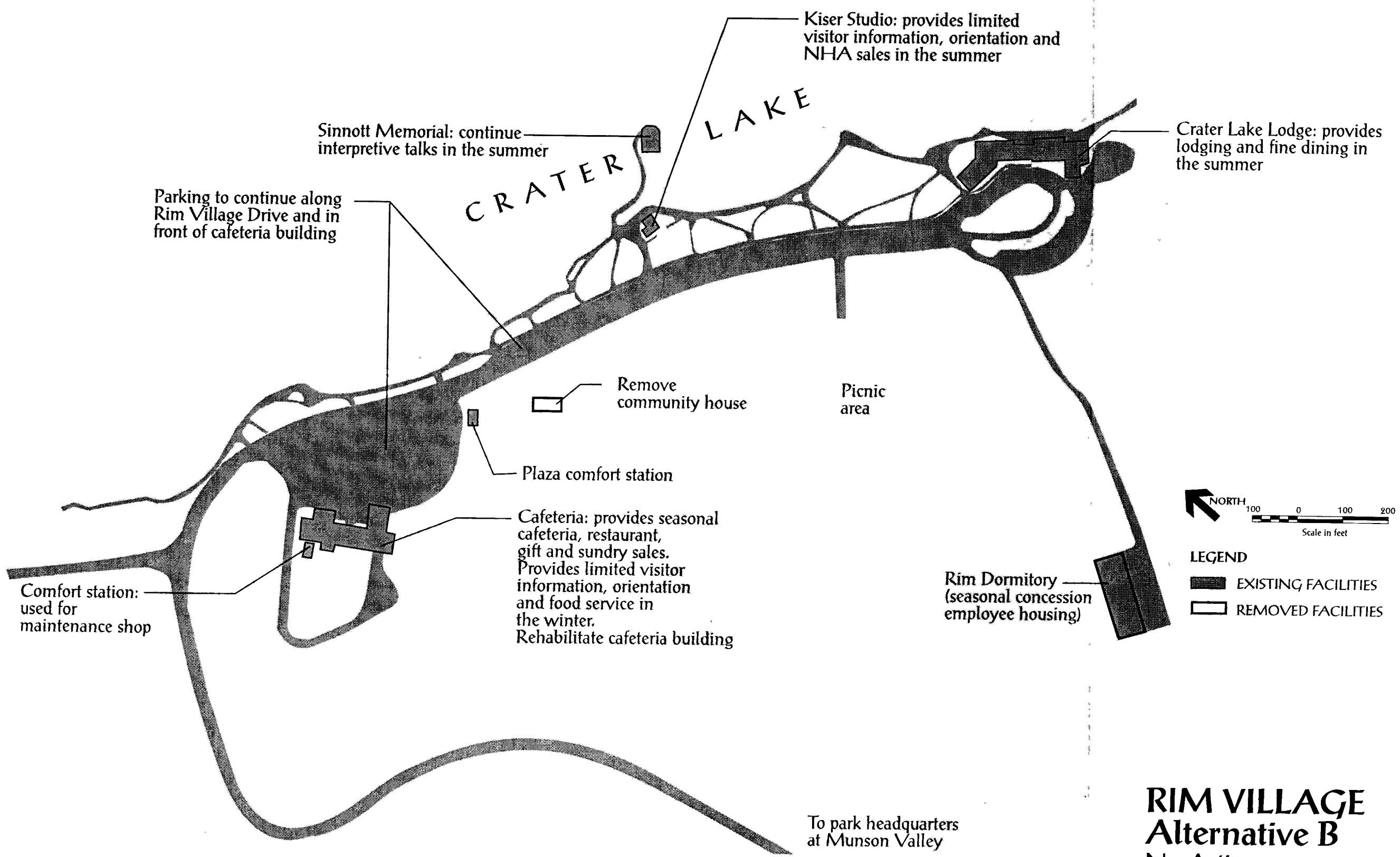
Fine dining would continue to be provided in the lodge, and the restaurant, cafeteria, and gift shop in the cafeteria building would remain. However, the cafeteria building has major structural problems that would require the rehabilitation of the concession facility. Visitor contact and NHA sales would continue to take place in the Kiser Studio, and NPS interpretive walks and exhibits would be available throughout the village and at the Sinnott Memorial. The community house, which no longer functions as a social gathering place or location for evening interpretive programs, would be removed. Parking would continue to be provided in front of the cafeteria building, along Rim Village Drive, and at the entrance to the lodge. The cafeteria building would continue to provide limited visitor information, orientation, and food service in the winter.

Mazama Village was developed to provide for increased visitation in the 1950s and 1960s. Its "completion" resulted in eventual closure of the Rim and Cold Spring campgrounds. Mazama Village also provided the place to relocate some commercial services formerly located at Rim Village (the cabins and store). Seasonal services include lodging (40-unit Mazama Village Motor Inn); a camper service store with prepackaged food, camper supplies, sundry sales items, public showers and laundry; a campground; an amphitheater; and a gasoline station. The 70-bed Mazama Dormitory is under construction and will be completed in 1998.

The Cleetwood Trail would continue to allow visitors to reach Crater Lake and the tour boat services. Interpretive exhibits would remain at the top and the bottom of the trail. Boat tours, which have been popular on the lake since the early part of the century, would continue to give visitors an opportunity to view Crater Lake and the caldera from a unique perspective. There are currently nine scheduled boat tours on Crater Lake from mid-to-late-June through mid-September. Minimal docking and equipment storage facilities would continue to be available. Temporary structures at the top and bottom of the trail would continue to provide restrooms and ticket and limited food and sundry sales. The trailhead parking lot would be restriped to provide 120 parking places 9 feet wide, but unofficial overflow parking would continue at peak times along Rim Drive.

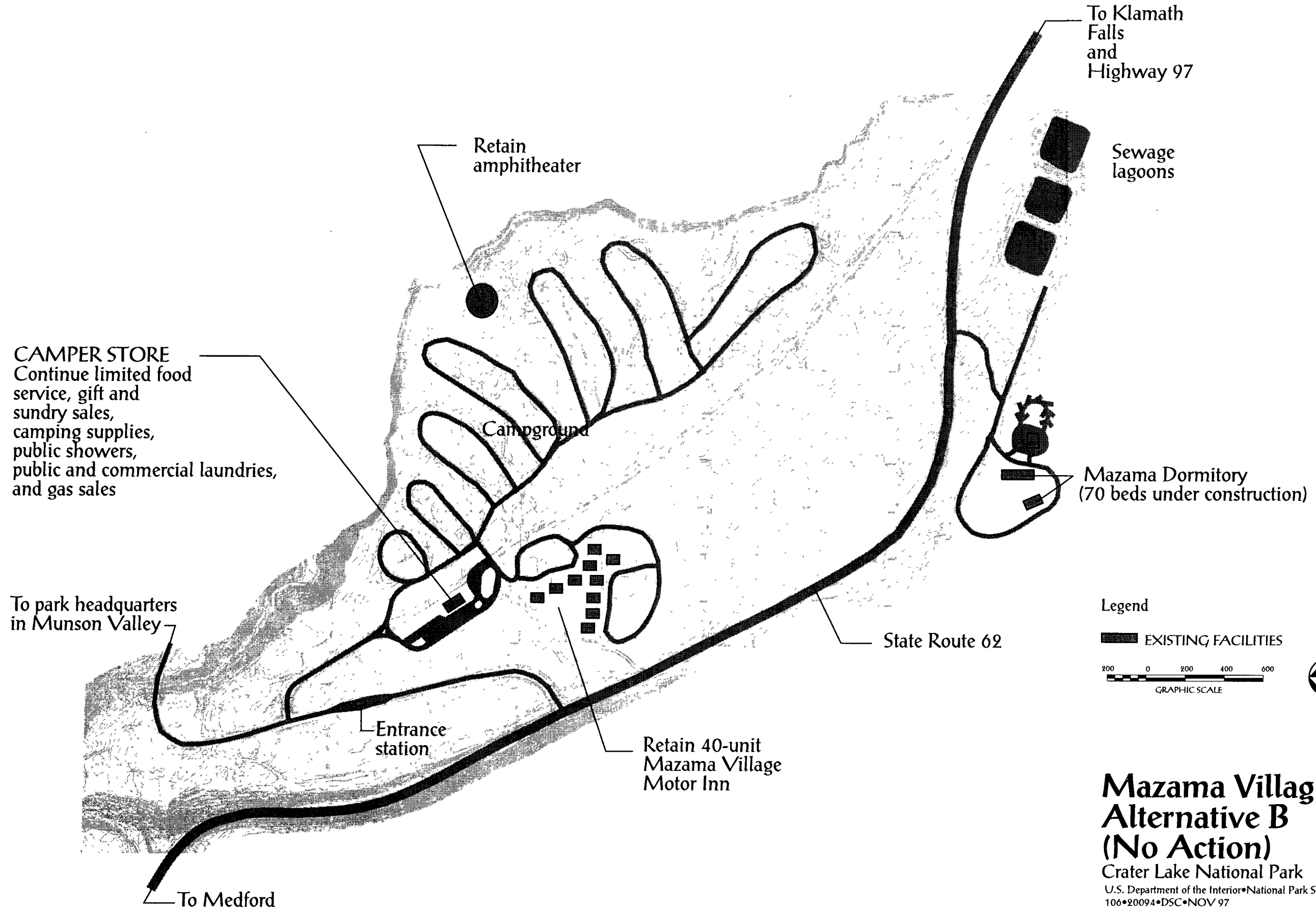
The entire fuel delivery system for the tour boats is scheduled to be replaced in 1998. The fuel supply system would consist of a screened, aboveground storage tank adjacent to the rim, a double-wall fuel line down the caldera wall, and a protected, screened aboveground storage tank at the lakeside. This would be connected to the dispensing unit by a double-wall fuel line running under the trail at the lakeside. All components of the fuel system would be upgraded to ODEQ and EPA standards.

Munson Valley would remain the focal point for park administration, housing, and year-round visitor contact. NHA sales and the post office would continue to be available year-round, and guided walks of the historic district would continue during the summer.



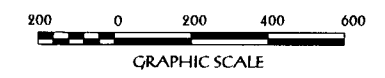
**RIM VILLAGE
Alternative B
No Action**

Crater Lake National Park
U.S. Department of the Interior • National Park Service
106 • 20099 • DSC • NOV 97



Legend

EXISTING FACILITIES



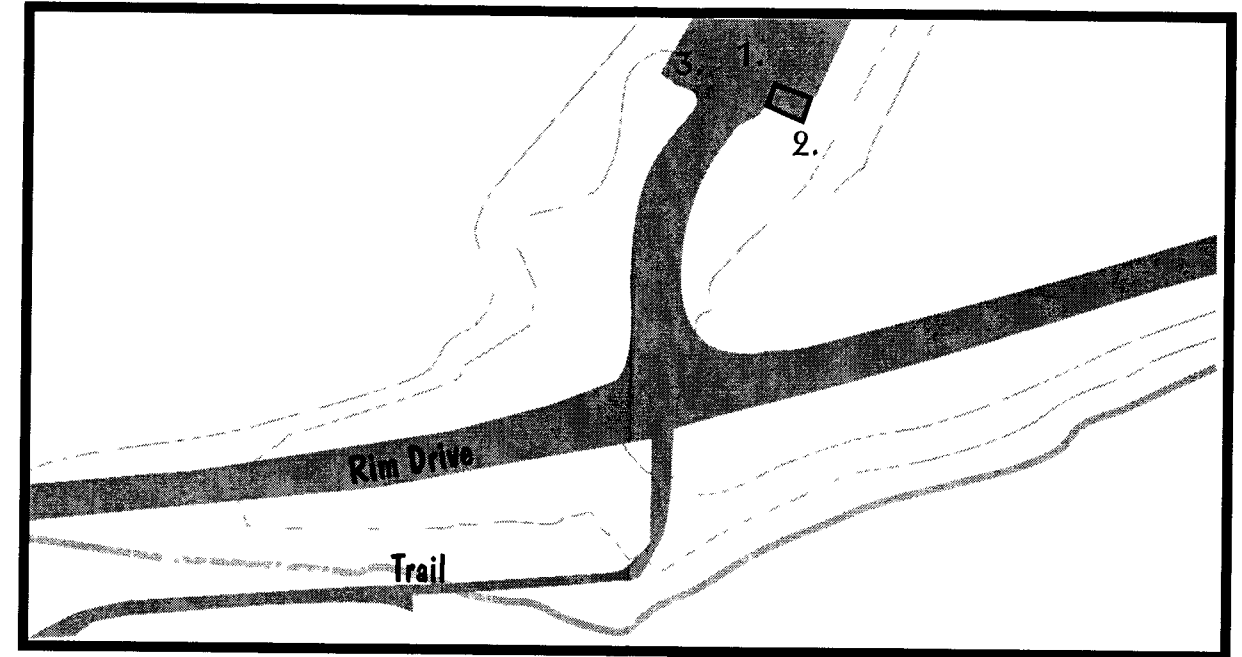
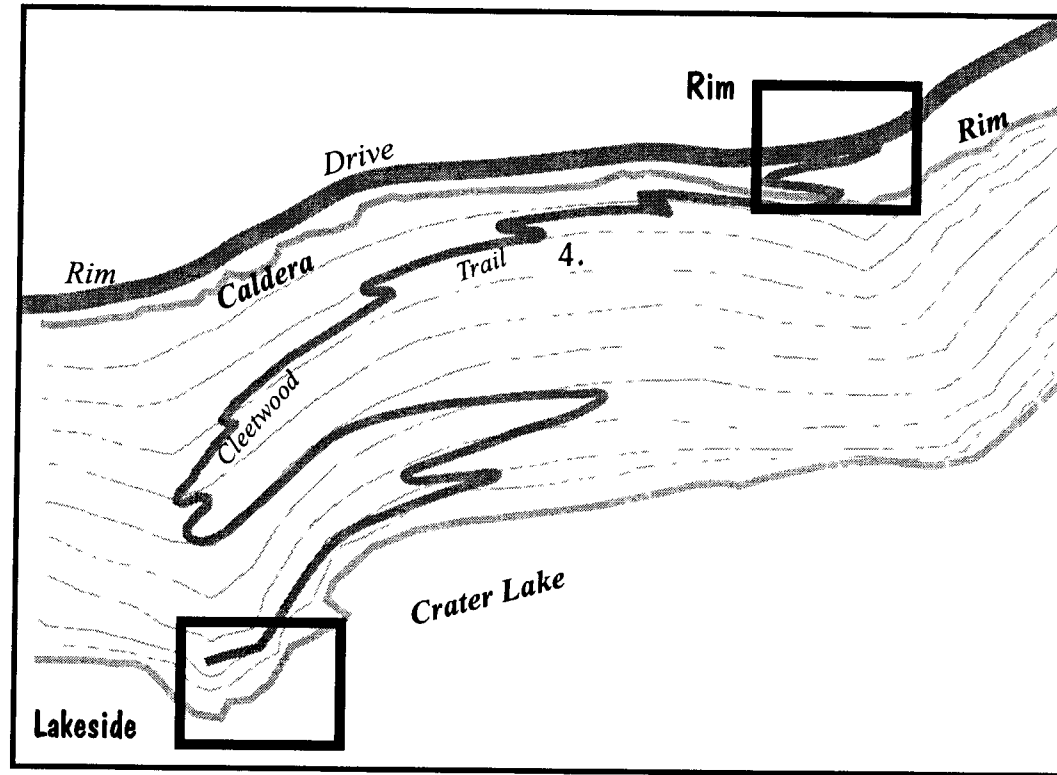
**Mazama Village
Alternative B
(No Action)**
Crater Lake National Park
U.S. Department of the Interior • National Park Service
106 • 20094 • DSC • NOV 97

Key Elements:

- * Temporary structures for Park Service and concession needs
- * Bulkhead and dock in current configuration
- * 9 (+1) Boat tours per day

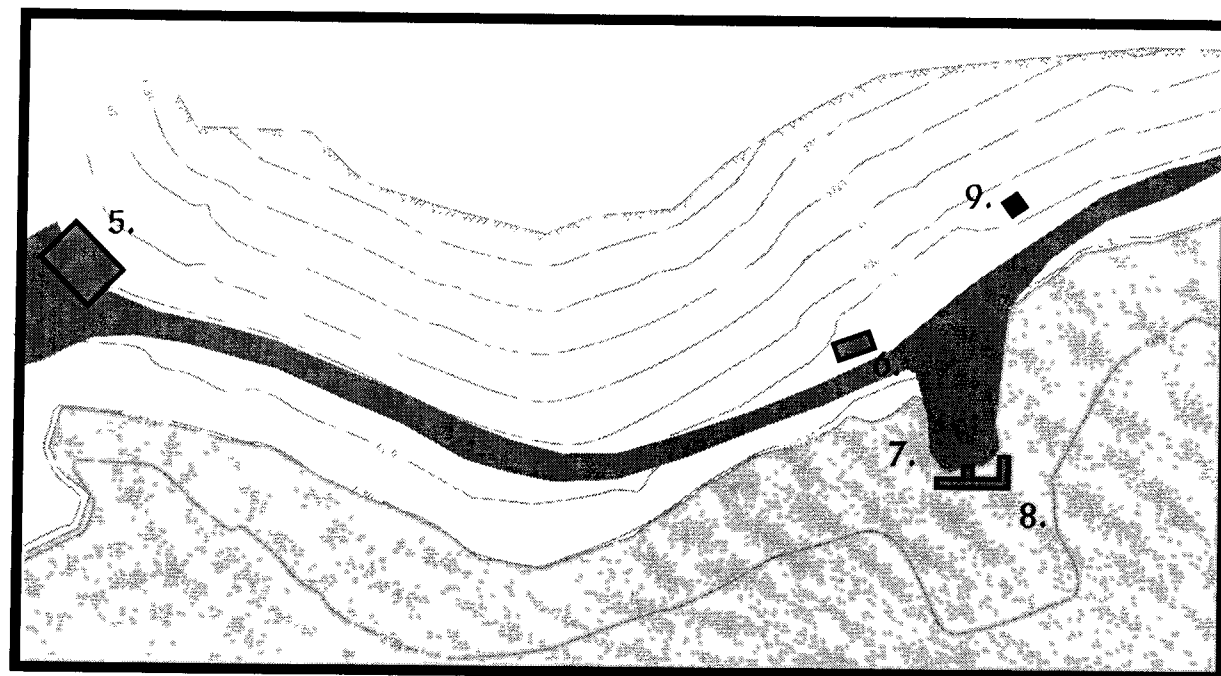
Trail Area

- 4. Retain existing trail layout and wayside exhibits at top and bottom of trail



Trailhead Site Plan

- 1. Restripe parking lot to provide 120 spaces; overflow parking would continue at peak times along Rim Drive
- 2. Temporary seasonal ticket office and limited food, sundry, and gift sales
- 3. Portable toilets in parking lot



Lakeside Site Plan

- 5. Existing toilets
- 6. Temporary concession boat operations building
- 7. Bulkhead
- 8. Dock remains in current configuration
- 9. Upgrade fuel system to meet ODEQ and EPA standards

Legend

- EXISTING FACILITIES
- PROPOSED FACILITIES



Not to scale

Cleetwood Alternative B (No Action)

Crater Lake National Park
 United States Department of the Interior • National Park Service
 106•20109•DSC•NOV 97

To
Rim
Village

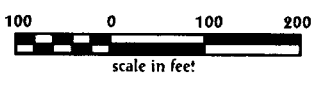
STEEL INFORMATION CENTER
Provide year-round visitor
contact station and post office



East Rim Drive

To Mazama Village

Legend
Existing Facilities



Munson Valley Alternative B (No Action)

Crater Lake National Park
United States Department of the Interior
National Park Service
106•20104•DSC•NOV 97

ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES

GENERAL CONCEPT

Alternative C would offer a more self-directed visitor experience that would be less facility-dependent and less structured than at present. Visitors would be able to travel to various park features and obtain onsite interpretation.

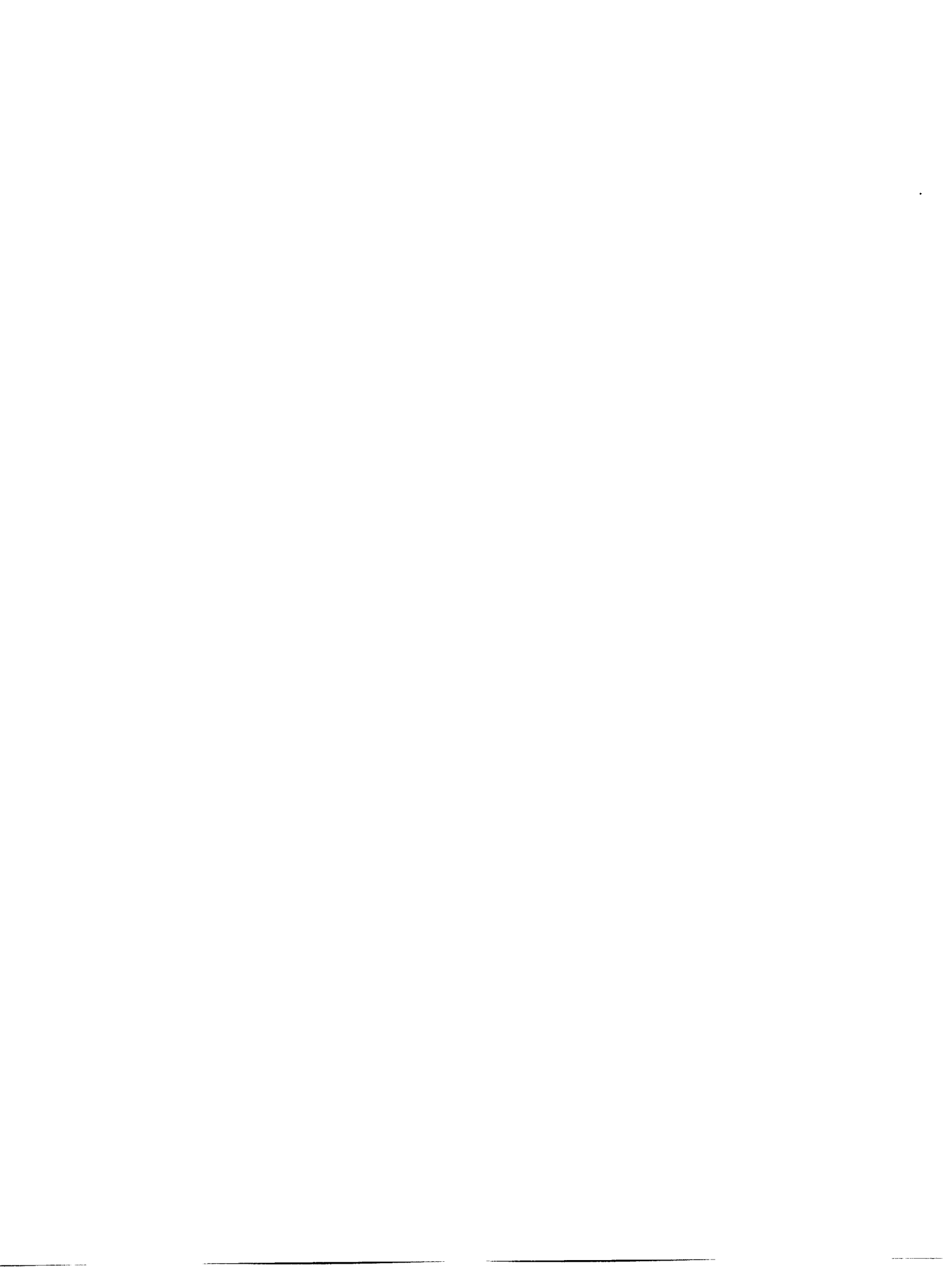
DEVELOPED AREA ALTERNATIVES

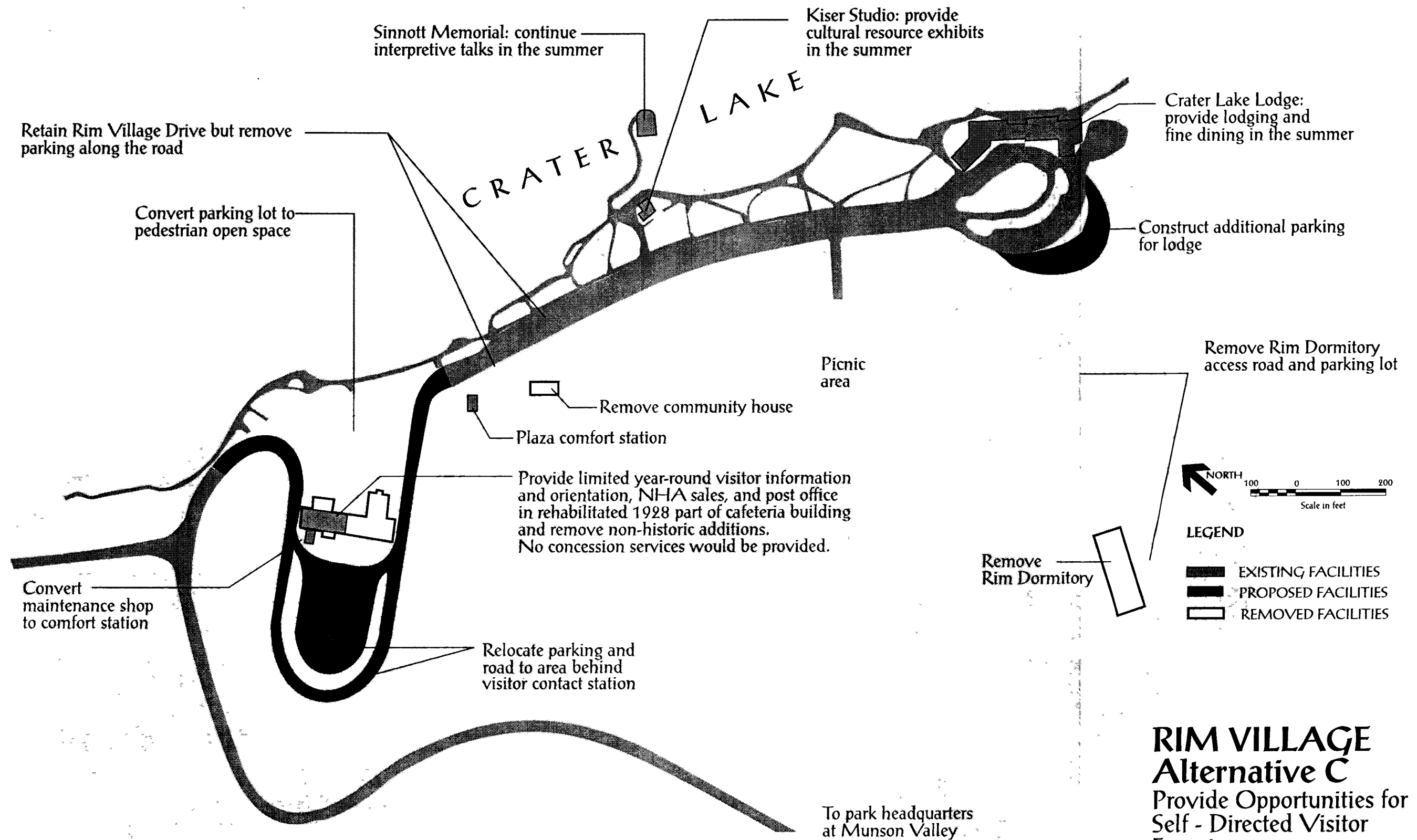
Crater Lake Lodge would continue to provide summer lodging and dining, but all other commercial services and associated support facilities at Rim Village would be eliminated to reduce impacts on natural and cultural resources. Food services, gift and sundry sales, and housing to replace Rim Dormitory would be available at Mazama Village. Visitor information, orientation, and interpretation, as well as NHA sales and a post office, would be available in Rim Village at a small year-round contact station in the rehabilitated 1928 part of the cafeteria building. The Sinnott Memorial would continue to be used for interpretive talks about Crater Lake geology, and the Kiser Studio would be converted to display cultural resource exhibits related to the village and the studio. Interpretation and visitor information would also be available at wayside exhibits along trails and at overlooks. A small parking area would be provided behind the visitor contact station, and a new parking loop would be built to expand parking at the lodge. Parking in the main lot, along Rim Village Drive, and at Rim Dormitory would be removed and converted to visitor pedestrian space. Generally this alternative would relieve vehicle and pedestrian congestion because there would be fewer facilities and activities to detain visitors at Rim Village.

Essential concession services at Mazama Village such as food, camping supplies, and gift sales would be slightly increased, and gasoline would continue to be available; however, public laundry and showers would be eliminated. Visitors would be assisted by a self-service information and orientation kiosk near the Mazama Village store. The amphitheater and campground would continue to be available at their present locations. There would be no public overnight lodging because the 40-unit Mazama Village Motor Inn would be converted to concession employee housing. A small concession maintenance facility would be constructed.

The boat tours at Cleetwood would be canceled to enhance the lake viewing experience. The dock and bulkhead would be replaced by a small dock and equipment storage structure for the research vessel so that monitoring of lake conditions could continue. The lakeside toilet would be retained and the entire fuel system could be removed and the impacted area restored. Fuel needed for search and rescue vessels would be carried down the trail in containers on low-impact vehicles. Interpretation would be enhanced along the Cleetwood Trail by constructing more exhibits at the rim and lakeshore and by providing trail pamphlets to assist visitors on their self-guided tour of the trail. The trail would be upgraded for safety and erosion control purposes, and low-impact equipment, such as powered wheelbarrows, would be used for NPS research operations. The parking lot would be reduced in size, and much of the area would be restored to natural conditions. Development at and near the parking lot would be minimal. The portable toilets would be retained at the rehabilitated area of the parking lot.

As in alternative A Munson Valley would remain the focal point for park administration and housing. In winter a backup visitor contact station with NHA sales items and a post office would be available.





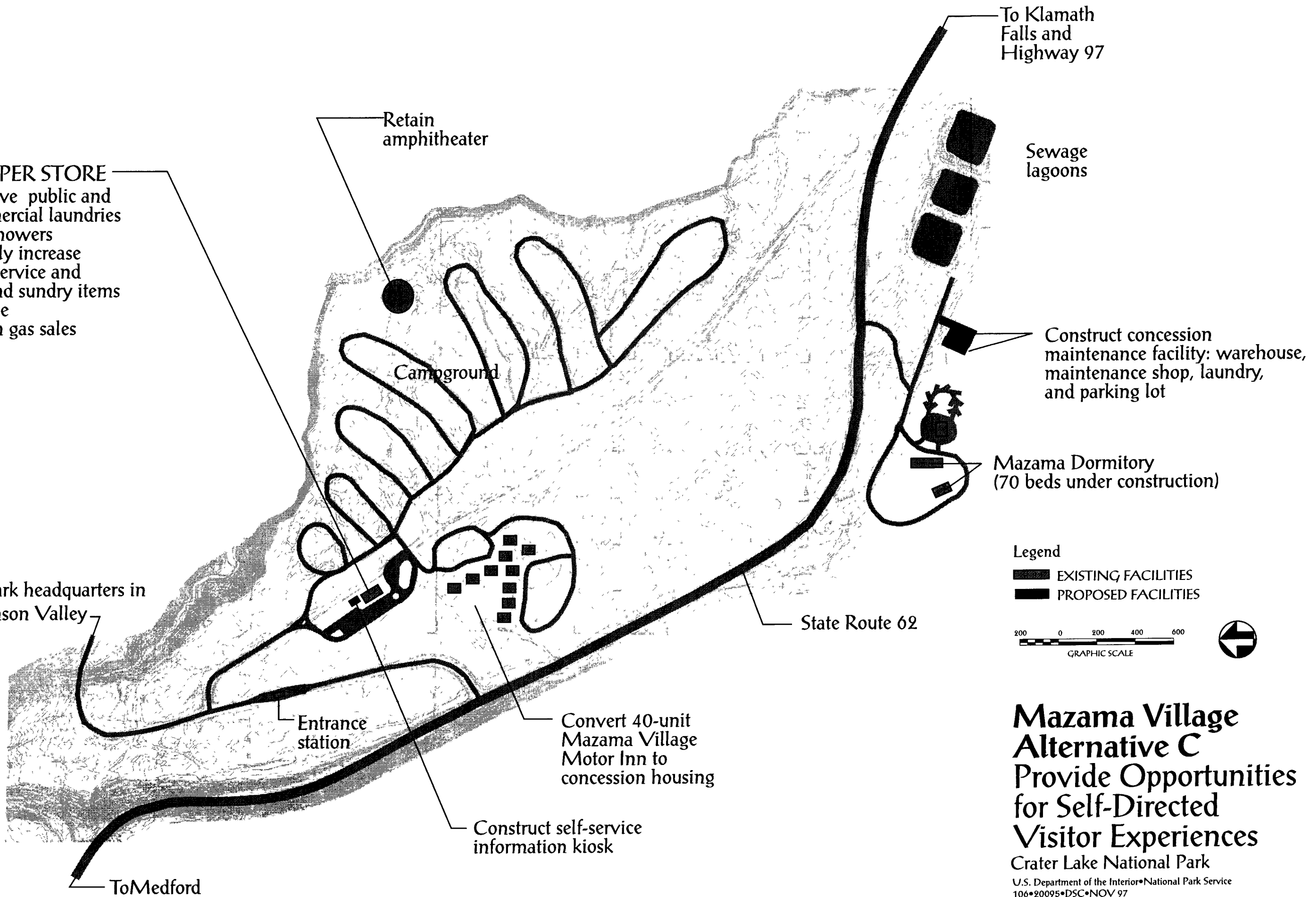
RIM VILLAGE Alternative C

Provide Opportunities for
Self-Directed Visitor
Experiences

Crater Lake National Park

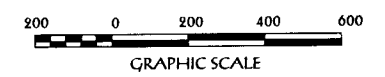
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- CAMPER STORE**
- Remove public and commercial laundries and showers
 - Slightly increase food service and gift and sundry items for sale
 - Retain gas sales



Legend

- EXISTING FACILITIES
- PROPOSED FACILITIES



**Mazama Village
Alternative C
Provide Opportunities
for Self-Directed
Visitor Experiences**

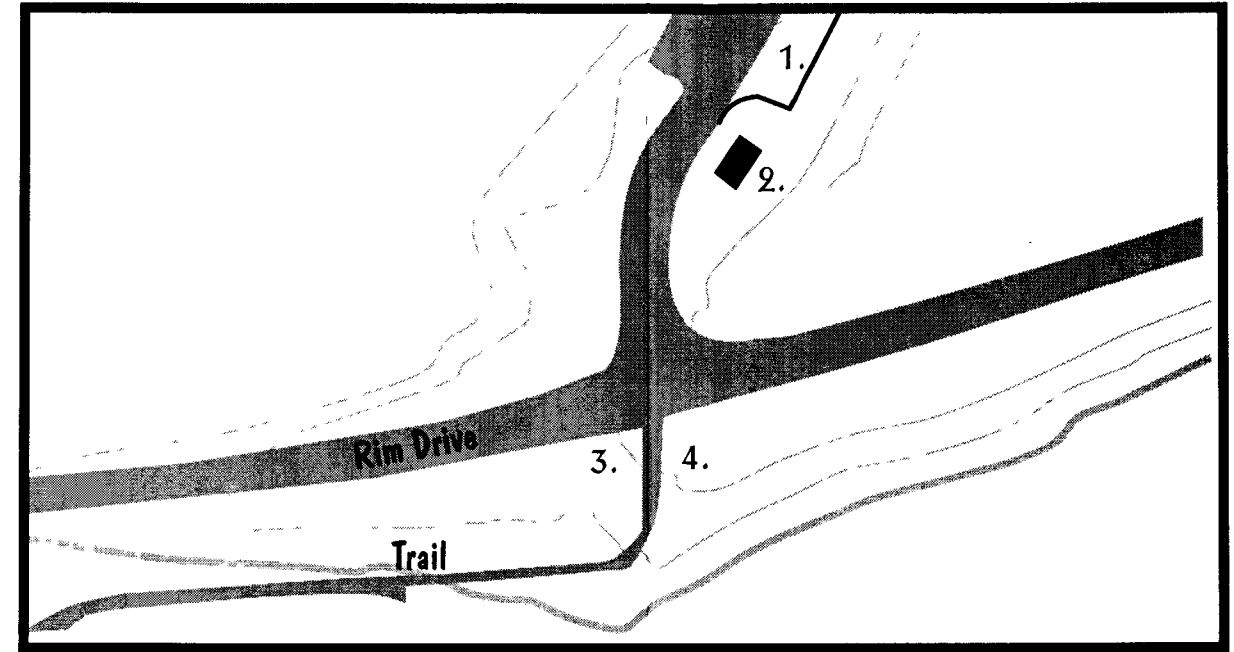
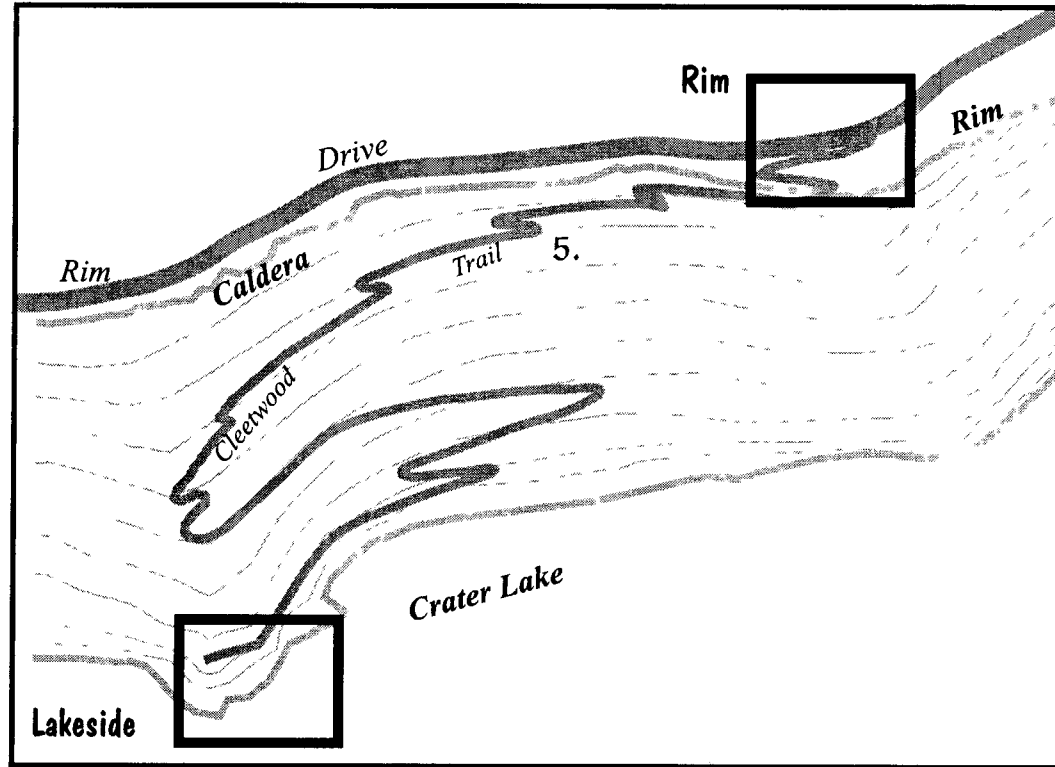
Crater Lake National Park
U.S. Department of the Interior • National Park Service
106 • 20095 • DSC • NOV 97

Key Elements:

- * Removal of tour boats from Crater Lake
- * Reduce size of parking lot and revegetate that area
- * Replace bulkhead and dock with smaller structure
- * Restore shoreline to a more natural configuration

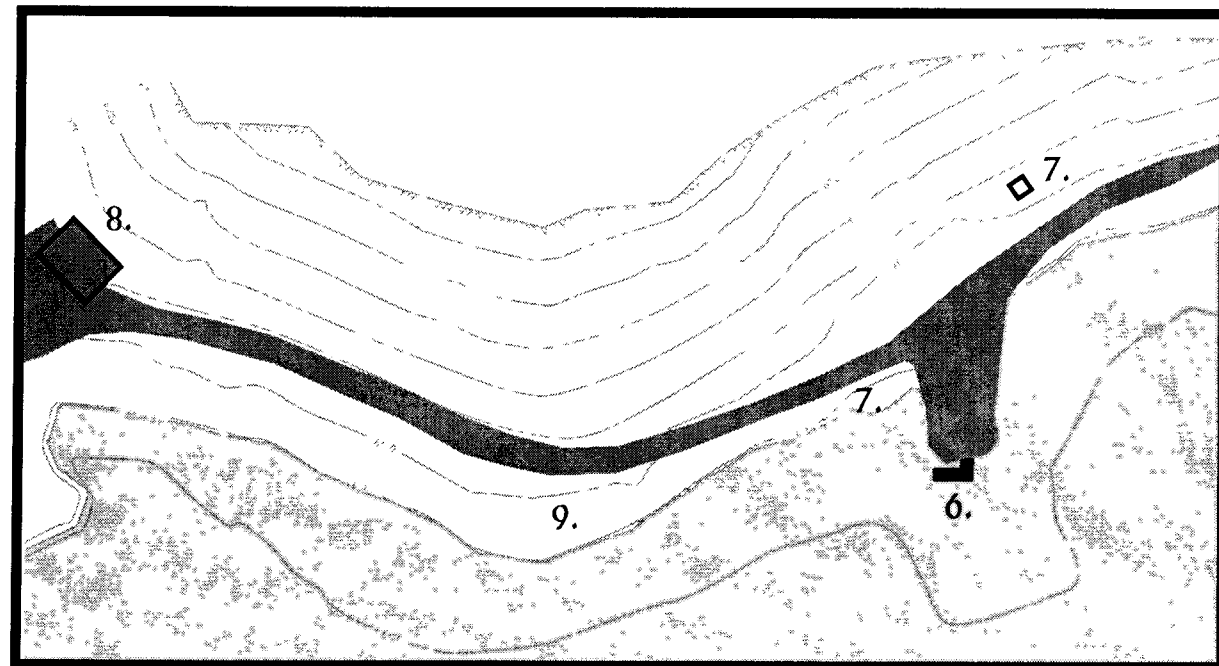
Trail Area

- 5. Retain existing trail layout and provide minor erosion control



Trailhead Site Plan

- 1. Reduce size of parking lot
- 2. Retain picnic area and portable toilets and construct small structure for NPS search and rescue and maintenance supplies
- 3. Increase exhibits and provide trail pamphlets
- 4. Retain existing trailhead configuration



Lakeside Site Plan

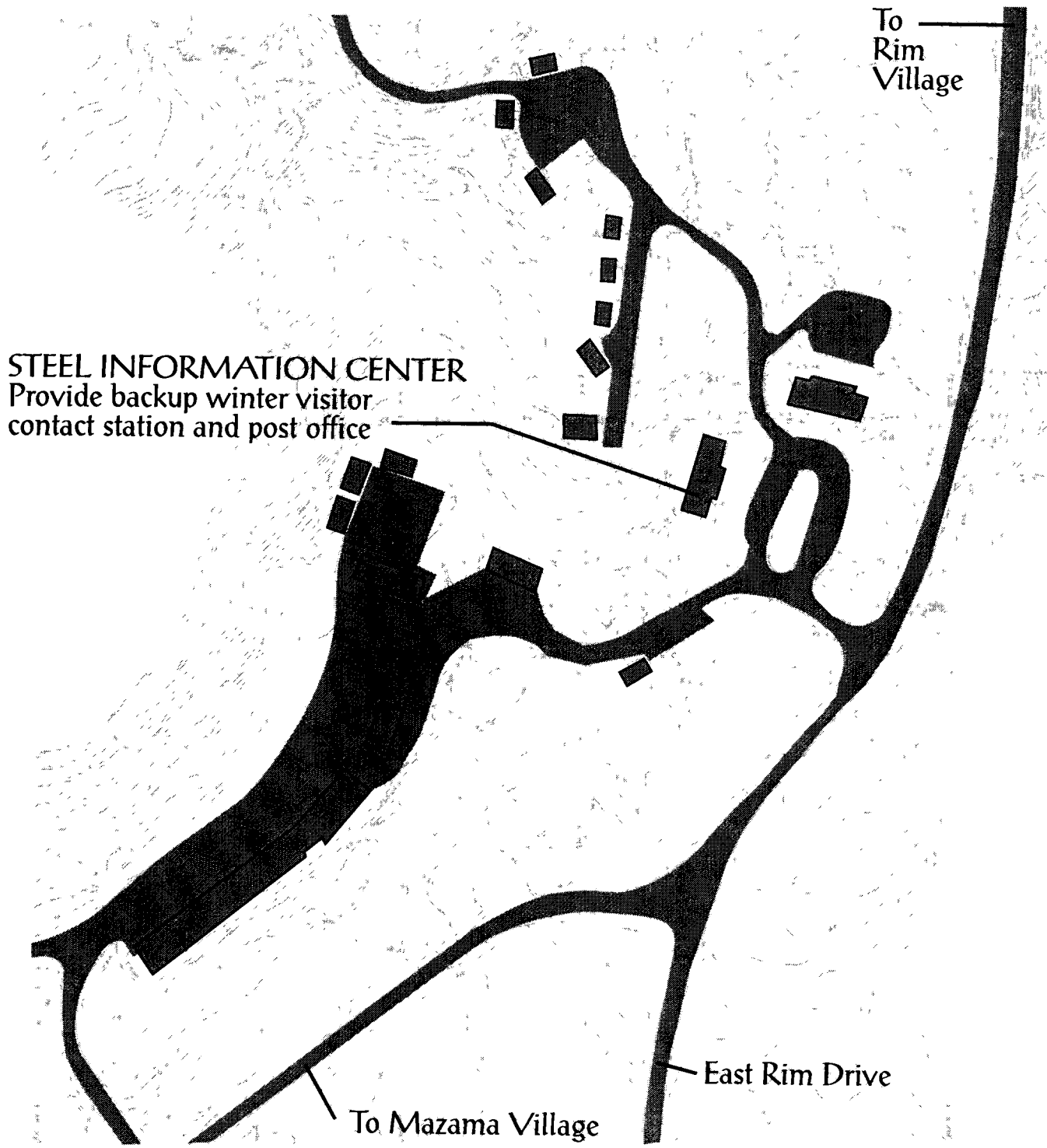
- 6. Remove existing dock and bulkhead and replace with smaller dock for research vessels
- 7. Remove boats & fuel system
- 8. Retain existing restrooms and add storage
- 9. Naturalized shoreline

Legend

- EXISTING FACILITIES
- PROPOSED FACILITIES
- REMOVED FACILITIES

Not to scale

**Cleetwood
Alternative C**
Provide Opportunities for Self-Directed
Visitor Experiences
Crater Lake National Park
United States Department of the Interior • National Park Service
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Legend

 Existing Facilities



Munson Valley Alternative C

Provide Opportunities
for Self-Directed
Visitor Experiences
Crater Lake National Park

United States Department of the Interior
National Park Service
106•20105•DSC•NOV 97

ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES

GENERAL CONCEPT

Under alternative D a variety of commercial visitor services would be offered, and interpretive services provided by the National Park Service would be enhanced.

DEVELOPED AREA ALTERNATIVES

Visitor services at Rim Village would be expanded. The new visitor contact station and interpretive services would be the same as those described for the proposed action except an artist-in-the-park program would be developed at the Kiser Studio. Recreational opportunities would be increased through the addition of equipment rentals. Concessioner facilities (i.e., cafeteria, gifts, and sundry sales), parking, and Rim Village Drive would be moved back from the rim to enhance the visitor experience. The new concession building would be near the new remote parking area at the west end of the village. More parking space would also be available behind the new visitor contact station and at the Rim Dormitory site.

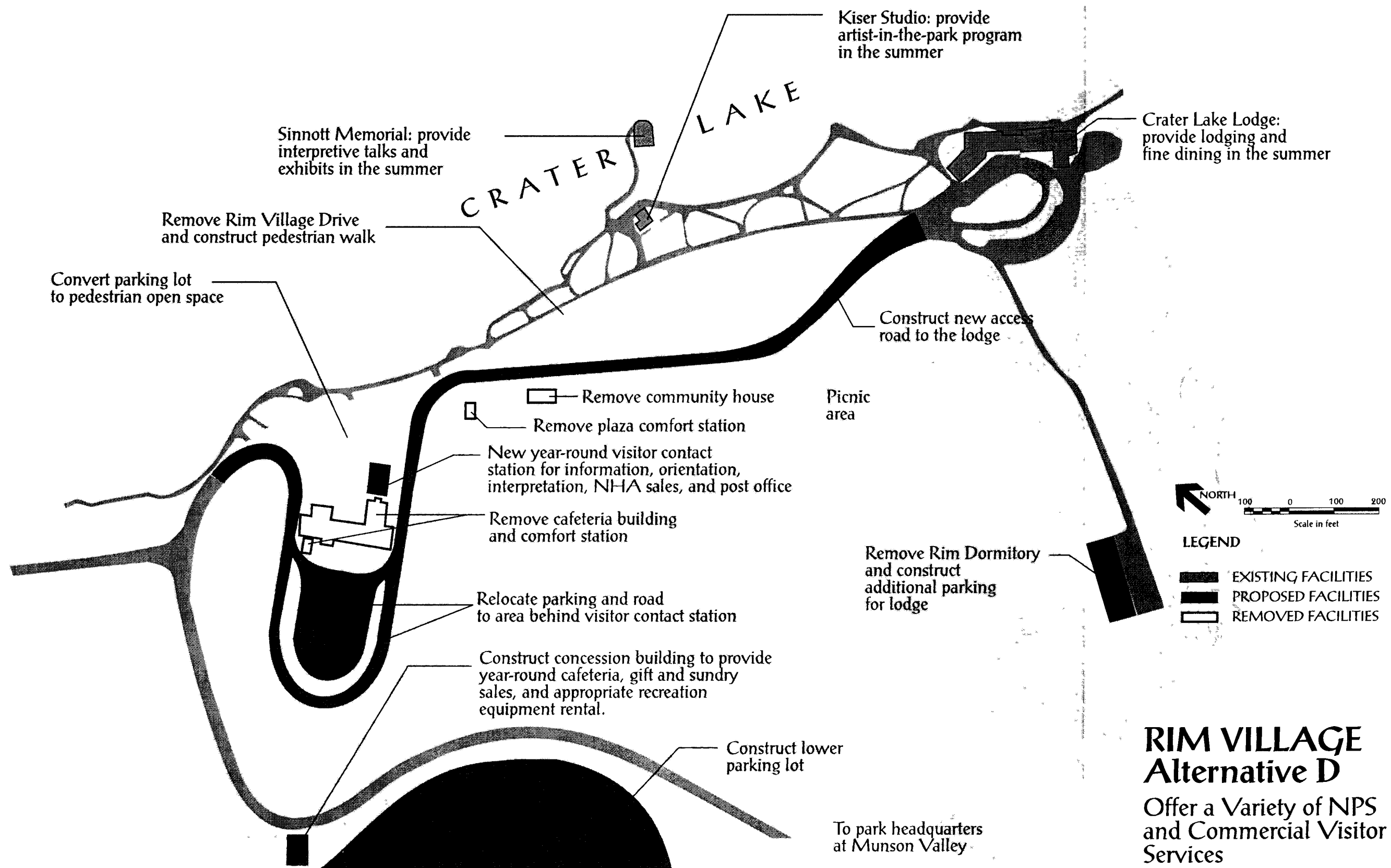
As in the proposed action, a greater level of interpretation and education would be offered at Mazama Village. Visitor information and orientation would be available at a self-service kiosk near the Mazama Village store. Evening programs would be provided at the amphitheater, but it would be relocated to a more central location. An additional 40-unit, year-round motel with kitchenettes would be constructed to accommodate those visitors who wanted to stay longer in the park. Year-round food services (cafeteria), sundry and gift sales, vehicle services, public laundry and showers, and recreation equipment rentals would be available to meet various visitor needs. Two group sites would be developed in the campground to accommodate larger groups. Roads through Mazama Village would be modified to allow for better snow removal, a parking lot would be constructed at the new amphitheater site, and covered parking would be built next to the lodging units. The 70-bed Mazama Dormitory is under construction and will be completed in 1998. A large facility to house maintenance supplies and a small warehouse will be developed at the dorm site.

Boat tours at Cleetwood would be reduced slightly from nine to eight tours per day with a pickup at Wizard Island when necessary. NPS ranger-led interpretive talks would be provided on the boats and at Wizard Island. Flexibility in tour length would be incorporated to add diversity to the visitor experience. The reduction of boat tours, in addition to flexible tour lengths, would lessen parking problems during peak hours. To allow for advance purchasing, a reservation system would be implemented for the convenience of visitors who wanted to take the boat tour.

Trail access to the lake would be upgraded for safety and erosion control purposes. The trail alignment would be modified by installing a grated metal staircase before the slide chute for visitor safety. However, the trail would be retained through the chute for park use. Only low-impact powered equipment would be allowed on the trail for NPS and concession operations. Interpretation would be enhanced along the trail by providing additional wayside exhibits. At the trailhead a composting vault toilet would be built and a permanent structure would be constructed to provide limited concession food and sundry sales. The parking lot would be restriped to provide 120 spaces 9 feet wide and a drop-off area would be added. On the lakeshore a new dock and bulkhead to access boats at all water

levels would be developed. The entire fuel delivery system for the tour boats is scheduled to be replaced in 1998. The fuel supply system would consist of a screened, aboveground storage tank adjacent to the rim, a double-wall fuel line down the caldera wall, and a protected, screened aboveground storage tank at the lakeside. This would be connected to the dispensing unit by a double-wall fuel line running under the trail at the lakeside. All components of the fuel system would be upgraded to ODEQ and EPA standards. A small permanent structure would be built to house the aboveground storage tank at the lakeside and to provide storage. An unobtrusive shade structure and open-air waiting area with seating would be constructed to enhance the visitor experience.

As in alternative A, Munson Valley would remain the focal point for park administration and housing. In winter a backup visitor contact station with NHA sales items and a post office would be available.

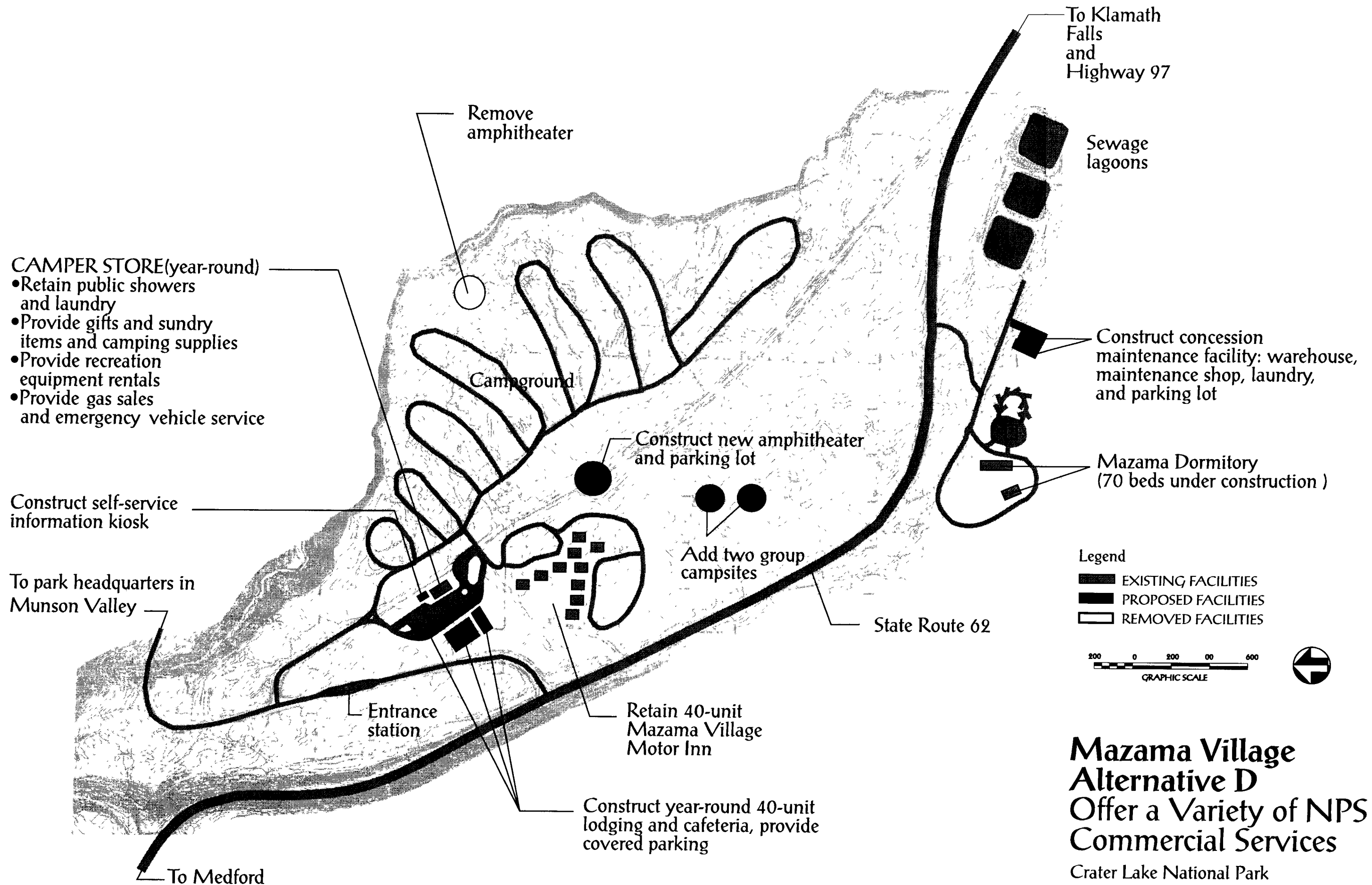


RIM VILLAGE Alternative D

Offer a Variety of NPS
and Commercial Visitor
Services

Crater Lake National Park

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Mazama Village Alternative D Offer a Variety of NPS and Commercial Services

Crater Lake National Park

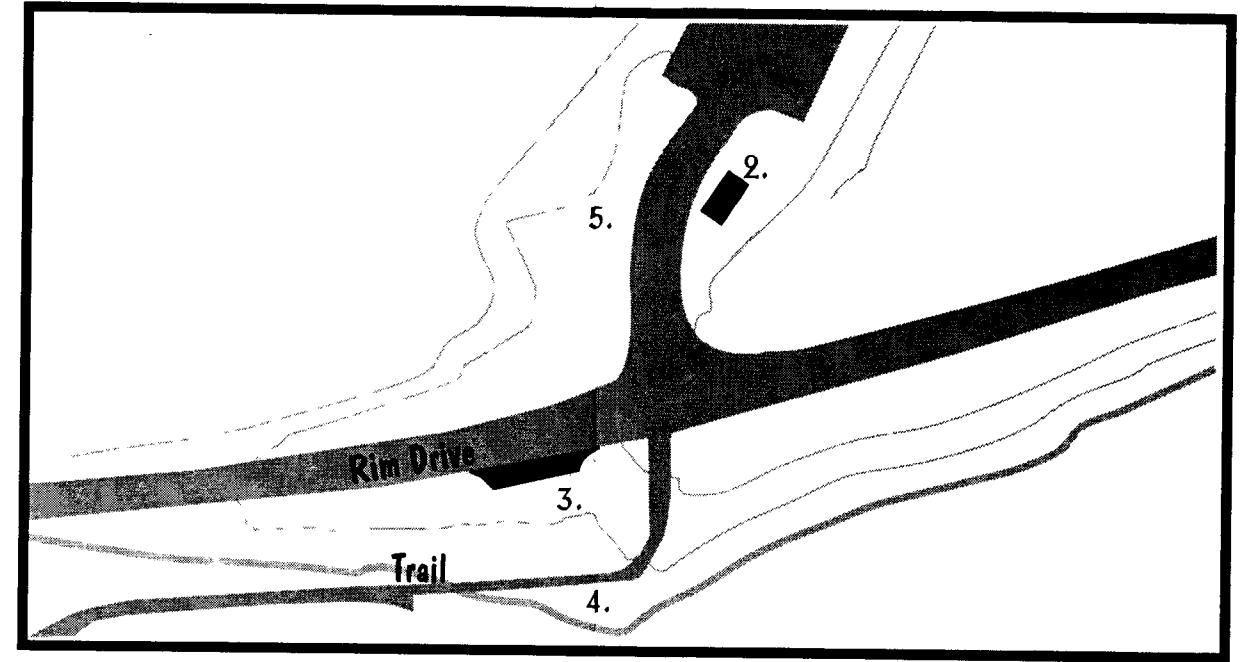
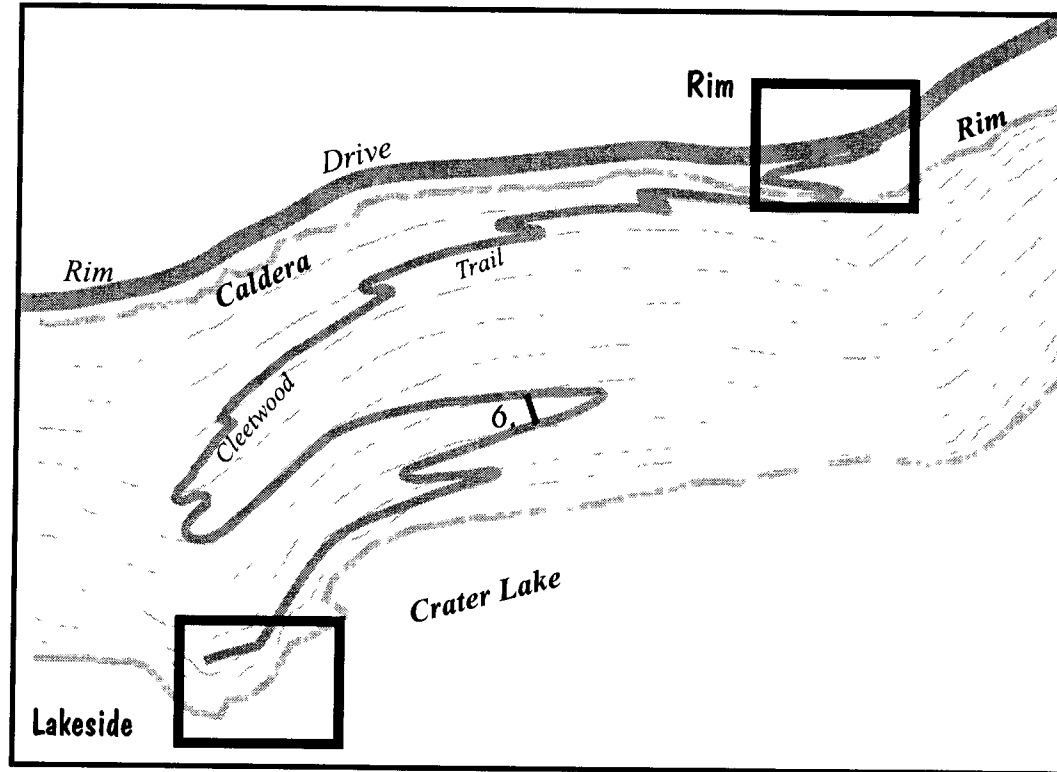
U.S. Department of the Interior • National Park Service
106 • 20096 • DSC • NOV 97

Key Elements:

- * Small permanent Buildings at rim and lakeside
- * New bulkhead and dock
- * 8 (+1) Boat tours per day

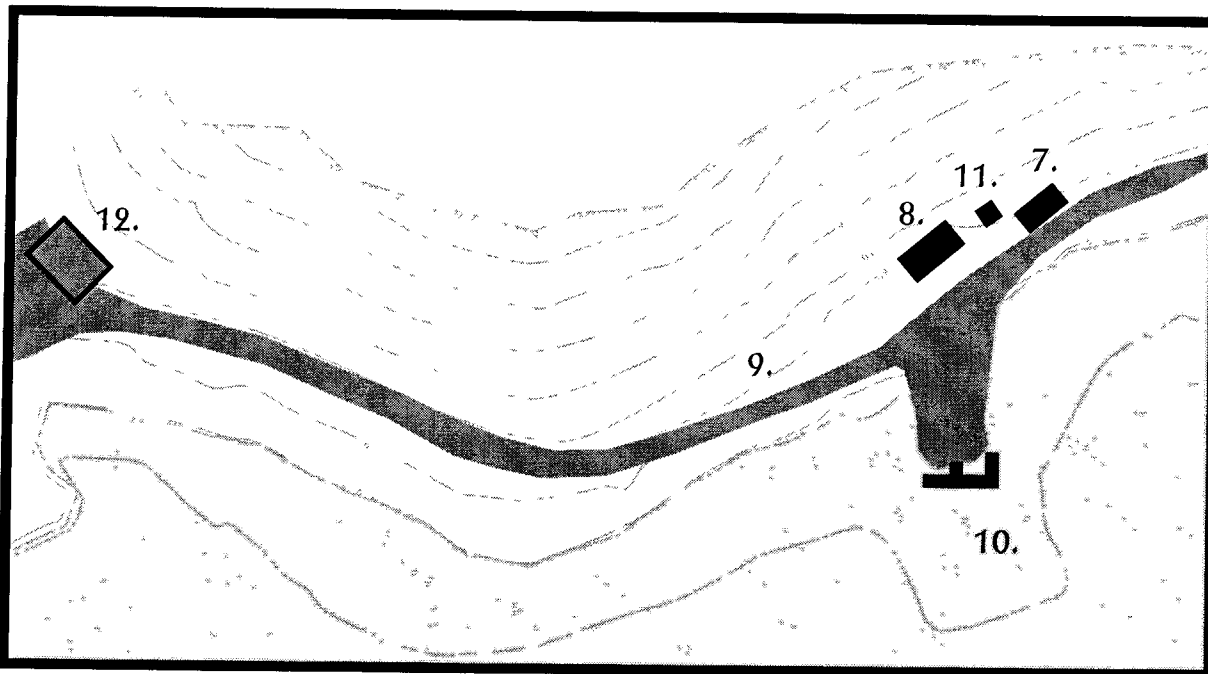
Trail Area

- 6. Install grated metal staircase to avoid slide chute



Trailhead Site Plan

- 1. Restripe parking lot to provide 120 spaces
- 2. Construct permanent building for concessioner ticket sales and limited sundry and food sales
- 3. Provide vehicle drop off
- 4. Increase wayside exhibits
- 5. Construct vault composting toilet



Lakeside Site Plan

- 7. Construct seasonal shade structure with seating for visitor comfort
- 8. Construct permanent building at lakeside for storage of supplies and equipment for boat operations and maintenance needs
- 9. Provide open-air waiting area
- 10. Construct new bulkhead and dock
- 11. Upgrade fuel system to meet ODEQ & EPA standards
- 12. Retain vault toilets

Legend

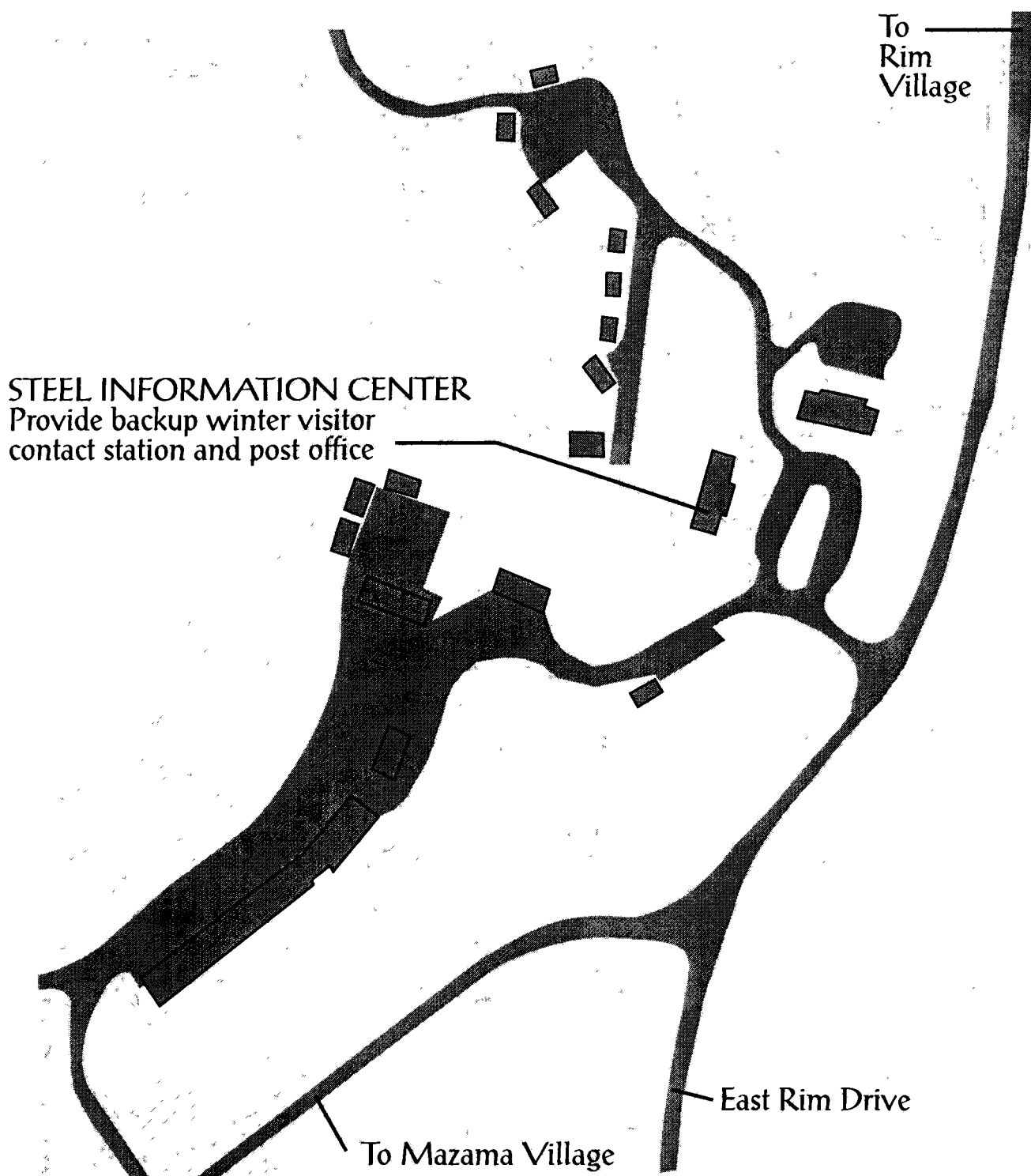
- EXISTING FACILITIES
- PROPOSED FACILITIES



Not to scale

Cleetwood Alternative D
Offer a Variety of NPS and Commercial Visitor Services

Crater Lake National Park
United States Department of the Interior • National Park Service
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STEEL INFORMATION CENTER
 Provide backup winter visitor
 contact station and post office

East Rim Drive

To Mazama Village

To
 Rim
 Village

Legend

 Existing Facilities



**Munson Valley
 Alternative D**

Offer a Varsity of NPS and
 Commercial Visitor Services

Crater Lake National Park

United States Department of the Interior
 National Park Service
 106•20106•DSC•NOV 97

ALTERNATIVE E: FOCUS VISITOR SERVICES AT RIM VILLAGE

GENERAL CONCEPT

Alternative E would offer the kinds and levels of visitor services and facilities presented in the *Record of Decision* for the 1995 *Development Concept Plan / Environmental Impact Statement*. This alternative is aimed at making the park a destination for extended visitor use. The main focus of visitor services, experiences, and facility development would be at Rim Village.

DEVELOPED AREA ALTERNATIVES

Rim Village would be the main destination point in the park, and the focus would be on providing a variety of visitor services and experiences related to interpretation, education, and enjoyment. The level of NPS and concession services available would encourage visitors to spend a significant amount of time at Rim Village. Parking would be moved away from the rim, a year-round activity center would combine NPS visitor contact functions, NHA sales, and post office amenities with concession services. Interpretation would be concentrated in and near the new activity center. The activity center would include indoor evening programs, changeable interpretive exhibits, and an auditorium. Interpretation would include a roving interpreter, historical walks, and additional interpretive wayside exhibits. The Kiser Studio would display cultural exhibits pertaining to the studio and village, and the Sinnott Memorial would be used for lake viewing and limited interpretation. The community house and cafeteria building would be removed to provide more open space for visitors. Overnight accommodations and fine dining at Crater Lake Lodge would continue, and a year-round cafeteria and restaurant would be available in the activity center. Gifts (related to the park) and sundry sales and equipment rentals would also be available in the activity center. Rim Village Drive would be removed and an access road from the new three-level remote parking structure to the activity center and lodge would be constructed. Shuttle service would be available to carry visitors from the remote parking area to the activity center and the lodge. Rim Dormitory would be removed.

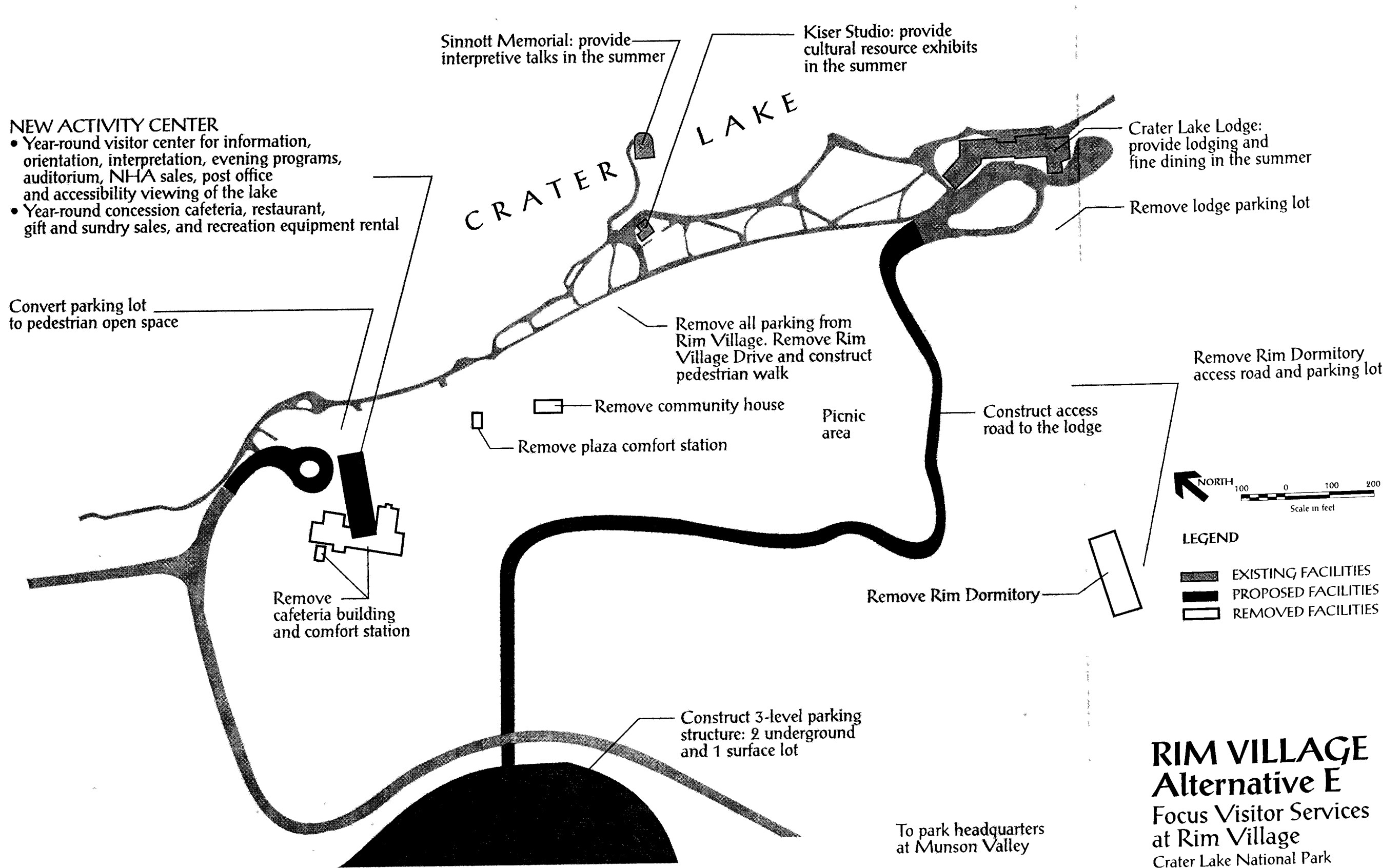
As in the proposed action, the level of interpretation and education at Mazama Village would be greater than at present. Visitor information and orientation would be available at a self-service kiosk near the Mazama Village store. Evening programs would be provided at the amphitheater, but it would be relocated to a more central location. An additional 40-unit, year-round motel with kitchenettes would be constructed to accommodate visitors who wanted to stay longer in the park. A year-round restaurant would be built, and the camper service store would provide sundry and gift sales, public showers and laundry, vehicle services, recreation equipment rental, and other amenities to meet various visitor needs. Two group sites would be developed in the campground to accommodate larger groups. The roads through Mazama Village would be modified to allow for better snow removal, a parking lot would be constructed at the new amphitheater site, and covered parking would be built next to the lodging units. The 70-bed Mazama Dormitory is under construction and will be completed in 1998. To offset the concession housing lost with the removal of Rim Dormitory, either the number of beds at Mazama Dormitory would be increased to about 100 or a new employee RV/trailer facility could be built west of OR 62. Additional housing would be located after further planning determined a suitable location. A large maintenance facility to contain maintenance supplies and a small warehouse will be developed at the dorm site.

Boat tours at Cleetwood would continue at current levels (nine scheduled boat tours daily with one additional trip for Wizard Island pickup when necessary). A reservation system would be implemented for the convenience of visitors who wanted to take the boat tours. The addition of an interpreter on Wizard Island and additional interpretation throughout the area would further increase visitors' understanding of the lake and the geological processes that formed the caldera.

The Cleetwood parking lot would be enlarged to accommodate RVs and restriped to provide 120 spaces 9 feet wide to reduce overflow parking along Rim Drive. The Cleetwood Trail would be modified to add variety and a greater level of interpretation to the visitor experience and for safety and erosion control purposes. The existing trail would be retained but structurally engineered deflector walls would be constructed above the trail through the slide chute, the rock overhang above the trail below the slide chute would be cut back, and only low-impact power equipment would be used for NPS and concession operations. Minimal concession services, such as limited food and sundry sales, and low-maintenance composting vault toilets would be available at the rim. A moderately sized permanent structure would be built at the rim for storage of maintenance and concession supplies. On the lakeshore a new dock and bulkhead to access boats at all water levels would be developed, a small permanent storage structure for boat operations would be built, and an unobtrusive shade structure and open-air waiting area with seating would be constructed to enhance the visitor experience.

The entire fuel delivery system for the tour boats is scheduled to be replaced in 1998. The fuel supply system would consist of a screened, aboveground storage tank adjacent to the rim, a double-wall fuel line down the caldera wall, and a protected, screened aboveground storage tank at the lakeside. This would be connected to the dispensing unit by a double-wall fuel line running under the trail at the lakeside. All components of the fuel system would be upgraded to ODEQ and EPA standards.

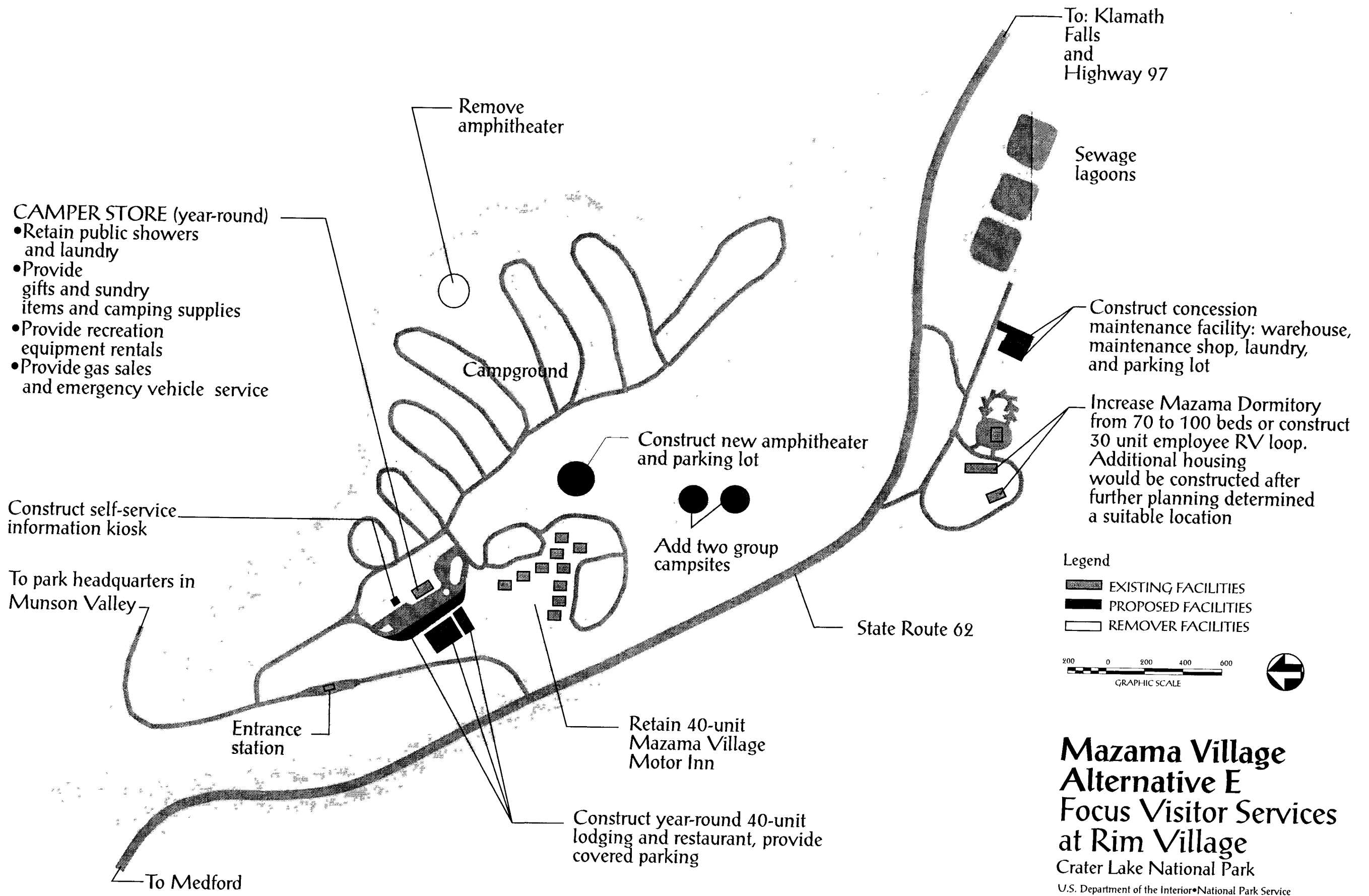
As in alternative A Munson Valley would remain the focal point for park administration and housing. In winter a backup visitor contact station with NHA sales items and a post office would be available.



RIM VILLAGE Alternative E

Focus Visitor Services
at Rim Village
Crater Lake National Park





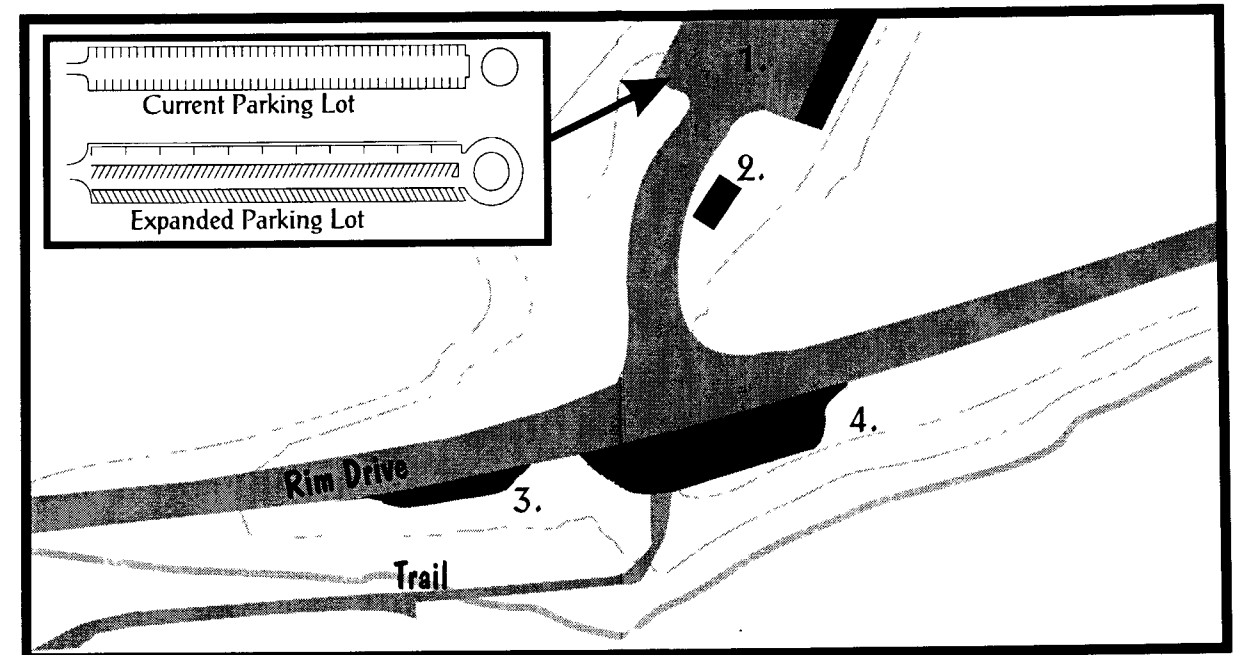
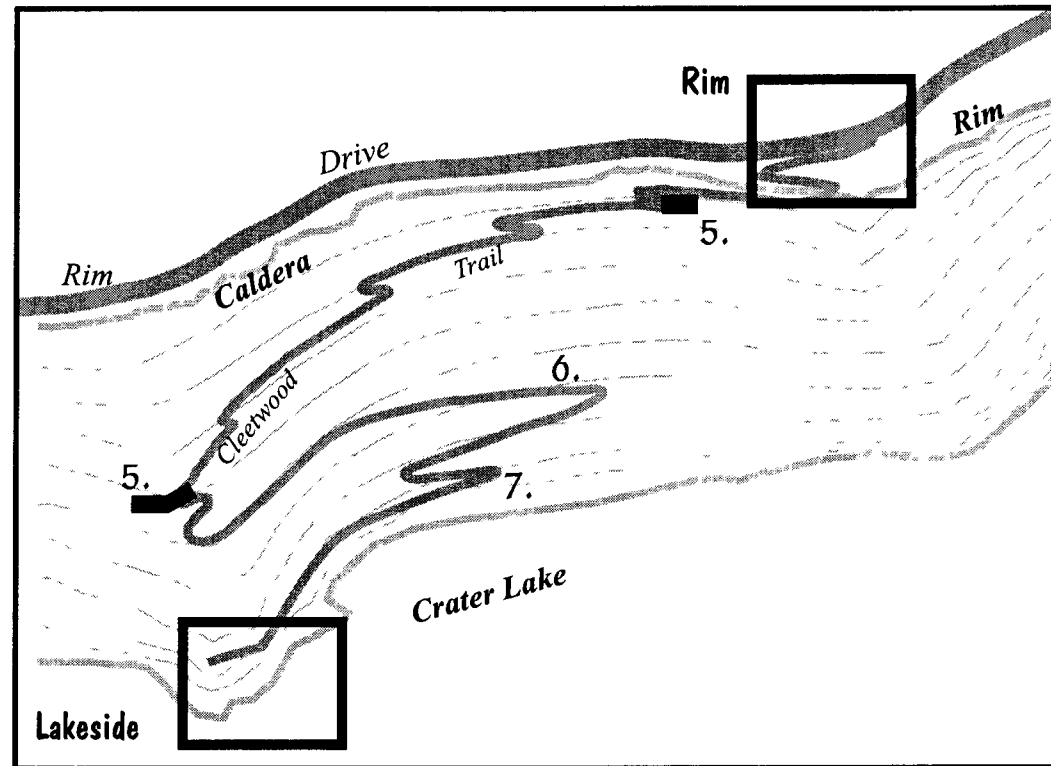
Mazama Village Alternative E Focus Visitor Services at Rim Village Crater Lake National Park

Key Elements:

- * Enlarge parking lot
- * Permanent buildings at rim and lakeside
- * New bulkhead and dock
- * 9 (+1) Boat tours per day

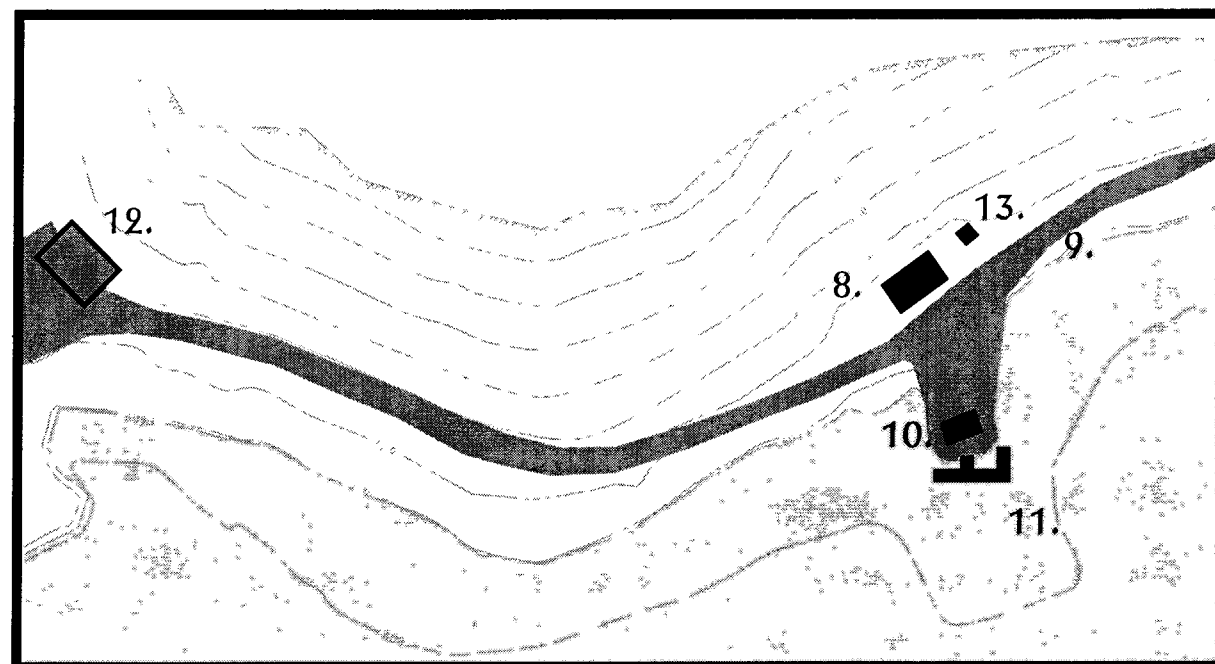
Trail Area

- 5. Provide trail spurs for solitude
- 6. Create deflector walls above slide chute to increase visitor safety
- 7. Cut back rock overhang to mitigate rockfall hazard



Trailhead Site Plan

- 1. Restripe parking lot to provide 120 spaces. Widen lot to provide RV spaces
- 2. Construct permanent building for ticket, sundry and food sales and for storage of equipment for boat operations and maintenance needs
- 3. Provide vehicle drop off for emergency vehicle
- 4. Develop pedestrian overlook with picnic area to allow for viewing lake. Increase wayside exhibits and construct composting toilet



Lakeside Site Plan

- 8. Construct permanent building at lakeside for storage of supplies and equipment for boat operations and maintenance needs.
- 9. Provide open-air waiting area for visitor comfort
- 10. Construct shade structure with seats for visitor comfort
- 11. Construct new bulkhead and dock to access lake at all water levels
- 12. Retain vault toilets
- 13. Upgrade fuel system to meet ODEQ & EPA standards

Legend

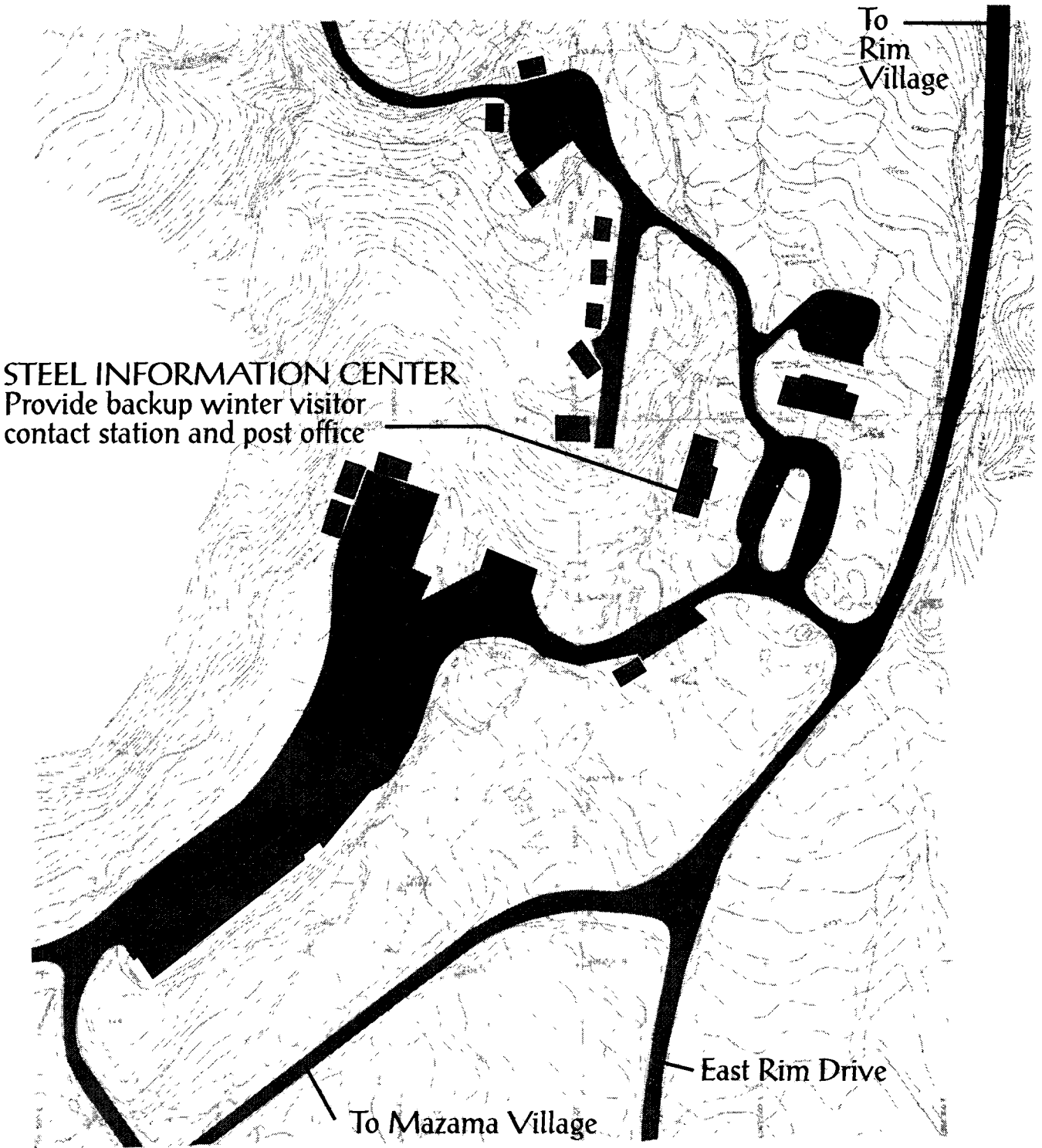
- EXISTING FACILITIES
- PROPOSED FACILITIES




Not to scale

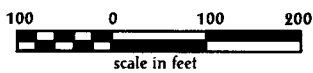
**Cleetwood
Alternative E**
Focus Visitor Services at Rim Village
Crater Lake National Park
United States Department of the Interior • National Park Service
106•20116•DSC•NOV 97





Legend

 Existing Facilities



Munson Valley Alternative E

Focus Visitor Services at Rim Village

Crater Lake National Park

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National Park Service

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ALTERNATIVES CONSIDERED BUT REJECTED

RELOCATE CLEETWOOD TRAIL TO BELOW RIM VILLAGE

During scoping the possibility of relocating the Cleetwood Trail to below Rim Village was suggested. This option was explored more thoroughly than most of the other rejected ideas, and a number of benefits of relocation were identified. A new location at or near Rim Village would have allowed the boat operation to connect to the electrical power grid. This would have made electrical motors in tour boats a more feasible option. Consolidating facilities would have been a positive outcome of this, and impacts from development would be concentrated at the Rim Village area. Access to the lakeshore would be easier in many ways, with the trailhead near the largest concentration of visitors in the park. Access to Wizard Island would be easier and more direct for visitors, which could result in the eventual elimination of motorized craft on the lake. In addition, winds are not as strong on this section of the lake because it is protected by the caldera walls. This would have afforded facilities greater protection from wave action.

This option was eventually rejected because of a number of concerns raised by NPS staff and Dr. Charles Bacon, a geologist with the United States Geological Survey. The concerns are listed below:

- ◆ *Rockfall Hazards:* Visitors frequenting the Rim Village area and their activities could loosen rocks above the trail route, or actually throw rocks, creating a dangerous situation for people on the trail. Another concern with rockfall is the large amount of unconsolidated breccia and fractured lava flows on this section of the caldera wall. These geologic formations can be a source of falling rocks and debris, a danger to the people on the trail, and an unstable substrate for the trail itself.
- ◆ *Snow:* This part of the caldera wall has a northern exposure, and snow does not melt out until late in the summer season, which would hinder easy access to the lake shore.
- ◆ *Construction Hazards:* Construction of a new trail could be a hazard to the people on the crews.
- ◆ *Steepness and Elevation:* The caldera wall at Cleetwood is less steep and 200 feet lower than the wall below Rim Village. If the trail were moved to this area, the length and steepness of the trail would make access much more difficult for visitors.
- ◆ *Maintenance Concerns:* A shorter working season, steep cliffs, abundant loose rock, and greater elevation gain, would make trail maintenance considerably more expensive and risky than it currently is.
- ◆ *Wilderness Designation:* The caldera wall is proposed wilderness, and using tractors to transport supplies and relocating the trail to below Rim Village would require the changing of proposed wilderness boundaries.

REMOVE THE CLEETWOOD TRAIL

This option would have removed the trail to the lake reducing human impacts on caldera ecology (e.g., the transport of invasive nonnative plant species into the caldera by hikers). This option was rejected

because the trail is the only maintained, organized place from which to reach the water. If the trail were removed visitors would probably continue to try to reach the lakeside, thereby increasing the need for search and rescue. Continued trail access to the lake is also considered important to maintain interpretive boat tour opportunities and scientific research on Crater Lake.

USE ELECTRIC MOTORS IN TOUR BOATS

This option would have retrofitted the current gasoline-powered boat engines with motors powered by electricity. A system of wind turbines, photovoltaic panels, and a backup gasoline generator would have been installed to supply the boats with the necessary electric power. Although the technology does exist to implement such a scheme in less remote locations, it was determined that this option was not practical at Crater Lake. The option was rejected because the length of tours might increase and the boats would be less powerful, which could decrease visitor safety. The remoteness of Cleetwood would make it nearly impossible to connect to the electrical grid. Also, wind in the area is usually insufficient to operate wind turbines and photovoltaic panels would result in visual impacts.

However, electric motors are a desirable option worth pursuing because of the lack of noise and water pollution. When the technology becomes practicable (approximately 5 to 10 years), electric motors or another type of nonpolluting fuel source should be implemented.

TABLE 1: COMPARISON OF ALTERNATIVES

SERVICES AND FACILITIES	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
RIM VILLAGE					
Visitor Contact (NPS)	Provide year-round visitor information, orientation, accessible viewing of lake, and interpretive exhibits in new visitor contact station. Rehabilitate the community house for summer evening programs	Provide limited visitor information and orientation at Kiser Studio (summer) and cafeteria building (winter); year-round accessible viewing of the lake would not be provided; remove the community house	Provide limited year-round visitor information, orientation, and accessible viewing of the lake in rehabilitated 1928 part of cafeteria building; remove later additions to cafeteria building; remove the community house	Same as the proposed action	Provide year-round visitor orientation and interpretation with accessible viewing of lake, indoor evening programs, changeable interpretive exhibits, and auditorium in new activity center near the cafeteria site; remove the community house
Interpretive Programs (NPS)	Provide roving interpreter, historical walks, interpretive waysides, and evening programs during the summer	Provide roving interpreter, historical walks, and interpretive waysides during the summer	Same as no-action alternative	Same as the proposed action	Same as the proposed action
Sinnott Memorial	Present interpretive talks about Crater Lake geology; develop exhibits about Crater Lake geology and lake ecosystems	Present interpretive talks about Crater Lake geology	Same as no-action alternative	Same as the proposed action	Provide limited interpretation at Sinnott Memorial because new activity center would be the focus of interpretation
Kiser Studio	Provide cultural resource interpretive exhibits during the summer	Provide NPS visitor contact and orientation	Same as the proposed action	Provide Artist-in-the-Park program during the summer	Same as the proposed action
Food Services (Concession)	Offer fine dining at Crater Lake Lodge during the summer and year-round deli/fast food service in rehabilitated 1928 part of cafeteria building; remove later additions to cafeteria building	Retain cafeteria and restaurant at cafeteria building and fine dining at Crater Lake Lodge during the summer; rehabilitate the cafeteria building	Offer fine dining at Crater Lake Lodge during the summer; remove all other food service	Offer fine dining at Crater Lake Lodge during the summer; provide year-round cafeteria in new facility at the lower parking area; remove the cafeteria building	Offer fine dining at Crater Lake Lodge during the summer; provide year-round cafeteria and restaurant at new activity center; remove the cafeteria building
Gift and Sundry Sales (Concession)	Offer limited numbers of sundries and gifts (related to Crater Lake) in rehabilitated 1928 part of cafeteria building	Retain year-round gift (related to Crater Lake) and sundry sales at cafeteria building	Relocate sales of sundries and gifts to Mazama Village	Offer sundries and gifts (related to Crater Lake) in new facility at the lower parking area	Sell sundries and gifts (related to Crater Lake) at new activity center
Recreation Equipment (Concession)	None	None	None	Rent appropriate recreation equipment out of a new facility at the lower parking area	Rent appropriate recreation equipment out of the new activity center
Lodging (Concession)	Continue summer lodging at Crater Lake Lodge	Same as the proposed action	Same as the proposed action	Same as the proposed action	Same as the proposed action
Natural History Association (NHA) Sales	Provide space in new visitor contact station for NHA sales that support NPS interpretive and research programs at Crater Lake; provide post office	Continue to provide space at Kiser Studio for seasonal NHA sales that support NPS interpretive and research programs at Crater Lake	Provide space in rehabilitated part of 1928 cafeteria building for NHA sales that support NPS interpretive and research programs at Crater Lake; provide post office	Same as the proposed action	Provide space in the new activity center for NHA sales that support NPS interpretive and research programs at Crater Lake; provide post office
Roads	Retain Rim Village Drive to lodge	Same as the proposed action	Same as the proposed action	Remove Rim Village Drive; construct new access road from remote parking area and visitor contact station to lodge	Remove Rim Village Drive; construct new access road from parking structure and activity center to lodge for shuttle buses
Parking	Remove cafeteria parking lot; construct a smaller parking lot behind the cafeteria building; retain parking along Rim Village Drive and at the lodge; use Rim Dormitory site for bus parking	Retain parking along Rim Village Drive, in front of cafeteria building, and at the lodge	Construct a small parking lot behind visitor contact station; remove parking from rim edge, along Rim Village Drive, and at Rim Dormitory; build additional parking loop at lodge for guests	Construct a small parking lot behind the visitor contact station; build a new parking lot off the rim; remove parking along Rim Village Drive; and provide more parking for lodge at the Rim Dormitory site	Remove all parking from Rim Village and construct new three-level parking structure off the rim with a shuttle system to provide access to the new activity center and lodge
Rim Dormitory (Concession Housing)	Remove the 70-bed Rim Dormitory	Retain Rim Dormitory	Same as the proposed action	Same as the proposed action	Same as the proposed action
Estimated Costs (in Millions of Dollars)*	\$15.0	\$6.1	\$12.4	\$17.1	\$59.9

SERVICES AND FACILITIES	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
MAZAMA VILLAGE					
Visitor Contact (NPS)	Build a self-service information kiosk near the Mazama Village store to provide seasonal information for visitors entering the park	No self-service information kiosk would be provided	Same as the proposed action	Same as the proposed action	Same as the proposed action
Interpretive Programs (NPS)	Relocate amphitheater to a more central location; provide evening programs at the amphitheater and offer natural history walks during the summer	Continue to provide evening programs at the amphitheater and offer natural history walks during the summer	Same as the no-action alternative	Same as the proposed action	Same as the proposed action
Camper Services (Concession)	Retain existing camper supplies and public showers at Mazama Village store; remove public laundry	Retain existing camper supplies and public showers and laundry at the Mazama Village store	Retain existing camper supplies at Mazama Village store; remove public laundry and showers	Same as the no-action alternative	Same as the no-action alternative
Food Services (Concession)	Retain limited food service at the Mazama Village store during the summer and develop a new seasonal restaurant	Retain limited food service at the Mazama Village store during the summer	Increase limited food service slightly from existing levels	Construct a new cafeteria that could operate year-round	Construct a new restaurant that could operate year-round
Gift and Sundry Sales (Concession)	Increase space at the seasonal camper store for sales of sundries and gifts (related to Crater Lake) slightly over existing levels	Retain limited sundry and gift sales (related to Crater Lake) at the seasonal camper store	Same as the proposed action	Offer sundries and gifts (related to Crater Lake) year-round at the camper store	Same as alternative D
Gasoline Station (Concession)	Retain seasonal gasoline sales at the camper store	Same as the proposed action	Same as the proposed action	Provide year-round gasoline and emergency vehicle service during the summer	Same as alternative D
Recreation Equipment (Concession)	None	None	None	Provide recreation equipment rentals	Same as alternative D
Lodging (Concession)	Retain the 40-unit Mazama Village Motor Inn for seasonal public lodging	Same as the proposed action	Convert the 40-unit Mazama Village Motor Inn to concession employee housing; no public lodging would be available at Mazama Village	Build 40 new units with kitchenettes to provide year-round lodging; retain the existing 40 seasonal units	Same as alternative D
Roads	Retain existing roads to provide adequate seasonal access to services and facilities	Same as the proposed action	Same as the proposed action	Modify roads to allow for better snow removal for year-round operations	Same as alternative D
Parking	Provide parking at the camper store, restaurant, and amphitheater	Rely on existing parking areas to accommodate the level of services and facilities of this alternative	Continue to provide camper store parking	Provide amphitheater, camper store, and cafeteria parking; construct covered parking to accommodate the new lodging units	Same as alternative D
Mazama Dormitory (Concession Housing)	Complete the 70-bed Mazama Dormitory in 1998; locate or construct employee housing outside the park, or add an additional 30-beds to the Mazama Dormitory (100 total), or build up to 30 RV sites in the park.	Complete the 70-bed Mazama Dormitory in 1998	Complete the 70-bed Mazama Dormitory in 1998; convert the 40-unit Mazama Village Motor Inn to concession employee housing	Same as the no-action alternative	Same as the proposed action, plus additional housing would be constructed after further planning determined a suitable location
Maintenance Facility (Concession)	Construct a maintenance facility near the Mazama Dormitory site	None	Construct a concession maintenance facility near the Mazama Dormitory site	Construct a larger maintenance facility with a small warehouse near the Mazama Dormitory site	Same as alternative D
Estimated Costs (in Millions of Dollars)*	\$3.6	\$0.0	\$1.9	\$10.9	\$9.8

SERVICES AND FACILITIES	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
CLEETWOOD					
Wayside Exhibits (NPS)	Increase wayside exhibits along trail	Retain wayside exhibits at top and bottom of trail	Increase wayside exhibits at top and bottom of trail and provide self-guiding trail pamphlets	Same as the proposed action	Same as the proposed action
Interpretive Programs (NPS)	Continue to provide NPS ranger-led interpretive talks on boat tours; add NPS interpreter at Wizard Island	Same as the proposed action	None	Same as the proposed action	Same as the proposed action
Boat Tours (Concession)	Offer seven boat tours per day with 8th boat trip when needed for Wizard Island pickup; offer a variety of tour lengths and routes	Maintain current level — nine tours per day with 10th boat trip when needed for Wizard Island pickup	Eliminate boat tours	Provide eight tours per day with 9th boat trip when needed for Wizard Island pickup; offer multiple tour lengths and routes	Same as no-action alternative
Ticket Sales (Concession)	Sell tickets at the rim at a permanent structure; institute a reservation system to allow visitors to buy tickets by phone and at concession facilities in the park; hold a number of tickets for same-day purchase	Sell tickets at nonpermanent concession facility at rim	None	Same as the proposed action	Same as the proposed action
Food Services (Concession)	Offer limited prepackaged food and beverages at rim in permanent structure	Continue to use temporary structure for the sales of prepackaged food and beverages	None	Same as the proposed action	Same as the proposed action
Sundry Sales (Concession)	Offer limited sundry sales at rim in a permanent structure	Continue to use temporary structure for limited sundry sales	None	Same as the proposed action	Same as the proposed action
Parking	Restripe existing parking lot to provide 120 spaces 9 feet wide; no overflow parking along Rim Drive would be anticipated	Retain existing parking lot dimensions; restripe with 120 spaces 9 feet wide; overflow parking would continue at peak times along Rim Drive	Provide minimal parking (50 spaces); restore rest of existing parking lot to natural conditions	Restripe parking lot to provide 120 spaces 9 feet wide; add drop-off area; overflow parking would be anticipated along Rim Drive at peak periods because of the level of tours provided	Same as alternative D except the parking lot would be widened to provide RV spaces and there would be a greater level of overflow parking along Rim Drive during peak periods
Trail	Retain trail with some additional erosion control measures; use low-impact vehicles for NPS research operations and concessions	Retain existing trail; use small tractors for concession and NPS operations	Retain trail with some additional erosion control measures; use low impact powered equipment for NPS research operations where possible	Modify trail alignment by installing a grated metal staircase before the slide chute for visitor safety; retain trail through chute for park use only; allow only low-impact powered vehicles on trail for NPS and concession operations	Retain existing trail and construct deflector walls above trail through slide chute; cut back rock overhanging trail below slide chute; use low-impact powered vehicles for NPS and concession operations
Trailhead Support Facilities	Construct composting / vault toilet; store boat operations and maintenance equipment in a permanent structure	Retain portable toilets	Retain portable toilets at rehabilitated portion of the parking area	Construct composting / vault toilet	Construct composting / vault toilet and a larger structure for concession boat maintenance and equipment storage
Lakeside Support Facilities	Improve bulkhead and replace dock (may not be used by boats at extreme water levels); build a small storage structure for concession and NPS boat operations; provide small waiting area with shade structure; retain existing toilet	Retain existing toilet, dock, bulkhead, and gangway; build nonpermanent storage for boat operations; only minimal facilities for NPS and concession equipment would be provided	Remove existing dock and bulkhead; construct small dock and equipment storage for research vessel; retain existing toilet	Construct new dock and bulkhead to access boats at all water levels; build permanent structure for concession and NPS boat operations; provide shade structure and open-air waiting area with seating; retain existing toilet	Same as alternative D
Fuel System	The entire fuel system is scheduled to be replaced in 1998 and will consist of a screened aboveground storage tank near the rim with metered outflow; double-wall fuel line down caldera wall to a screened, protected above-ground storage tank at lakeside; double-wall, underground fuel line below trail to a dispensing pump with a marine nozzle; system will meet ODEQ and EPA standards	Same as the proposed action	Remove entire fuel system and restore sites; gasoline needed for search and rescue and research boats would be carried down in containers on low-impact vehicles	Same as the proposed action	Same as the proposed action
Estimated Costs (in Millions of Dollars)*	\$2.0	\$1.0	\$1.1	\$2.6	\$3.4

SERVICES AND FACILITIES	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
MUNSON VALLEY					
Visitor Contact (NPS)	No contact during the summer; provide backup visitor contact station during the winter	Provide year-round visitor contact and interpretive exhibits at the Steel Information Center	Same as the proposed action	Same as the proposed action	Same as the proposed action
Natural History Association (NHA) Sales	Provide backup NHA sales and post office areas in winter	Offer NHA sales at Steel Information Center to support NPS interpretive and research programs at Crater Lake; continue operation of post office	Same as the proposed action	Same as the proposed action	Same as the proposed action
Estimated Costs (in millions of Dollars)*	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
TOTAL ESTIMATED COSTS (IN MILLIONS OF DOLLARS)	\$20.6	\$7.1	\$15.4	\$30.6	\$73.1

* NOTE: A significant component of the estimated costs to implement any of the alternatives would be incurred by the park concessioner. The exact amount and payment conditions will be presented in the new long-term concession contract. The concessioner costs will be phased in over a period of time and may occur in more than one long-term contract.

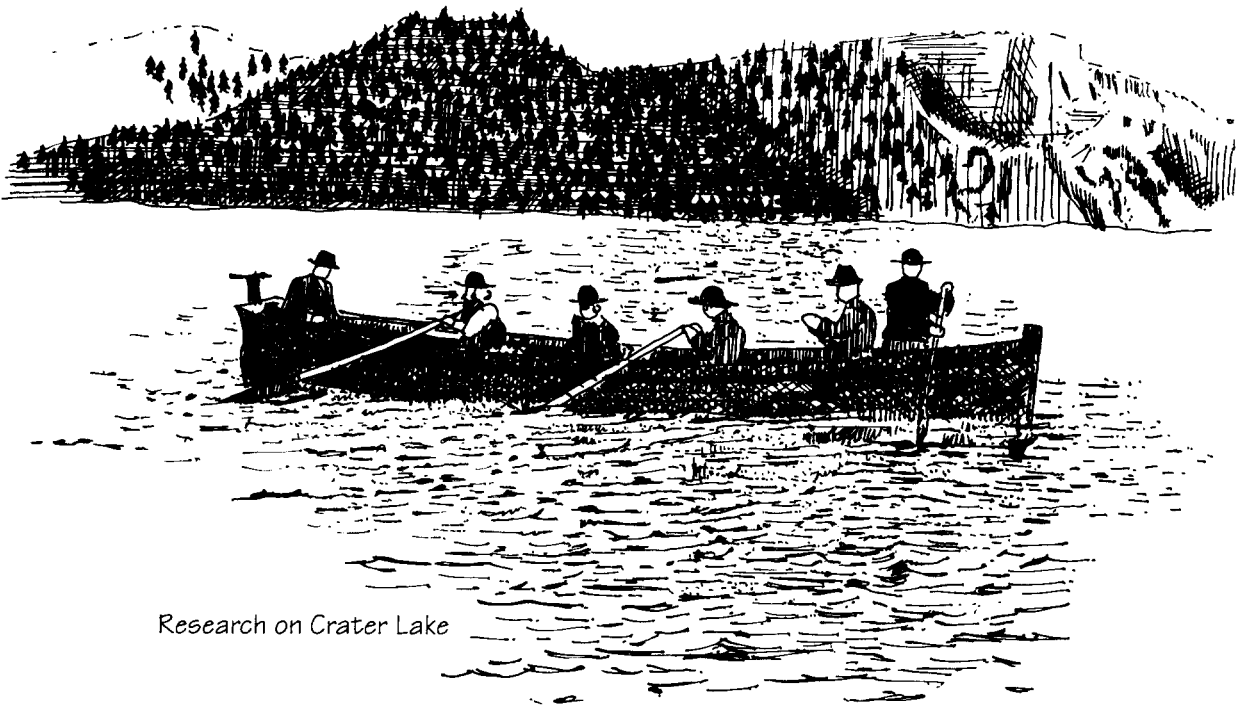
Estimated costs will be further refined for the proposed action when it moves into the design phase.

TABLE 2: COMPARISON OF IMPACTS

IMPACT TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
NATURAL RESOURCES					
Soils / Geology / Vegetation	Localized adverse impacts on soils would take place at Rim Village and Mazama Village from new construction and additional foot traffic. The potential for erosion along the Cleetwood Trail would be reduced following the construction of new retaining walls; during construction there would be a short-term increase in erosion potential along the trail. There would be an incremental increase in the disturbance of soils and vegetation at Rim Village and Mazama Village and along the Cleetwood Trail from continued visitor use. The loss of 2.4 acres and recovery of 1.8 acres in the park would not be a significant change in vegetative cover type or extent.	No significant changes in any vegetative communities would occur. Erosion potential along the Cleetwood Trail would remain largely the same; however, erosion could be slightly reduced by using low-impact equipment for maintenance whenever possible.	There would be a net decrease in the amount of acreage disturbed by development on the rim, with a loss of 2.0 acres and recovery of 3.8 acres. This would not constitute a significant change in soils or vegetative cover type or extent in the park. The potential for erosion along the Cleetwood Trail would decrease with less foot and maintenance vehicle traffic and with trail improvements.	About 13.3 acres of vegetation and soil would be adversely impacted at Rim Village and Mazama Village from new construction and additional foot traffic; however, about 3.1 acres would be recovered. The potential for erosion along the Cleetwood Trail would be reduced following the construction of new retaining walls; during construction there would be a short-term increase in erosion potential along the trail. Incremental increases in the disturbance of soils and vegetation at Rim Village and Mazama Village and along the Cleetwood Trail from continued visitor use would not be a significant change in vegetative cover type or extent.	About 12 acres of vegetation and soil would be adversely impacted at Rim Village and Mazama Village from new development and additional foot traffic; however about 3.7 acres would be recovered within the park. Incremental increases in the disturbance of soils and vegetation within Rim Village and Mazama Village and along the Cleetwood Trail from continued visitor use would not be a significant change in vegetative cover type or extent.
Water Resources	This alternative would provide a slight improvement in water quality because impervious surfaces in the park and the level of boat tours would be reduced.	This alternative would not alter the potential of pollution entering the lake.	This alternative would reduce the potential of pollution entering the lake.	Potential adverse impacts on water quality would be expected to decrease slightly under this alternative.	Potential adverse impacts on water quality would be expected to decrease.
Water Quantity / Annie Creek Flows	Water demand would result in a 5.1% reduction in the flow of Annie Creek, which would be 6% less than the current reduction.	Water demand would result in a continued 5.4% reduction in the flow of Annie Creek.	Water demand would result in a 4.4% reduction in the flow of Annie Creek, which would be 18% less than the current reduction.	Water demand would cause a 6.6% reduction in the flow of Annie Creek, which is 23% over the current reduction.	Water demand would cause a 7% reduction in the flow of Annie Creek, which is 29% over the current reduction.
Air Quality	Minor, short-term dust and equipment emissions would adversely affect air quality near construction sites during construction; however, air quality at Crater Lake National Park would not be expected to measurably change.	Localized air quality at Crater Lake would continue to be affected to a minor degree by NPS and concessioner operations. No new impacts on air quality would be expected.	Minor, short-term dust and equipment emissions would affect air quality near construction sites during development. Eliminating boat tours along with improvements to traffic flow and parking would be expected to improve air quality slightly at Cleetwood; however, air quality at Crater Lake National Park would not be expected to measurably change.	Same as the proposed action.	Same as the proposed action.
Special Status Species	The small incremental loss in habitat would not have a significant impact on special status plant or animal species.	No impacts on threatened, endangered, or other sensitive plant and/or wildlife species would occur.	Same as the proposed action.	Same as the proposed action.	Same as the proposed action.
Wildlife	There would be an incremental increase in loss of wildlife habitat and human disturbance in existing developed areas. The loss of 2.4 acres and recovery of 1.8 acres within the park would not be a significant change in wildlife habitat type or extent.	There would not be a significant change in wildlife habitat type or extent.	There would be a loss of 2.0 acres and recovery of 3.8 acres in the park, which would not be a significant change in wildlife habitat type or extent.	There would be an incremental increase in the loss of wildlife habitat and human disturbance at developed areas. The loss of 13.3 acres and recovery of 3.1 acres in the park would not be a significant change in wildlife habitat type or extent.	There would be an incremental increase in loss of wildlife habitat and human disturbance in the developed areas. The loss of 12 acres and recovery of 3.7 acres in the park would not be a significant change in wildlife habitat type or extent.

IMPACT TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
CULTURAL RESOURCES					
Prehistoric Resources	No impacts on prehistoric cultural resources would be expected.	Same as the proposed action.	Same as the proposed action.	Same as the proposed action.	Same as the proposed action.
Ethnographic Resources	No impacts on ethnographic cultural resources would be expected.	Same as the proposed action.	Same as the proposed action.	Same as the proposed action.	Same as the proposed action.
Historic Resources	Actions at Rim Village would generally benefit the historic designed landscape of the potentially eligible historic district. The addition of a visitor contact station and the removal of the parking lot along the rim edge would have a minor effect on cultural resources; however, there would be beneficial impacts on several historic structures as a result of the restoration / rehabilitation of the comfort stations, Kiser Studio, Sinnott Memorial, cafeteria, and the community house. No impacts on historic resources would be expected at other areas.	At Rim Village the removal of the community house could adversely affect the potentially eligible historic district. No impacts on historic resources would be expected at other areas.	Returning the Rim Village cafeteria building to its 1928 appearance and configuration would benefit the historic designed landscape of the potentially eligible historic district. The elimination of much of the existing parking would have an adverse effect on the designed landscape. No impacts on historic resources would be expected at other areas.	Removing the cafeteria and the community house, constructing a new visitor contact facility, removing Rim Village Drive and its rustic stone curbing and developing a new access road from the visitor contact station to the lodge would have adverse impacts on historic resources at Rim Village.	Historic resources in the potentially eligible Rim Village Historic District would be adversely affected by the development of a new activity center at Rim Village, the construction of a new access road that would connect the parking structure and activity center with the lodge, and the removal of the community house and cafeteria building.
VISITOR EXPERIENCE					
Visitors at Rim Village	Visitors would benefit from enhanced information and interpretive opportunities at the new visitor contact station and other sites, slightly reduced congestion, and continued opportunities for lodging and fine dining at Crater Lake Lodge. Shifting some of the commercial services at the cafeteria building to Mazama Village combined with the addition of a deli/fast food service at Rim Village would benefit visitors by providing these services in a couple of locations. Overall, this alternative would have a beneficial effect on the visitor experience at Rim Village.	Overall the visitor experience would remain the same. Visitors would continue to be adversely affected by vehicle and pedestrian congestion at the parking areas. People seeking a visitor contact station would continue to have to rely on the undersized Kiser Studio, which is difficult to find. Visitors would continue to benefit from opportunities to purchase groceries or to eat at the restaurant or cafeteria. Visitors would continue to have opportunities for fine dining and overnight lodging at Crater Lake Lodge.	Visitors at Rim Village would benefit from a more relaxed and less congested experience, better opportunities for NPS contact, and increased interpretation. Most visitors would be inconvenienced by the relocation of a significant portion of food and merchandise services to Mazama Village.	Same as the proposed action, except there would be more open space for pedestrians with the removal of the community house and cafeteria building, and visitors would be able to rent recreation equipment out of the new facility.	Visitors would benefit from more activities, a full-range of services, and increased levels of interpretation at a new activity center. Crater Lake Lodge would continue to provide seasonal overnight accommodations and fine dining. Vehicle congestion at Rim Village would be greatly reduced; however, some visitors might be adversely affected by increased levels of pedestrian traffic, which would probably result from the concentration of activities and services.
Visitors at Mazama Village	Visitors would benefit from information provided at a new self-service kiosk, and the relocated amphitheatre would provide visitors with easier access to programs. Visitors seeking lodging and other services would benefit from the continued operation of the Mazama Village Motor Inn, a new restaurant, and the expanded availability of sale items at the Mazama Village store. Some visitors would be inconvenienced by the lack of a public laundry.	Overall, the visitor experience at Mazama Village would remain the same. Visitors would continue to benefit from opportunities to purchase food and other merchandise, as well as gasoline, at the Mazama Village store. Visitors would also continue to benefit from opportunities to shower and do laundry. Seasonal lodging would continue to be available at the Mazama Village Motor Inn, which would benefit visitors seeking overnight accommodations. Visitors would continue to be inconvenienced by the lack of an information kiosk.	While interpretive opportunities would remain the same, visitors would benefit from information provided at a new self-service kiosk. The effects of expanding selections at the Mazama Village store and removing the shower and laundry facilities would vary depending on the individual. Many visitors could be inconvenienced by the elimination of these services and the moderately priced Mazama Village Motor Inn.	Visitors would benefit from information provided at the new self-service kiosk, and the relocated amphitheatre would provide visitors with easier access to evening programs. Visitors seeking overnight accommodations would benefit from the continued operation of the Mazama Village Motor Inn, the development of 40 new year-round lodging units, and the addition of two group sites at the campground. Visitors would also benefit from a new year-round cafeteria and the continued provision of merchandise sales and services at the camper store. The addition of rental equipment at the Mazama Village store would also benefit visitors.	Same as alternative D except there would be a new restaurant instead of a new cafeteria.

IMPACT TOPIC	ALTERNATIVE A: PROPOSED ACTION	ALTERNATIVE B: NO ACTION	ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES	ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES	ALTERNATIVE E: FOCUS VISITOR FACILITIES AT RIM VILLAGE
Visitors at Cleetwood	<p>Restriping the parking lot and the reduced number of boat tours would alleviate most of the parking problems; however, the narrow spaces could adversely affect those driving large vehicles and RVs. Development along the rim and the lakeside, including vault toilets, storage facilities, a shade structure, and a new dock, could have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Boat tours would continue, which would benefit some visitors while adversely affecting the pristine lake viewing experience sought by others. Improvements to the fuel supply system for boat tours would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Improvements to the trailhead and the trail would benefit visitors by making both areas more visually appealing and safer. Visitors would benefit from increased interpretation through more signs on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island. Overall the visitor experience would be enhanced.</p>	<p>Overall the visitor experience would remain the same at Cleetwood, as would the level and types of services. However, an increase in the capacity of the parking lot could help reduce parking deficiencies during busy summer days. Improvements to the fuel supply system for boat tours would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Some visitors would continue to benefit from opportunities to see the lake by boat and to receive NPS interpretation. The tour boats would continue to adversely affect the pristine lake viewing experience sought by others. The seasonal structures would remain unattractive, and visitors would continue to be exposed to inclement weather at the lakeshore.</p>	<p>Eliminating boat tours would adversely affect visitors seeking this type of experience. Also lost would be opportunities for visitors to see the caldera up close and to receive NPS interpretation while on the lake. However, many other visitors would benefit because the pristine lake environment would be enhanced. Removal of the fuel tanks and gasline would further enhance the aesthetic appeal of the area. Visitors would also benefit elsewhere from more opportunities for NPS contact and education and a reduction in traffic congestion. Reduced congestion on the Cleetwood Trail would allow for a more peaceful hiking experience.</p>	<p>Restriping the parking lot would alleviate parking deficiencies to a large degree; however, the narrow spaces could adversely affect those driving large vehicles and RVs. Overflow parking along Rim Drive would continue to cause congestion and result in pedestrian safety problems during peak periods. Development along the rim and the lakeside, including two new permanent structures, a shade structure, and a new dock and bulkhead, would have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Improvements to the boat tour fuel system would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Boat tours would continue, which would benefit some visitors while adversely effecting the pristine lake viewing experience sought by others. Improvements to the trailhead and the trail, including the installation of a staircase, would improve visitor safety. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island.</p>	<p>Enlarging and restriping the parking lot would greatly alleviate parking deficiencies and would reduce the need for additional parking along Rim Drive. Development along the rim and the lakeside, including a new permanent structure, vault toilets, storage facilities, a shade structure, and a new dock, could have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Improvements to the boat tour fuel system would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Boat tours would continue, which would benefit some visitors while adversely effecting the pristine lake viewing experience sought by others. Improvements to the trailhead and the trail would benefit visitors by making both areas more visually appealing and safer. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island.</p>
Visitors at Munson Valley	<p>Some visitors might be adversely affected by a lack of visitor contact during the summer. Winter visitors would benefit from opportunities for NPS contact at the Steel Information Center, which would serve as a backup visitor contact station.</p>	<p>The visitor experience would remain the same with visitors having opportunities for year-round NPS contact and interpretive walks.</p>	<p>Same as the proposed action.</p>	<p>Same as the proposed action.</p>	<p>Same as the proposed action.</p>



Research on Crater Lake

AFFECTED ENVIRONMENT

NATURAL ENVIRONMENT

CLIMATE

Crater Lake National Park is near the midpoint of the Sierra Cascade Mountain Province of the Pacific Mountain System. The park is slightly south of the main track for the numerous heavy storms that strike the North Pacific Coast each winter, but is still well within the belt of their influence. There are significant climatic differences in the park. Rainfall, snowfall, and temperatures are all greatly affected by elevation. Climatological observations have been taken at the park headquarters area, which is situated at about 6,475 feet. The park's climate is dominated by long winters with high snowfall and brief warm and sunny summers. About 70% of the annual precipitation occurs from November through March, and practically all of this winter precipitation is snow. Snow depths of 100 to 200 inches are an almost yearly occurrence at park headquarters, which averages more than 530 inches per year. The seasonal total has ranged between 280 and 880 inches. During the winter months the average daytime temperatures are just above freezing, with average nighttime minimum temperatures between 17° and 20°F. Except for occasional thunderstorms, summer weather is generally mild with clear skies. During the summer, daytime temperatures are moderate and only occasionally exceed 85°F. At night summer temperatures usually range between 40° and 50°F with occasional dips into the 30s or below.

TOPOGRAPHY / GEOLOGY / SOILS

The topography of Crater Lake ranges in elevation from about 3,800 feet in the southwest corner of the park to 8,900 feet at Mount Scott, which is the highest point in the park. Most of the rim area is situated near the 7,000 foot elevation level. However, the Watchman and Hillman Peak areas on the western side of the lake are slightly in excess of 8,100 feet. The lake is surrounded by steep-walled cliffs that range from 500 to 2,000 feet in height above the lake's surface.

Crater Lake lies inside the caldera of Mount Mazama. This volcano last erupted more than 7,700 years ago, and after its massive eruption it collapsed and formed the basin in which Crater Lake formed. Mt. Mazama was part of a north-south chain of large cones that were formed during the last few hundred thousand years along the crest of the Cascade Range (Schaffer 1983).

Rim Village is at about 7,100 feet on the south rim. Within the Rim Village area, slopes of approximately 5 to 30% extend south from the rim. The northern boundary of Rim Village is the caldera rim, where steep slopes extend down to the lake. Rim Village is on a complex of andesitic bedrock, glacial debris, and pyroclastic rock — volcanic rock with a high percentage of gaseous material at the time of eruption (USGS 1991). Soils developed on the surface of Mazama pumice, alluvium (stream deposits), and glacial debris. In general, the soils contain poorly defined soil horizons (layers of soil distinguishable from adjacent layers).

Mazama Village is at an elevation of 6,000 feet. Although the areas's topography is relatively flat, steep, forested slopes are immediately south of this area. Annie Creek Canyon, a deeply incised canyon, is immediately north and east of Mazama Village and drains to the south. Mazama Village has been mapped as Mazama ash flow from the Holocene (10,000 years ago to the present) (USGS 1991). This ash flow is a result of the enormous eruption that culminated in the collapse of the mountain and sent ash flows sweeping down the slopes of the volcano, burying the land surfaces, stream channels,

glacial deposits, soils, and vegetation of that time. This ash flow filled what is now called Annie Creek Valley and portions of Munson Valley and continued into the Wood River Valley, the former lakebed of Upper Klamath. The Wood River Valley was last underwater during the Pleistocene. Soils are generally a clean, pumice, silty sand containing some fragments of rock less than 24 inches in diameter. The soil is well drained.

The topography of the Cleetwood area is very steep. The average slope down to the lake is 72%. Rocks at Cleetwood are volcanic, formed during the last 100,000 years. The principle rock types are andesites, basalts, dacites, and rhyodacites. These rocks are frequently unconsolidated and highly fractured and reach down into the lake. The fractured nature of these rocks may allow water to pass through the fissures and into the groundwater table. In addition, pumiceous volcanic flow breccias and tuffs, composed largely of andesite and rhyodacite, are in the area (Bacon, pers. comm. 1996). As in other areas in the park, such as Mazama Village, pyroclastic flow debris are present. Soils in the Cleetwood area are excessively drained, cindery soil formed in pumiceous and scoracious cinders and ash, ranging in size from sand to cobble and occurring on slopes of up to 15%. In general, soils are young and shallow. Erosion of the trail down to the cove is a continuing problem because of the steep slopes and unconsolidated nature of the surface material.

Munson Valley is at an elevation of 6,475 feet. This area is near the base of the surrounding slopes and is also composed of volcanic breccia, remnant glacial material, and ash. The foundation material is made up of fragmented crystalline and volcanic flow rock with silty, residual soil resulting from weathering of the rock.

WATER RESOURCES

Crater Lake is 4.5 to 6.0 miles across, has 20 miles of shoreline, a surface area of 21.5 square miles, and, with a depth of 1,932 feet, is the deepest lake in the United States. The lake has no surface inlets or outlets other than springs along the caldera wall. Precipitation enters the lake primarily through rainfall and snowfall on the lake itself and secondarily through runoff from the caldera walls (Collier et al. 1990). The residence time of the water in the lake has been estimated at 150 years. Because no water flows out of the lake, only percolation through the caldera walls and evaporation balance precipitation amounts to maintain water levels. The unconsolidated fragmented deposits reaching down into the lake at Cleetwood may be responsible for significant leakage of water (Bacon et al. 1990).

Crater Lake is a youthful lake in an extremely oligotrophic state, having few plant nutrients, abundant dissolved oxygen, and no significant stratification. The water is considered extremely pure. This purity is attributed to the age of the lake and to the absence of inflowing streams that would introduce minerals and debris. The deep blue color of the lake is because of the extremely clear water. The water clarity reading in September 1996 was the clearest on record (Secchi disk reading of 40.9 meters).

Seeps and springs form the headwaters of the intermittent and perennial streams originating on the outer slopes of the rim and in the valleys below the rim. Two intermittent streams and one palustrine emergent wetland associated with one of the streams are in the Rim Village area. The headwaters of one stream and the associated wetland are west of Rim Drive at the entrance to Rim Village. The stream begins at the outlet from the culvert under the Rim Drive. The second stream originates below the Rim Drive in a drainage south of the multipurpose (cafeteria) building. The two intermittent streams flow generally west into Dutton Creek, which continues westward into the Rogue River system. Floodplains associated with these small streams are narrow, extending no more than a few feet beyond the mean highwater line.

No springs, streams, or wetlands occur in the Mazama Village area. However, Annie Spring is north of the area and Annie Creek flows through the deep, steep-sided canyon immediately east of the area. Annie Creek joins with the Wood River and eventually flows into the Klamath River system south of the park.

There are no springs or streams in the Cleetwood area.

Several springs and streams originate in Munson Valley and along the slopes above the valley. The west branch of Munson Creek originates at Munson Springs, which is near the head of the valley. The other streams in the valley are tributaries to Munson Creek, which eventually flows into Annie Creek. Stream channels in the valley vary between well-defined channels contained between narrow, steep banks and shallow meandering and braided channels, which flow through extensive riparian wetland complexes. Floodplains appear to be contained within the steep banks of well-defined channels or occur in the boundaries of associated wetlands.

Information regarding groundwater characteristics in the park is limited. Most of the available information was developed during evaluations for potential well sites. A significant water table is estimated to be about 2,000 feet below the surface in Munson Valley. While perched water tables are likely to occur at shallower depths, they are not expected to be large enough to provide a reliable water supply.

Annie Spring, located near the Mazama campground, has supplied high-quality water to the park since the 1870s. The source of water for Annie Spring is shallow groundwater originating as snowmelt; the spring's output is reduced during years when the winter snowpack is low. (Century West Engineering Corporation 1994.) Water is pumped from the spring to storage facilities at Rim Village, Mazama Village, and Munson Valley.

A U.S. Geological Survey stream gauging station is on Annie Creek under the Munson Valley road bridge near Mazama Village. This gauging station provides daily streamflow measurements and is the location of the water supply system's pump stations. The lowest flow in the last 16 years was in 1992 at 710,000 gallons per day (gpd), or 1.1 cubic feet per second (cfs) (Century West Engineering Corporation 1994). This low flow was the result of a physical blockage at Annie Spring that has since been removed. The average low flow, which provides the best estimate of current flow levels, is about 1,565,000 gpd, or 2.4 cfs.

Several tributaries downstream of Annie Spring add significantly to the stream's flow. The Oregon Department of Water Resources monitors flows in Annie Creek as it leaves the park. During drought years the lowest flows recorded are about 35 cfs — about 14 times the average low flow at the Annie Spring pump station (Sparks pers. comm.).

The water supply system pumps water to Rim Village, Mazama Village, and Munson Valley. Two pump stations, the Annie Spring-Mazama pump station and the Annie Spring-Headquarters pump station, are under the main park road bridge, which crosses Annie Creek just north of the Mazama campground. The headquarters pump delivers water to Munson Valley and to Rim Village via an additional pump at the headquarters utility building (Century West Engineering Corporation 1994).

AIR QUALITY

Crater Lake National Park has very low air pollution levels. National ambient air quality standards (NAAQS) exist for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and inhalable particulate matter. There are also standards for the prevention of significant deterioration (PSD) of air quality. Increments exist for both class I and class II areas, with more stringent parameters prescribed for class I areas, which are applicable to Crater Lake. The National Park was designated a class I area under the 1977 Clean Air Act, which requires the most stringent protection for air quality afforded under the law.

VEGETATION

Vegetation at Crater Lake National Park ranges from a Douglas fir forest at the southwest corner of the park to a high-elevation white bark pine forest. Lodgepole pine, sugar pine, white fir, and Shasta red fir are other common coniferous species.

Vegetation at Rim Village is dominated by evenly spaced stands of mountain hemlock, Shasta red fir, and other conifers that are similar in age and size and that have an open understory. Some large, mature trees that are representative of late-successional forest are found in the area. Understory species that do exist include Crater Lake currant and woodrush. Other vegetation types include a mixed mountain hemlock community, goldenbush scrub, grassland, meadows, and pumice flat. Shasta red fir and white bark pine seedlings and saplings grow along the caldera and in other openings in the forest canopy.

Two unique communities were identified at Rim Village. Unique communities are relatively undisturbed natural communities that are uncommon in a geographic region. They are recognized because of their current reduced extent, because it is important to ensure that species that depend on the unique communities do not become threatened, and because they play an important role in maintaining biodiversity. The following unique communities are not specifically protected by state or federal law.

- *Mountain Hemlock / Crater Lake Currant Understory*: This community of large, mature mountain hemlock with Crater Lake currant in the understory is considered a unique community because of the limited distribution of Crater Lake currant and the occurrence of the currant within the stand of mature mountain hemlock. The Crater Lake currant is at Rim Village. Although this species is not considered a special-status plant species, Crater Lake currant has a restricted distribution that centers on Crater Lake National Park. Crater Lake currant exists in the Cascade Range of southern Oregon, from Douglas County to Klamath and Jackson Counties (Jones & Stokes Associates 1993b).
- *Pumice Flat*: Populations of pumice sandwort, an herbaceous plant species that is associated with the pumice flat vegetation type, were found at several locations at Rim Village. Pumice sandwort inhabits sparsely vegetated pumice flats and rocky areas dominated by an assortment of forbs. This species is not considered a special-status plant species, but the distribution of the species is apparently restricted to the Crater Lake region, Mount McLoughlin, and Mount Jefferson (Jones & Stokes Associates 1993b).

Coniferous forest covers most of the Mazama Village area. The dominant forest vegetation types are pure lodgepole pine forest, mixed lodgepole pine forest, and mixed mountain hemlock forest. These

forests are present in a variety of age classes at this site. Pure and mixed lodgepole pine forest includes Shasta red fir and mountain hemlock. The understory consists of seedlings and saplings of the same species, as well as an herbaceous layer dominated by grasses. Occasional whitebark pine saplings are found in the northwest portion of Mazama Village. Grassland occurs in isolated areas around the Mazama campground and is the dominant understory in much of the lodgepole pine forest. The mixed mountain hemlock forest contains many large, mature mountain hemlock characteristic of late-successional forest. In addition to the large mountain hemlock, lodgepole pine, red fir, and white fir are also found in the overstory.

The following unique communities are found at Mazama Village:

- *Mountain Hemlock / Crater Lake Currant Understory*: The Crater Lake currant is on the north boundary of Mazama Village near the C-loop campground site and is associated with the mixed phase of the mountain hemlock forest in this area.
- *Late-Successional Mountain Hemlock Forest*: The southern portion of Mazama Village contains approximately 54 acres of large, mature hemlock trees mixed with occasional lodgepole pine, Shasta red fir, and white fir. Some snags and decaying logs are found in this late-successional forest. This community is considered a unique community because of its habitat value for northern goshawk (a federal candidate), for cavity nesters, and for other dependent wildlife and because of the limited occurrence of late-successional forest in the southern Cascade mountains.

Cleetwood is located in the mountain hemlock forest type. Two species, the mountain hemlock and the lodgepole pine are found along the Cleetwood Trail. Other plant species in the area include low mountain lupine, Newberry knotweed, sulphur flower, spreading phlox, and Pacific bleeding heart.

The dominant vegetation types at Munson Valley are mixed mountain hemlock forest, mixed lodgepole pine forest, willow scrub, and wet meadow. Mountain hemlock dominates the forest vegetation type, with lodgepole pine and white fir as subdominant species. Munson Valley also includes Quarry Flat, an unvegetated staging area for storing road construction equipment and materials. A large willow scrub and wet meadow area on the rocky slopes southwest of Quarry Flat. This area is dominated by Eastwood's willow, mountain alder, arrowleaf groundsel, false-hellebore, showy sedge, Lewis monkeyflower, and straight-leaf rush.

WETLANDS

Rim Village contains one small wetland, totaling approximately 0.04 acre. The wetland is classified as seasonal palustrine emergent using the U.S. Fish and Wildlife Service classification system and is dominated by showy sedge and false-hellebore (USFWS 1979). The wetland is supported by runoff from surrounding uplands, as well as a road with a culvert, which directs water to the wetland.

No wetlands are present at Mazama Village or Cleetwood.

A large wetland area associated with Munson Creek is found in the Munson Valley area. These wetlands are primarily north and south of park development. Hillside seeps that support scrub-shrub and emergent wetlands occur on the slopes west of Quarry Flat.

WILDLIFE AND FISH

Crater Lake National Park provides a large block of relatively undisturbed habitat that supports healthy populations of native wildlife species. The most frequently seen animals in the park include Cascades golden-mantled ground squirrel, Townsend's chipmunk, Clark's nutcracker, and gray jay. These species are common throughout the park. Other commonly observed animals include raven, Stellar's jay, pika, marmot, and hare. Porcupine, red fox, elk, black bear, and black-tailed deer are also occasionally seen. Cougars are rarely seen in the park but are likely present at low densities.

Although Crater Lake was originally barren of fish, fish stocking took place between 1888 and 1941. Of the number of species that were stocked, only kokanee salmon, brook trout, and brown trout still exist in the lake. Introduced brook trout inhabit Munson and Annie Creeks. Introduced brown trout are found in Annie Creek near the park boundary.

SPECIAL STATUS SPECIES

No threatened, endangered, or other special status plant species have been found at Rim Village, Mazama Village, or Munson Valley.

The pumice flat vegetation type at Rim Village is potential habitat for pumice grape-fern, a category 1 candidate for federal threatened or endangered listing and a Forest Service sensitive species. However, this plant has not been observed at Rim Village.

No known species listed as endangered or threatened by federal agencies have been identified at Cleetwood.

The Lost River sucker (*Deltistes luxatus*) and shortnose sucker (*Chasmistes brevirostris*) are both federally listed endangered species. Both species are primarily lake residents that spawn in rivers, streams, or springs associated with lake habitats. In the upper Klamath Lake watershed Lost River sucker spawning runs are primarily limited to Sucker Springs in upper Klamath Lake and the Sprague and Williamson Rivers. Spawning runs also occur in the Wood River and Crooked Creek. Shortnose sucker spawning runs in the upper Klamath Lake watershed are primarily limited to the Sprague and Williamson Rivers, although spawning runs may occur in the Wood River and in Crooked Creek (USFWS 1996). These species are not known to inhabit the park at present, and it is not known if they have historically inhabited the park.

Peregrine falcon (*Falco peregrinus anatum*), an endangered species, and bald eagle (*Haliaeetus leucocephalus*) and northern spotted owl (*Strix occidentalis caurina*), both threatened species, are present in the park but do not regularly use developed areas for breeding, foraging, or shelter. No other wildlife species listed as threatened or endangered by federal agencies are known to exist in the park.

Peregrine falcons are likely to forage along the entire caldera and have been frequently observed near Rim Village by the lodge and near Sinnott Memorial (S. Stonum pers. comm.). However, Rim Village itself does not contain habitat typical of peregrine falcons. Most habitat and reported activity are from within the caldera. One active peregrine eyrie exists within the caldera. Tour boats are restricted from areas on the lake that are near the nest site.

Bald eagles occur intermittently near the lake and can potentially show up anywhere in the park. The most typical habitat is along the shores of the lake. Bald eagles typically exist near water where they forage on fish, carrion, and waterfowl. No nesting has been reported at Crater lake in recent years, and

the bald eagles that currently use the park are probably nomadic birds. Adults may travel through the area during their spring and fall migration. Bald eagle habitat potentially exists along Annie Creek, but no nest sites are known in this area.

Northern spotted owls are found in dense, multistoried forests in the park at elevations up to 6,550 feet (Crater Lake Natural History Association 1993, L. Stonum pers. comm.). Because spotted owls can exist in a wide variety of habitats during nonbreeding periods or during dispersal, spotted owls could travel through any forested area of the park. However, none of the areas considered in this document contain habitat similar to that in which northern spotted owls have been found in the park.

Because the park contains a large block of relatively undisturbed habitat, several state-listed sensitive species are present. In general, most state-listed species have very specific habitat requirements. Many of the species present in the park require wetlands, streams, late-successional forest, or ponderosa or lodgepole pine forests.

At Rim Village the pumice flat area supports few if any sensitive species. Potentially, Swainson's hawk (*Buteo swainsoni*) may forage in this area as they pass through the park during migration. Northern goshawk (*Accipiter gentilis*) could forage near the rim and at Munson Valley. Undeveloped portions of Mazama Village are probably used by northern goshawk. As with most large predatory birds, northern goshawks live at relatively low densities, even in highly suitable habitat (territories usually average larger than 10 square miles) (Oregon Department of Fish and Wildlife and Bonneville Power Administration 1992). Therefore, northern goshawks use Mazama Village as part of much larger territories. The mountain hemlock forest at Mazama Village contains snags and trees affected by mistletoe that are typical of northern goshawk nesting habitat. The areas being considered for development contain lodgepole pine forest that is less suitable for nesting. Three woodpecker species listed as sensitive by the state use the forest near Mazama Village: pileated woodpecker (*Dryocopus pileatus*), three-toed woodpecker (*Picoides tridactylus*), and black-backed woodpecker (*Picoides arcticus*).

California wolverine (*Gulo gulo luteus*) and Pacific fisher (*Martes pennanti pacifica*) are members of the weasel family (*Mustela*). Because these species travel regularly over large distances, they could potentially use any of the park's developed areas as part of much larger home ranges. However, these species tend to avoid areas with human activity or development. Because of large-scale loss of natural habitats throughout both species' ranges, the entire park may contain foraging habitat and travel corridors important to their distribution and abundance in Oregon. These species require large areas of relatively undisturbed habitats that are uncommon outside of national parks and designated wilderness areas. Another member of the weasel family, American marten (*Martes americana*), may also be present at any of the park's developed areas.

The Crater Lake newt (*Taricha granulosa mazama*) is the only amphibian in the park that is considered rare. This subspecies of the rough-skinned newt is endemic to Crater Lake and is found in the shoreline ecosystem of the lake. This species has been found at Cleetwood.

Bull trout (*Salvelinus confluentus*) are classified as candidate species in the Klamath River basin by the U.S. Fish and Wildlife Service; however, they are already a state-listed sensitive species. Bull trout in the Klamath Basin are considered to be a separate evolutionary unit from Columbia River bull trout under the definitions of the Endangered Species Act. An interagency team of Klamath Basin biologists and the Oregon Department of Fish and Wildlife are developing strategies to reestablish bull trout in Annie Creek within and downstream of the park boundary. Bull trout may be present within Annie

AFFECTED ENVIRONMENT

Creek; however, (1) brook trout are abundant in the creek, and hybridization with introduced brook trout is known to seriously impact bull trout populations (Oregon Department of Fish and Wildlife and Bonneville Power Administration 1992); (2) spot checks along the creek have found no bull trout (Brock pers. comm.); and (3) there are no recent records of bull trout occurrences in the creek (Oregon Department of Fish and Wildlife and Bonneville Power Administration 1994).

CULTURAL ENVIRONMENT

PREHISTORIC RESOURCES

Three cultural resource surveys examined the present project areas, including surveys of the Rim Village area (Minor et al. 1989), the Mazama Village area (Bergland 1985a), and the Munson Valley and Mazama Village areas (NPS 1994a). No archeological resource sites have been recorded in areas where development is planned, and no prehistoric cultural resources either listed on or eligible for listing on the national register are known to exist in the proposed development areas. No archeological surveys have been conducted in the Cleetwood area.

Prehistoric occupation of the Crater Lake area could date to more than 10,000 years ago, when extensive mountain glaciers began to recede and hunters followed big game into southeastern Oregon (Mairs et al. 1994). The great eruption of Mount Mazama, more than 7,700 years ago, left the area around it temporarily uninhabitable. Until Euro-Americans arrived in the area, prehistoric populations from the eastern and western sides of the Cascade Mountains intermittently used the park area. Prehistoric uses included hunting, traveling to trade materials such as obsidian (volcanic glass used to make some stone tools), gathering resources such as huckleberries, and practicing traditional spiritual activities in the higher elevations and around Crater Lake.

Archeological survey work has been conducted in the park since the mid-1960s, and to date less than 1% of the land area has been examined (Mairs et al. 1994). However, an archeologist working for the National Park Service has made some predictions about where archeological sites are likely to occur (Bergland 1985b). These sites include small base camps near water resources that are indicated by scatters of stone tools; rock features, such as cairns or piles, stacks, and rings, on mountain peaks and high ridges (probably associated with spiritual activities); and hunting sites throughout the park that are indicated by isolated tools such as projectile points.

Prehistoric remains that have been found near the project areas include a possible source area for chunks of obsidian raw material (site record number 35KL804) found near Crater Lake Lodge on the rim of the lake (Minor et al. 1989). Although many of the isolated artifacts found in the park do not have precise locational information, the snapped-off upper end of a projectile point (record number 853) came from the highway below the visitor facilities at the rim of the caldera (Mairs et al. 1994). Analysis has shown that the point's source is Newberry Crater, located northeast of the park. A hydration reading, used to estimate the dates of obsidian artifacts, suggests that the projectile point dates to the late-prehistoric period.

Five finds have been made in the park headquarters area in Munson Valley, consisting of one intact projectile point (record number 860); the base of another projectile point (record number 861); a flake, or stone chip, resulting from toolmaking (no record number); one-half of a split nodule, or chunk, (record number 2112); and four stone pieces (record number 863) that may not have resulted from human activities (Mairs et al. 1994). All of the artifacts are made of obsidian, and the source of the whole projectile point, which is of a late-period style, is Newberry Crater. However, a couple of the finds came from "contaminated" fill brought into the park from a barrow pit near the Williamson River.

The locations of these prehistoric remains relative to the project areas is unclear, and none of the sites have been recommended for listing on the National Register of Historic Places.

ETHNOGRAPHIC RESOURCES

Three Indian groups bordered the Crater Lake area on the west — Molala, Upper Umpqua, and Takelma. The Klamath Indians lived to the east (Mairs et al. 1994). Indian lifeways, before disruption by Euro-American contact, involved seasonal movements from lower-elevation winter villages to hunt and gather a variety of fish, plant, and animal resources throughout their territories. Use of the Cascade Mountains, such as the Crater Lake National Park area, included the establishment of warmer season camps to hunt animals, gather plant products such as huckleberries, and to conduct traditional spiritual activities. Raiding by various Native American groups also took place in the area.

Spirit quests took Indian people to isolated places that were believed to possess the powers of certain physical forces and animals that, when acquired, brought success in activities such as gambling, romance, and curing (Mairs et al. 1994). Those on quests retreated alone to particular places to fast, stay awake for long periods, undertake certain physical activities, and pray, while waiting for an answering vision. Some activities included running, stacking rocks into high piles, and swimming in water bodies thought to possess a sought-after power.

A recent overview of the park considers Crater Lake to have been an important place of power and danger, highly regarded as a spirit quest site (Mairs et al. 1994). This study refers to the lake as an important sacred place or landscape; such sites are called “traditional cultural properties” by cultural resource managers, although the boundaries of Crater Lake as a traditional cultural property have yet to be defined and documented. Parts of the lake are associated with mythical events and characters, and parts may be used for contemporary spirit quest rituals.

There are no known ethnographic resources in the project areas, and no specific information is currently available on American Indian concerns regarding cultural resources that might be associated with the project areas. However, the National Park Service will continue to consult with concerned Indian tribes during the design process to learn about possible cultural resources in the project areas and how to avoid them.

HISTORIC RESOURCES

The documented historic resources in Crater Lake National Park are primarily associated with the development of the area as a national park. Most of the historic structures and districts in the park represent the activities of the National Park Service or the park’s concessioners.

Rim Village

Four buildings in Rim Village are listed on the National Register of Historic Places under criterion A, for their association with the history and development of Crater Lake National Park, and criterion C, as outstanding examples of rustic architectural design. These include Crater Lake Lodge (1981), Sinnott Memorial building (1988), and comfort stations no. 68 and 72 (1988). In addition, the National Park Service has determined that Rim Village is eligible for listing on the national register as a historic designed landscape (NPS 1990b).

In a 1997 nomination to the National Register of Historic Places submitted to the Oregon State Historic Preservation Office, the National Park Service has determined that seven buildings (including the aforementioned four) and other individual features in Rim Village are potentially eligible for

listing on the national register. These features are eligible under criterion A for their association with the history and development of Crater Lake National Park and criterion C for their association with site planning and design by NPS landscape architects and as outstanding examples of rustic naturalistic design in the areas of architecture and landscape architecture.

As described in the 1997 nomination, the Rim Village Historic District has 12 individual features that comprise a designed historic landscape in terms of form and function. The features listed under the circulation category include roads and parking areas (vehicular circulation) and walkways and four hiking trails (pedestrian circulation), which begin at points in the district. A promenade extending 3,450 linear feet along the edge of the caldera is the primary pedestrian circulation system for Rim Village. The features listed under vegetation include planting concepts, which describe the philosophy behind all plantings in the district, and plant materials, which are the material forms of that philosophy. Six buildings, including the aforementioned four plus the Kiser Studio, the community house, and one structure, a crenelated stone masonry wall that delineates the promenade and creates a parapet with three observation bays of varying configurations that extend into the caldera, contribute to the designed historic landscape. Small scale features include a variety of detail elements such as free standing boulders, stone benches, and masonry details such as steps and curbing. These elements are historically important to the rustic character of the designed landscape.

Also underway is a national register determination of eligibility for Rim Drive, including the segment of road between Munson Valley and Rim Village.

Mazama Village

Remnants of a historic military wagon road are in the Mazama Village area, as well as in other areas of the park, including Munson Valley and Rim Village. Soldiers from Fort Klamath built the road in the summer of 1865 to improve transportation routes in the region. Under the command of Captain Franklin B. Sprague, about 20 men from Company I, First Oregon Volunteer Infantry, built a new wagon route across the Cascade Range to improve the road from Jacksonville to Fort Klamath. The new road followed Union Creek off the Rogue River, then down along Annie Creek, providing an easier route over which to haul supplies to Fort Klamath. During the road's construction, soldiers "rediscovered" Crater Lake and gave it more publicity than had resulted from earlier explorations. Sprague concluded correctly that the lake was the crater of an extinct volcano.

Although much of the route of the original wagon road lies under modern highways or has lost its identity through other disturbance, segments of the old road are visible in some places. A general reconnaissance survey of the wagon road during 1994 found a 2-mile-long segment in the general Mazama Village area; however, it is well away from any proposed construction. The current water tank for Mazama Village, installed in 1972, as well as a proposed enlarged water storage tank, are in the middle of a noncontiguous section of the wagon road.

The only other previously documented cultural resource in the Mazama Village area was the Annie Spring residence (Crater Lake building no. 129). This building was evaluated for its architectural merit in 1984 and was determined ineligible for listing on the National Register of Historic Places because it did not "contribute to the thematic nomination" (NPS 1985b). The building was removed in 1987.

Cleetwood

The Cleetwood Trail extending down the caldera from the rim to the lake was completed in 1959. It was constructed in its present location because the caldera wall in this area is mostly forested, ensuring greater soil stability than two earlier trails built to the lake from Rim Village. Its southern exposure also ensured that the snow would melt sooner than along the two earlier trails, both of which had northern exposure. In addition, the vertical height of the caldera at Cleetwood is 200 feet less than at Rim Village, providing a shorter hike for park visitors.

An archeological survey has not been conducted, and there are no known cultural resources in the Cleetwood area.

Munson Valley

The Crater Lake superintendent's residence at Munson Valley was designated a national historic landmark in 1987 because it is an outstanding example of rustic architectural design.

In 1988 the Munson Valley Historic District, which contains the park headquarters area, was listed on the National Register of Historic Places under criteria A and C. This nomination designated 18 buildings that contribute to the significance of the district. Subsequent landscape analyses have expanded on the significance of this district as a designed landscape (NPS 1990a) and have established its historical significance under national register criteria A, B, C, and D (NPS 1991). The only other previously documented historic resource in Munson Valley is an archeological site (FS no. 93-1-H), which consists of a scatter of historic debris (NPS 1994a) that has not been evaluated for eligibility for listing on the National Register of Historic Places under criterion D. No proposed project work, however, would affect this site.

VISITOR EXPERIENCE

RIM VILLAGE

Rim Village is the focal point of year-round visitor activity. During the summer season, observation areas along the rim and the Sinnott Memorial provide visitors with unobstructed views of Crater Lake. In addition, Rim Village serves as a staging area for hiking trails, including the Garfield Peak Trail. The Park Service maintains a visitor contact station, picnic area, and comfort stations, and park rangers lead interpretive talks on a variety of subjects. The park concessioner provides cafeteria and restaurant food services and a gift store. The rehabilitated historic Crater Lake Lodge reopened in 1995 and offers 71 guest rooms and fine dining.

During the winter, Rim Village remains the focal point for many visitor activities; however, high snow levels reduce lake viewing opportunities. People can have a limited view of the lake from a converted culvert viewing area placed perpendicular to the caldera. Visitors with disabilities currently have no safe viewpoint during the winter. The concessioner maintains very limited food service and a gift store. The Park Service provides guided interpretive snowshoe tours from Rim Village, and a small interpretive display is located in the cafeteria. No lodging is available during the winter season.

MAZAMA VILLAGE

Mazama Village serves as another focal point for summer visitors. Mazama Village is closed during the winter season. Development is partially screened from view from the entrance road by mature lodgepole pine and shrub vegetation. Visitor activities are oriented toward tent and recreational vehicle camping. Other activities include hiking along the Annie Creek Canyon and Godfrey Glen Trails.

Overnight lodging is available in the 40-unit Mazama Village Motor Inn during the summer. A camper store offers prepackaged food, camper supplies, gifts, gasoline service, and public showers and laundry. Park rangers provide evening interpretive programs. Traffic circulation minimizes pedestrian conflicts, with most vehicles traveling one way through campground loops. Vehicle noise and exhaust emissions are minimal because traffic volumes are low and vehicles travel at low speeds.

CLEETWOOD

The Cleetwood Trail is about 1 mile long and provides the only access to the lake. From mid to late June through early September, boat tours are available through the park concessioner. NPS interpretation is provided on the tours. Each 1 ¼-hour tour circles the inside of the caldera with a stop at Wizard Island and a close-up look at Phantom Ship. Parking is available at the rim; however, during the summer months visitors frequently experience congestion in the current parking lot. Many visitors park along Rim Drive when spaces in the parking lot are unavailable. This causes congestion along Rim Drive. Portable toilets are currently available at the parking lot. Permanent composting toilets are located at the lakeside.

MUNSON VALLEY

Munson Valley is primarily a Park Service administration, maintenance, and housing area rather than a visitor use area. The visitor experience in Munson Valley is focused on the Steel Information Center, where most visitor contact with NPS interpretive staff occurs. The Crater Lake Natural History Association operates a sales outlet in this building. During the summer visitors can also access the Castle Crest Wildflower Trail and the trail to the Lady of the Woods from Munson Valley. The main buildings in this area reflect a rustic architectural theme characteristic of the park. No concessioner services are available in Munson Valley. Conflicts between pedestrians and traffic are minimal.

CONCESSION OPERATIONS

All the concession facilities and services at Crater Lake National Park take place at Rim Village, Mazama Village, and Cleetwood and are currently operated by a private concessioner, Crater Lake Lodge, Inc.

RIM VILLAGE

The summer, in-season, period of concession operations is generally from mid-May through mid-October. Depending on snow conditions, May and October usually offer the concessioner an opportunity to open the Mazama Village facilities and campground a couple of weeks earlier and keep them open a couple of weeks later. Traditionally, the concessioner generates more than 90% of its total sales during the peak 90- to 100-day period in the summer.

During the winter, off-season, heavy snow necessitates the closure of facilities and significantly reduces the level of service at the multipurpose (cafeteria) building at the rim. The multipurpose building is the only facility kept open daily that offers limited food and gift shop services. This facility also serves as the principal concessioner warehouse and cold storage facility. The rental of cross-country skis and snowshoes from this building has been discontinued because there is not enough visitor demand. Park records indicate that winter visitation accounts for about 10% of total park visitors.

Crater Lake Lodge, Inc., employs up to 240 people in the summer, including management staff. An employee dormitory on the east side of the village currently provides the majority of seasonal housing and serves some administrative functions. The lack of adequate seasonal housing has been critical and has contributed to high staff turnover and hiring limitations. A new government dormitory is under construction near Mazama Village, which will be assigned to the concessioner to alleviate some of this overcrowding. The concessioner will be required to provide furniture, fixtures, and equipment.

A NPS-owned 71-room lodge and 78-seat dining room has been assigned to Crater Lake Lodge, Inc. The concessioner has a significant investment in personal property (i.e, dinnerware, cooking, reservation, and housekeeping equipment) in this building.

MAZAMA VILLAGE

A camper services building constructed by the concessioner (enlarged in 1994) offers camper supplies, coin-operated public showers and laundry, commercial laundry, gasoline sales, and limited snack food services. This facility serves as the concessioner's only laundry for the lodge and the concessioner-constructed 40-unit Mazama Village Motor Inn. The concessioner also operates an assigned 213-site NPS campground.

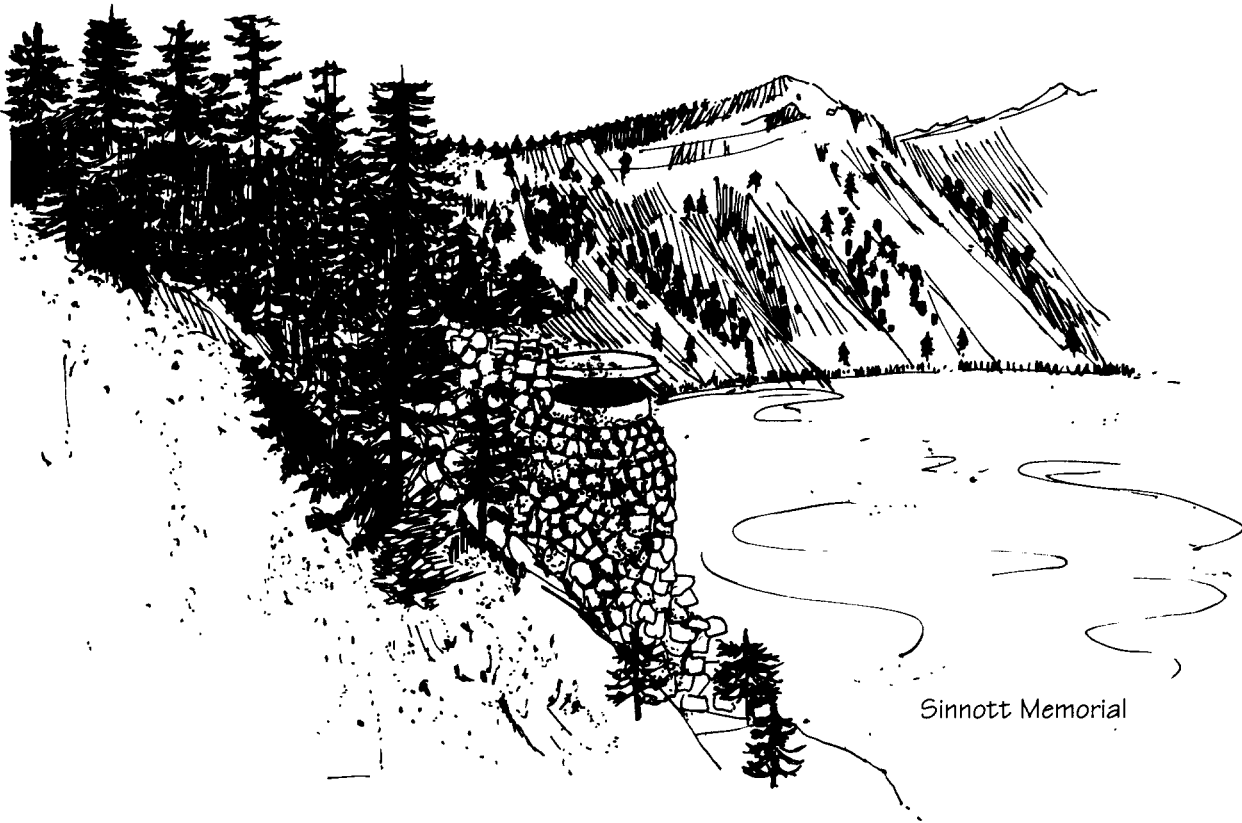
CLEETWOOD

Seasonal boat tours of Crater Lake are provided from a dock at Cleetwood. The concessioner owns and operates four 60-passenger boats from mid-to-late-June through mid-September. Currently, there are nine scheduled tours, plus one trip to Wizard Island for passenger pickup.

LOCAL ECONOMY

While Crater Lake National Park plays a major role in the recreation industry of southern Oregon, the developments proposed in this plan are not intended to result in more visitors to the park. Rather, the proposed actions are intended to facilitate a more desirable visitor experience and to enhance resource protection. Therefore, the regional recreation industry is not considered an element of the affected environment, and economic impacts for all alternatives would be negligible.





Sinnott Memorial

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A: PROPOSED ACTION

NATURAL RESOURCES

Impacts on Soils / Geology / Vegetation

Analysis: Developments at Rim Village and Mazama Village would take place on relatively flat areas and would not require extensive alteration of topography. Construction activities and visitor and employee use would result in localized surface disturbance and soil compaction.

About 2.4 acres of vegetation and soils would be impacted at Rim Village and Mazama Village. Constructing the new visitor contact station and a small parking area behind the cafeteria would result in the loss of about 1.3 acres of grassland on the rim. About 1.8 acres would be rehabilitated by removing Rim Dormitory and the large cafeteria parking lot. Removing these facilities would also allow the Park Service to restore 0.7 acre of pumice flat and shrub vegetation.

A few mature mountain hemlock and other large trees scattered throughout Mazama Village could be adversely affected by development. Small trees less than 14 inches in diameter would be adversely affected by development in 1.1 acres of lodgepole pine forest.

Erosion potential would temporarily increase during the installation of new retaining walls along the Cleetwood Trail. However, stability of the soil around the trail would improve after the construction was completed. The addition of 1 to 2 feet of soil and gravel on the surface of the trail, along with a small retaining wall on the outer edge of the trail, could help to prevent erosion from under the present retaining walls on the uphill side of the trail. Accelerated trail erosion from equipment transportation could also be reduced by using low-impact equipment whenever possible. Because the trail is near wilderness areas and because of the geology and soils in the area, hardened trail surfaces are not practical or desirable. Trail surfaces would continue to require and receive regular maintenance. Constructing the retaining walls along the Cleetwood Trail would also have short-term adverse impacts on vegetation. However, vegetation lost or damaged would be replaced by new growth after the construction was finished.

This alternative would not result in fill or alteration of wetlands present at the Rim Village or Munson Valley areas.

Because all actions proposed for Munson Valley would use existing facilities, no new impacts on soils, geology, or vegetation would be expected.

Cumulative Impacts: The concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village was approved as part of the 1995 *Development Concept Plan*, and the dormitory is currently under construction. The size of the dormitory and maintenance facility would vary by alternative; however, the gross area impacted in the lodgepole pine forest would still be about 5 acres. This acreage lost would be in addition to the 1.1 acres of lodgepole pine forest that would be impacted under this alternative.

TABLE 3: ACRES OF VEGETATION DISTURBED OR REMOVED (ALTERNATIVE A)

Area	Vegetation Type								
	MH	LP	MC	PF	DM	OW	G	D	REHAB
Rim Village							1.3		1.8
Mazama Village		1.1							
Cleetwood			<0.1*				<0.1		
Notes: MH = mountain hemlock; LP = lodgepole pine forest; MC = mixed conifer forest; PF = pumice flat; DM = dry meadow; OW = open water/lake bed; G = grassland; D = disturbed native vegetation / unvegetated; REHAB = acreage restored/revegetated *disturbance mostly limited to shrubs / groundcover / barren soil — most or all large trees would remain									

Conclusion: Localized adverse impacts on soils would take place at Rim Village and Mazama Village from new construction and additional foot traffic. The potential for erosion along the Cleetwood Trail would be reduced following the construction of new retaining walls; during construction there would be a short-term increase in erosion potential along the trail.

There would be an incremental increase in the disturbance of soils and vegetation at Rim Village and Mazama Village and along the Cleetwood Trail. The loss of 2.4 acres and recovery of 1.8 acres in the park would not be a significant change in vegetative cover type or extent.

Impacts on Water Resources

Analysis: About 2.4 acres of impervious surfaces would be created in the park during the construction of new buildings and parking. However, about 1.8 acres of existing impervious surfaces would be restored after the employee dormitory and cafeteria parking area were removed.

Construction at Rim Village would not take place near nor would it impact the stream and associated wetland west of the Rim Village entrance. Construction activity involved in removing the large parking area at the rim is planned to avoid disturbing the stream, the small floodplain of the stream, and its associated wetland. Any potential adverse impacts on water quality from runoff during ground-disturbing activities would be either completely avoided or minimized through mitigating measures such as silt fencing. Removing the large cafeteria parking area would benefit water quality in the lake because the potential for stormwater runoff to reach the lake would be reduced. Removing the parking area would also eliminate the need for blowing potentially contaminated snow over the edge of the rim during snow removal operations.

Removing Rim Dormitory would not impact surface water resources because the facility is far from surface water features.

Constructing the concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village would not likely affect surface waters because the area is relatively level, well drained, and contains no nearby surface water features. No construction would take place near Annie Spring or Annie Creek; therefore, the water quality of Annie Creek would not be impacted.

**TABLE 4: AVERAGE DAILY SUMMER WATER USE
(GALLONS PER DAY) ALTERNATIVE A**

Rim Village	34,400
Mazama Village	34,000
Munson Valley	10,900
Total	79,300

Extension / expansion of the bulkhead at Cleetwood and the installation of a new dock would result in a short-term impact on water quality. Risks of petroleum spills from gasoline-powered tour boats would be slightly reduced because there would be fewer boat tours. Effects on the water quality of the lake resulting from motorboat exhaust would also be slightly reduced. The current single-walled fuel line that runs down the caldera walls would be replaced in 1998 with a double-walled line. The new line would reduce potential adverse impacts on water quality because it would be more resistant to rock impacts. However, if there was a leak in the inner hose it would not be as readily apparent in a double-walled line. It should be noted that risks associated with the fuel lines would be minimal because there would be very little time that gas was actually in the hose, and it would be completely empty after fuel was delivered to the tank below. All components of the fuel system would be brought into EPA and ODEQ compliance.

Cumulative Impacts: No cumulative impacts on water quality would be expected under this alternative.

Conclusion: This alternative would provide a slight improvement in water quality because impervious surfaces in the park and the level of boat tours would be reduced.

Impacts on Water Quantity / Annie Creek Flows

Analysis: Table 4 presents the average summer daily water demand that would continue to be supplied from Annie Spring. This alternative would result in the use of approximately 79,300 gallons per day (gpd). This would be a decrease of about 5,200 gpd from Annie Spring, which would be a 6% decrease compared to the existing water demand. Water withdrawals would reduce flows in the upper parts of Annie Creek by 5.1%. This would be less than the current withdrawals, which reduce flows by 5.4%.

Cumulative Impacts: Water demands on Annie Creek include all existing and proposed facilities. Cumulative impacts on water supply would result in a decrease of about 6%.

Conclusion: Water demand would result in a 5.1% reduction in the flow of Annie Creek, which would be 6% less than the current reduction.

Impacts on Air Quality

Analysis: Short-term adverse impacts on air quality would occur from construction activities. Emissions would consist primarily of dust generated during grading, as well as nitrogen oxides and reactive organic gas emissions from construction equipment. These impacts would only affect areas very near construction sites.

Reducing and reconfiguring parking at Rim Village would have an indirect effect on air quality by reducing traffic and idling times for vehicles, which would diminish hydrocarbon emissions in this area. More efficient traffic flow would result, and less pollution from emissions from nonmoving traffic would occur.

Air quality at Cleetwood would improve because traffic congestion would be alleviated. Additional spaces in the present parking lot would result in fewer people idling in their cars while waiting for a parking space or waiting for traffic to continue moving.

Cumulative Impacts: No cumulative impacts on air quality would be expected under this alternative.

Conclusion: Minor, short-term dust and equipment emissions would adversely affect air quality near construction sites during construction; however, air quality at Crater Lake National Park would not be expected to measurably change.

Impacts on Special Status Species

Analysis: Because no special status plant species were found in Rim Village, Munson Valley, and Mazama Village, no impacts on threatened and endangered or other sensitive plant species would take place in these three areas. Decreased foot traffic in Cleetwood could benefit the Pacific bleeding heart, which has been documented near the parking lot and along the Cleetwood Trail.

New development would mainly take place on previously disturbed areas. None of the areas contain habitat suitable for the northern spotted owl, and no effect on spotted owls would be expected.

Although the California wolverine and Pacific fisher regularly travel over large distances and could use the developed areas as part of much larger home ranges, these species typically avoid areas with human activity or development. This alternative would result in small-scale and localized reduction in habitat. However, this reduction would not have a significant effect on these species because most development is proposed in areas of previous development and the habitat that would be lost represents a small portion of the average home range size of these species. The reduction of American marten habitat throughout the park would be minor in relation to the amount of habitat available elsewhere.

Approximately 1.1 acres of northern goshawk habitat at Mazama Village would be removed. Because a pair of northern goshawks may range up to 6,000 acres, this level of habitat loss represents a small fraction of a single pair's territory. This loss of habitat for northern goshawk would not adversely affect any nesting pairs or individuals in the Rim Village or Munson Valley area because there is no suitable habitat. The loss of northern goshawk habitat at Mazama Village would not likely affect the populations either at the regional level or at the park level. Mazama Village also contains habitat used by three woodpecker species listed as sensitive by the state: pileated woodpecker, three-toed

woodpecker, and black-backed woodpecker. Because similar habitat is common throughout the park, impacts on these birds would be small in scale and local.

Water use by the park would be reduced under this alternative and no negative effect downriver on Wood River flows would be anticipated; therefore, no impacts on Lost River sucker or shortnose sucker or on sucker spawning habitat in Wood River would be expected.

Tour boats would continue to be restricted from areas on the lake near the peregrine falcon nest site. Bald eagle use near the lake is transient in nature, and past boat use has not appeared to impact this species. Therefore continued boat tours would not be expected to affect these species.

Crater Lake newts have been found at Cleetwood. Development impacts along the shoreline, which is newt habitat, would be limited and would primarily take place on the area already disturbed by the existing dock and associated facilities. A survey of the newt population at Cleetwood would be performed before any construction took place.

Cumulative Impacts: Bull trout used to migrate from Agency / Upper Klamath Lake to spawning beds in Sun Creek by way of Annie Creek and the Wood River. However, little or no flows from Annie Creek reach the Wood River during drought periods because of water demands in Annie Creek (more than 99% of which occur downstream of the park). This low flow has resulted in the disconnection of the Wood River / Annie Creek / Sun Creek migration route.

The Park Service water withdrawals would decrease under the proposed action, which would increase water flows in Annie Creek. This small increase in water flows (5,200 gpd) would not affect the current conditions downstream outside of the park, including the bull trout migration route.

Conclusion: The small incremental loss in habitat would not have a significant impact on special status plant or animal species.

Impacts on Wildlife

Analysis: This alternative would result in the long-term removal of up to 1.3 acres of habitat at Rim Village, 1.1 acres of habitat at Mazama Village, and less than 0.1 acre at Cleetwood. At Rim Village and Cleetwood, the areas proposed for development support a few small mammals and birds, but because of the high elevation and the relatively small area affected, few if any species would be significantly impacted. Abundance and species composition would not be affected.

Habitat impacted at Mazama Village would be lodgepole pine, which supports a variety of animals. However, in relation to the regional distribution of these habitat types and associated species, this impact would be small-scale and local and would not result in a major decline in animal populations in the park or region.

If trees or other vegetation were cleared during the breeding season (generally May through June), bird nests or mammal dens could be destroyed. During the construction of facilities, noise, machinery, and workers would cause some animals to avoid otherwise suitable habitat near construction sites. This impact would probably be minor because many animals tolerate nonthreatening disturbance, including construction activity.

The indirect impacts of disturbance would adversely impact some wildlife species. People and noise could cause large animals, such as deer, to avoid developed sites or might encourage “begger” individuals to frequent the development sites in search for food. Other smaller mammals and some birds might avoid otherwise suitable habitat near the developed areas; however, it is likely that they would seek suitable habitat nearby. Development in areas used by bear or cougar would increase the risk of negative interactions between these animals and humans.

Decreased water withdrawal from Annie Creek could increase habitat for fish and aquatic organisms during the low flow periods of August and September. Any beneficial effects would probably be relatively minor because the decrease in the amount of water that would be removed represents only a small portion of the total low-flow volume. Below the point of water withdrawal, the effect would be less significant as more tributaries augment the streamflow.

Cumulative Impacts: Completion of employee facilities and associated infrastructure at Mazama would impact an additional 5 acres in the lodgepole pine forest community. This acreage loss would add to previous habitat loss from existing development, as well as the 1.1 acres of lodgepole pine forest type impacted under this alternative.

Conclusion: There would be an incremental increase in loss of wildlife habitat and human disturbance in existing developed areas. The loss of 2.4 acres and recovery of 1.8 acres within the park would not be a significant change in wildlife habitat type or extent.

CULTURAL RESOURCES

Impacts on Prehistoric Resources

Analysis: Based on the findings of previous cultural resources field surveys, no impacts on prehistoric cultural resources would be anticipated. However, at the time of the surveys some project areas had not been determined, and surveys of these sites would be needed. Surveys would also be needed if final design and construction needs required the use of any additional land outside previously surveyed areas.

Should previously unknown cultural resources be uncovered during construction activities, work would be stopped immediately in the discovery area and the National Park Service would consult the state historic preservation officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) according to 36 CFR 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.

Cumulative Impacts: There would be no cumulative impacts on prehistoric cultural resources.

Conclusion: No impacts on prehistoric cultural resources would be expected.

Impacts on Ethnographic Resources

Analysis: The National Park Service has initiated consultation with the Klamath tribes at Chiloquin. There are no known ethnographic resources in the project areas to be affected under this alternative. However, the National Park Service would continue consultation during the design process to learn about possible Native American cultural resources in the project areas, potential project impacts on

these resources, and possible mitigating measures. No specific information is currently available on Native American concerns regarding cultural resources that might be associated with the project areas.

Impacts on cultural resources relating to Native American spiritual activities would be less likely in the Mazama Village and Munson Valley areas than in the Rim Village and Cleetwood areas. This is because of the possible use of Crater Lake itself and of high-elevation areas, such as mountain and ridge tops, for spiritual activities, and the participants' concomitant avoidance of developed areas. The Mazama Village and Munson Valley areas lie away from the lake, lack mountain and ridge tops, and already contain development. The potential for impacts on ethnographic resources at Rim Village and Cleetwood would be more likely because of their proximity to the lake. However, the proposed improvements would decrease vehicle traffic at the rim and reduce visual impacts in these areas.

Cumulative Impacts: There would be no cumulative impacts on ethnographic cultural resources.

Conclusion: No impacts on ethnographic cultural resources would be expected.

Impacts on Historic Resources

Analysis: Cultural resources in the Rim Village Historic District would benefit from protection and preservation. The historic designed landscape would further benefit from the rehabilitation of contributing elements such as buildings and structures, vehicle and pedestrian circulation features, and small-scale rustic elements.

Constructing a visitor contact facility between the cafeteria building and the plaza comfort station in Rim Village would have only a minor effect on the proposed historic district because it would be constructed in a style compatible with other buildings in the district. Removing the large parking area along the rim edge in front of the cafeteria would eliminate this circulation feature from the historic district. However, the area would be revegetated to be compatible with the village's historic designed landscape. The new parking lot behind the cafeteria would probably not affect historic resources because most of this lot would be outside the boundaries of the proposed historic district.

There is only one known historic resource in the Mazama Village area — a short segment of a historic military wagon road built in 1865. The construction of a new watertank and waterlines for the Mazama Dormitory complex and maintenance facility would take place in the middle of the wagon road segment. To minimize impacts from construction, the road segment would be protected from inadvertent damage by installing appropriate fencing.

No actions under this alternative would impact historic resources in the Munson Valley Historic District.

Cumulative Impacts: Cumulative impacts on historic resources would include the removal and revegetation of the large parking area along the rim edge in front of the cafeteria in the Rim Village Historic District, as well as the construction of a large water tank and waterlines in the middle of the historic wagon road segment in Mazama Village.

Conclusion: Actions at Rim Village would generally benefit the historic designed landscape of the historic district. The addition of a visitor contact station and the removal and revegetation of the parking lot along the rim edge would have a minor effect on historic resources; however, there would be beneficial impacts on several historic structures as a result of the restoration/rehabilitation of the

comfort stations, Kiser Studio, Sinott Memorial, cafeteria building, and the community house. No impacts on historic cultural resources would be expected at other areas.

VISITOR EXPERIENCE

Impacts on Visitors at Rim Village

Analysis: Constructing a year-round visitor contact station at a prominent site in Rim Village would make the facility easier to find for a greater number of park visitors. The larger facility would benefit visitors by providing enhanced park information and orientation materials and services, and the new location would provide better opportunities to view the lake during the winter.

Interpretation and visitor understanding of the area's natural and cultural resources would be significantly enhanced with the addition of interpretive exhibits (winter and summer), evening programs at the rehabilitated community house, cultural resource exhibits at Kiser Studio, and geology and lake ecosystem exhibits at Sinnott Memorial.

Vehicle and pedestrian congestion would be reduced with the removal of some rim parking, the elimination of Rim Dormitory, and the reduction of concessioner food and merchandise services.

Visitors would continue to benefit from opportunities for seasonal lodging at Crater Lake Lodge, and the lodge dining room would continue to provide fine dining during the summer. Lodge visitors would continue to have good views of the lake.

Reducing the size of the multipurpose (cafeteria) building that currently offers a cafeteria, a casual dining facility (Watchman), merchandise sales, and a concession merchandise/food storage space could inconvenience some visitors who are used to these services. However, the 1928 cafeteria building would be rehabilitated and its later additions removed, to provide visitors with a new place to purchase fast food/delicatessen items and some limited merchandise and sundries. The rehabilitated cafeteria would benefit most visitors because it would provide quicker food service and would be more visually appealing than the current multiuse facility. All other food services and the sales of gifts and sundries would be relocated to Mazama Village. Visitors would benefit from being able to obtain food and some retail merchandise at two locations.

Cumulative Impacts: No cumulative impacts on the visitor experience at Rim Village would be expected under this alternative.

Conclusion: Visitors would benefit from enhanced information and interpretive opportunities at the new visitor contact station and other sites, slightly reduced congestion, and continued opportunities for lodging and fine dining at Crater Lake Lodge. Reducing the amount of services at the cafeteria building and relocating other services to Mazama Village might inconvenience some visitors. Overall, this alternative would have a beneficial effect on the visitor experience at Rim Village.

Impacts on Visitors at Mazama Village

Analysis: Building a self-service kiosk near the Mazama Village store would benefit visitors by providing additional park orientation. Relocating the amphitheater to a more central location would allow for easier visitor access.

Removing the public laundry from the Mazama Village store would have adverse impacts on some visitors who are accustomed to this facility. Most visitors staying at the NPS campground would continue to benefit from public showers at the camper store.

Expanding food service, groceries, camper supplies, and merchandise sales would benefit visitors. Visitors would also benefit from the continued sale of gasoline. Greater use of the store, including associated parking congestion, might inconvenience some visitors especially during the day.

Continued seasonal operation of the Mazama Village Motor Inn by the concessioner and the construction of a new full-service restaurant to serve lodging and campground guests would benefit visitors in Mazama Village.

Cumulative Impacts: No cumulative impacts on the visitor experience at Mazama Village would be expected under this alternative.

Conclusion: Visitors would benefit from information provided at a new self-service kiosk, and the relocated amphitheatre would provide visitors with easier access to programs. Visitors seeking lodging and other services would benefit from the continued operation of the Mazama Village Motor Inn, a new restaurant, and the expanded availability of sale items at the Mazama Village store. Some visitors would be inconvenienced by the lack of a public laundry.

Impacts on Visitors at Cleetwood

Analysis: Development on the rim and lakeside could intrude on the visual scene. However, a rustic architectural style would be used in the design of these structures to minimize adverse visual impacts.

Visitors would benefit from an increase in the number of interpretive signs on the rim, lakeside, and along the trail.

Restriping the parking lot would increase the number of spaces without increasing the physical size of the parking lot. This would be beneficial because more vehicles could park in the existing lot. However, the narrow spaces might inhibit the drivers of larger vehicles. Individuals driving RVs would continue to have to park parallel to the curb, taking up four stalls each, which could affect drivers of smaller vehicles searching for a space when the main lot was full.

Some visitors would continue to benefit from the boat tours provided by the concessioner; however the number of tours would be reduced from current levels. A reservation system would probably enhance visitor satisfaction and tour boat occupancy rates. However, with a reduction in the number of boat tours, it is expected that some visitors would be adversely affected by not being able to take a boat tour on a given day because fewer seats would be available. Visitors taking the tour would benefit from NPS interpretation onboard the tour boat, as well as on Wizard Island. However, some visitors would be adversely affected because of the intrusion of the boats on the pristine lake environment.

An aboveground fuel storage tank near the rim could intrude on the visual scene. This potential impact would be minimized by placing the tank on the north side of Rim Drive and screening it. A fuel line running above ground down the caldera wall could also intrude on the visual scene; however, it could be placed in an unobtrusive location. Screening the tank at lakeside would improve the visual quality of that area.

Constructing a new bulkhead and dock would improve the visitor safety and the appearance of the lake edge. The bulkhead would not extend any farther into the lake than the current dock and bulkhead,

which could adversely affect visitors because boat tours might not be possible during extremely high or low water years.

Constructing a shade structure on the lakeside would benefit some visitors in hot or rainy weather. However, this structure could adversely affect some visitors because it would subtract from the natural appearance of the lake edge. Visual impacts would be minimized by using materials that were colored to blend with the surrounding rock so that the structure would not be clearly visible from other points along Rim Drive.

Replacing the temporary retail structure and redesigning the trailhead area would benefit visitors because the trailhead would be more aesthetically pleasing and safer. Visitors would benefit from new vault toilets near the entrance of the parking lot.

Reconstructing the retaining walls in a single style along the Cleetwood Trail would benefit visitors by improving the aesthetics along the trail. Replacing the old wood cribbing with a material that is common to all the retaining walls would create a continuity that is currently lacking along the trail. Removing the crib walls would also eliminate the smell of creosote, which many people find offensive.

Cumulative Impacts: No cumulative impacts on the visitor experience at Cleetwood would be expected under this alternative.

Conclusion: Restriping the parking lot and the reduced number of boat tours would alleviate most of the parking problems; however, the narrow spaces could adversely affect those driving large vehicles and RVs. Development along the rim and the lakeside, including vault toilets, storage facilities, a shade structure, and a new dock, could have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Boat tours would continue, which would benefit some visitors while adversely effecting the pristine lake viewing experience sought by others. Improvements to the fuel supply system for boat tours would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Improvements to the trailhead and the trail would benefit visitors by making both areas more visually appealing and safer. Visitors would benefit from increased interpretation through more signs on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island. Overall the visitor experience would be enhanced.

Impacts on Visitors at Munson Valley

Analysis: Visitors to this area might be inconvenienced because no visitor contact would be offered in the summer at the Steel Information Center. Even though no visitor information about the park would be available here, visitors would probably not be adversely affected because a new year-round visitor contact station would be opened at Rim Village. Winter visitors would continue to benefit from the information provided at the Steel Information Center when inclement weather forces the closure of the Rim Village facility.

Cumulative Impacts: No cumulative impacts on the visitor experience at Munson Valley would be expected under this alternative.

Conclusion: Some visitors might be adversely affected by a lack of visitor contact during the summer. Winter visitors would benefit from opportunities for NPS contact at the Steel Information Center, which would serve as a backup visitor contact station.

ALTERNATIVE B: NO ACTION

NATURAL RESOURCES

Impacts on Soils / Geology / Vegetation

Analysis: No new construction would take place in the Rim Village, Munson Valley, Mazama Village, and Cleetwood areas. The no-action alternative would be a continuation of existing infrastructure, buildings, and visitor orientation experiences. As a result, impacts on soils, geology, and vegetation that currently exist would continue. Because no construction or roadway realignment is proposed, there would not be any additional impacts on soils and vegetation.

The geology in many places along the caldera walls, including along the Cleetwood Trail, is inherently unstable, and retaining the Cleetwood Trail in its current condition and layout would continue the present rate of erosion and continue to subject the visitor and park staff to danger from rockfall; however, the continued practice of rock descaling above the trail would help alleviate this problem. A very thorough descaling at the fractured andesite overhangs would help prevent rockfall. Restricting the use of tractors to only times of necessity and using only low-impact equipment would help to reduce the rate of erosion on the trail.

Cumulative Impacts: Completing the concession employee housing facilities and associated infrastructure at Mazama would adversely impact about 5 acres of lodgepole pine forest vegetation type.

Conclusion: No significant changes in any vegetative communities would occur. Erosion potential along the Cleetwood Trail would remain largely the same; however, erosion could be slightly reduced by using low-impact equipment for maintenance whenever possible.

Impacts on Water Resources

Analysis: Impervious surfaces associated with parking, walkways, and buildings would remain the same and would continue to promote the overland sheet flow of drainage waters during rainfall events and snowmelt conditions. However, these impacts would not be of great extent because the porous nature of the soils would allow most of the runoff to infiltrate the soils.

Surface water flows would not be expected to change in the Rim Village area, and petroleum buildup on parking areas and subsequent runoff during rainfall or excessive snowmelt would continue to have the potential to reach the lake's shoreline without infiltration occurring.

Retaining the current level of activity at the rim above Cleetwood and keeping the trail in its current layout would continue to have insignificant impacts on water quality.

Gasoline-powered tour boats and research boats on Crater Lake would continue the risk of water contamination from fuel spills and leaks, engine oil and other lubricants, and various solvents used in the maintenance of the boats. Exhaust from the boats would continue to threaten the quality of the lake water. There are preliminary data on the effects of hydrocarbon emissions into the lake. Oregon State University recently completed a draft publication of their lake survey results that suggests total

petroleum hydrocarbon concentrations are low, and although it seems boat activities have an impact on hydrocarbon levels, they do not represent a deleterious impact on the lake environment.

The current single-walled fuel line that runs down the caldera walls would be replaced in 1998 with a double-walled line. The new line would reduce potential adverse impacts on water quality because it would be more resistant to rock impacts. However, if there was a leak in the inner hose it would not be as readily apparent in a double-walled line. It should be noted that risks associated with the fuel lines would be minimal because there would be very little time that gas was actually in the hose, and it would be completely empty after fuel was delivered to the tank below. All components of the fuel system would be brought into EPA and ODEQ compliance.

TABLE 5: AVERAGE DAILY SUMMER WATER USE (GALLONS PER DAY) ALTERNATIVE B

Rim Village	39,300
Mazama Village	31,800
Munson Valley	13,400
Total	84,500

Cumulative Impacts: There would be no cumulative impacts on water quality.

Conclusion: This alternative would not alter the potential of pollution entering the lake.

Impacts on Water Quantity / Annie Creek Flows

Analysis: Table 5 presents the average summer daily water demand that would continue to be supplied from Annie Spring. This alternative would result in the continued use of approximately 84,500 gpd. Continued water withdrawal rates would reduce flows in the upper reach of Annie Creek by 5.4%.

Cumulative Impacts: Water demands above include all existing and proposed concession facilities at Mazama. Cumulative impacts on water supply would result in the continued use of approximately 84,500 gpd.

Conclusion: Water demand would result in a continued 5.4% reduction in the flow of Annie Creek.

Impacts on Air Quality

Analysis: Traffic patterns, congestion, and pedestrian/vehicle interactions would continue to elevate, on a localized level, the amounts of mobile sources of pollutants such as carbon monoxide, nitrogen oxides, sulfur oxides, fine particulates, and reactive organic gases. These pollutants would continue to concentrate where traffic congestion occurs (such as at Rim Village) as a result of vehicle idling and visitors having difficulty locating a parking place during peak times.

Retaining current parking facilities and the trail in its current layout at Cleetwood would continue to result in traffic congestion at the parking lot. Restriping the parking lot might decrease the number of idling engines; however, it is expected that parking lot overflows would still be common. Removing paint from the parking lot and adding the new striping might result in a temporary addition to particulate matter at Cleetwood.

Gasoline-powered tour boats and research boats on the lake would continue to adversely affect air quality by contributing hydrocarbons, carbon monoxide, particulate matter, and other types of internal-combustion engine exhaust. Small spills from fueling operations would continue to have minor negative effects on air quality in the area.

Cumulative Impacts: There would be no cumulative impacts.

Conclusion: Localized air quality at Crater Lake would continue to be affected by NPS and concessioner operations. No new impacts on air quality would be expected.

Impacts on Special Status Species

No impacts on threatened, endangered, or other sensitive plant and/or wildlife species would occur.

Impacts on Wildlife

Analysis: Impacts on wildlife would continue at current levels at all sites, including disturbance from heavy traffic congestion at the Rim Village parking area. The promotion of high levels of small mammal concentrations at visitor experience areas in Rim Village could continue to reduce the presence of other bird species by competing for food and nest sites, as well as by preying on young eggs.

Water withdrawals from Annie Creek would continue to reduce habitat for fish and aquatic organisms during the low flow periods of August and September. The consequences of habitat loss from water withdrawal could include reductions in abundance, biomass, reproductive success, and survival of aquatic life. The magnitude of this reduction cannot be fully predicted because of the complex nature of the system. The effects are expected to be relatively minor because the amount of water that would be removed represents only a small portion of the total low-flow volume. Below the point of water withdrawal, the effect would be less significant as more tributaries augment the streamflow.

Cumulative Impacts: Completing employee facilities and associated infrastructure at Mazama would impact 5 acres of lodgepole pine forest community. This acreage lost would add to previous habitat loss from existing development.

Conclusion: There would not be a significant change in wildlife habitat type or extent.

CULTURAL RESOURCES

Impacts on Prehistoric Resources

As in alternative A, no impacts on prehistoric cultural resources would be expected. There would be no cumulative impacts.

Impacts on Ethnographic Resources

As in alternative A, no impacts on ethnographic cultural resources would be expected. There would be no cumulative impacts.

Impacts on Historic Resources

Analysis: With the exception of the community house, all buildings, structures, and circulation (vehicle and pedestrian) and small-scale rustic features at Rim Village would be retained in their existing condition. However, the removal of the community house could adversely affect the potentially eligible historic district.

As in alternative A, the completion of a new watertank and waterlines for the Mazama Dormitory complex and maintenance facility would take place in the middle of the historic wagon road segment. No actions would impact historic resources in the Munson Valley Historic District.

Cumulative Impacts: There would be no cumulative impacts on historic resources.

Conclusion: At Rim Village the removal of the community house could adversely affect the potentially eligible historic district. No impacts on historic cultural resources would be expected at other areas.

VISITOR EXPERIENCE

Impacts on Visitors at Rim Village

Analysis: Visitor contact would continue to be at the Kiser Studio. This would continue to have a negative effect on visitors because the building is undersized and is difficult for visitors to locate. Visitors would continue to benefit from limited interpretive talks and wayside exhibits.

At peak hours of the day during the summer vehicle and pedestrian congestion at the parking areas coupled with lengthy stays in the cafeteria building would continue to adversely affect the visitor experience at Rim Village. Visitors would still be able to purchase food at the rim in the existing cafeteria or restaurant. Visitors would benefit from continued opportunities to purchase groceries and sundries for picnics or other activities. However, this experience would be temporarily affected during the one to two summer seasons that would be required to repair the cafeteria building's structural problems. During this time, pedestrian and vehicle construction would be greatly reduced; however, many visitors would be inconvenienced by the lack of concession food and merchandise services.

The primary concessioner would continue to provide fine dining and overnight lodging for visitors in the 71-room lodge, which would have a beneficial effect on visitors seeking these services. Lodge visitors would continue to benefit from good views of the lake.

Cumulative Impacts: No cumulative impacts on the visitor experience at Rim Village would be expected under this alternative.

Conclusion: Overall the visitor experience would remain the same. Visitors would continue to be adversely affected at peak periods of the day by vehicle and pedestrian congestion at the parking areas.

People seeking a visitor contact facility would continue to have to rely on the undersized Kiser Studio, which is difficult to find. Visitors would continue to benefit from opportunities to purchase groceries or to eat at the restaurant or cafeteria. Visitors would continue to have opportunities for fine dining and overnight lodging at Crater Lake Lodge.

Impacts on Visitors at Mazama Village

Analysis: Visitors would continue to be adversely affected by lack of an information kiosk. Visitors would continue to benefit from interpretive programs at the amphitheater and nature walks.

A variety of camper services, including the sale of prepackaged foods, limited merchandise, gasoline, and coin-operated public laundry and showers would continue to benefit campers and visitors. Some visitors would be able to continue to enjoy seasonal lodging at the Mazama Village Motor Inn.

Cumulative Impacts: No cumulative impacts on the visitor experience at Mazama Village would be expected under this alternative.

Conclusion: Overall, the visitor experience at Mazama Village would remain the same. Visitors would continue to benefit from opportunities to purchase food and other merchandise, as well as gasoline, at the Mazama Village store. Visitors would also continue to benefit from opportunities to shower and do laundry. Seasonal lodging would continue to be available at the Mazama Village Motor Inn, which would benefit visitors seeking overnight accommodations. Visitors would continue to be inconvenienced by the lack of an information kiosk.

Impacts on Visitors at Cleetwood

Analysis: Visitors would continue to enjoy the same views. The current placement of large boulders at the trailhead is not in keeping with the historic nature of Rim Drive, and would continue to detract from the visual experience of some visitors. Boat tours would continue at current levels, which would benefit visitors seeking this type of experience. However, boats on the lake would continue to adversely affect the visual experience of some visitors viewing the lake from the rim.

The current parking lot is not visible from other locations on the rim, which would continue to benefit visitors viewing the lake. Increasing the parking lot capacity to 120 spaces would decrease, but not eliminate, the amount of overflow parking. This would benefit visitors trying to find a parking space and would reduce the amount of time that rangers would need to devote to traffic control.

An aboveground fuel storage tank near the rim could intrude on the visual scene. This would be minimized by placing the tank on the north side of Rim Drive and screening it. A fuel line running above ground down the caldera wall could also intrude on the visual scene; however, it could be placed in an unobtrusive location. Screening the tank at the lakeside would improve the visual quality of that area.

The Cleetwood Trail would continue to be visible from the water, especially where it crosses the scree slope and is exposed along the lake edge. The safety of visitors would continue to be enhanced through rock descaling practices above all parts of the trail.

The nonpermanent concessioner and NPS structures are unattractive, and the lack of a shade structure at the lakeshore would continue to expose visitors to the sun and inclement weather.

Cumulative Impacts: No cumulative impacts on the visitor experience at Cleetwood would be expected under this alternative.

Conclusion: Overall the visitor experience would remain the same at Cleetwood, as would the level and types of services. However, an increase in the capacity of the parking lot could help reduce parking deficiencies during busy summer days. Improvements to the fuel supply system for boat tours would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Some visitors would continue to benefit from opportunities to see the lake by boat and to receive NPS interpretation. The tour boats would continue to adversely affect the pristine lake viewing experience sought by others. The seasonal structure would remain unattractive, and visitors would continue to be exposed to the sun and inclement weather at the lakeshore.

Impacts on Visitors at Munson Valley

Analysis: Visitors would continue to benefit from opportunities for year-round NPS contact at the Steel Information Center and from interpretive walks of the historic district.

Cumulative Impacts: No cumulative impacts on the visitor experience at Munson Valley would be expected under this alternative.

Conclusion: The visitor experience would remain the same with visitors having opportunities for year-round NPS contact and interpretive walks.

ALTERNATIVE C: PROVIDE OPPORTUNITIES FOR SELF-DIRECTED VISITOR EXPERIENCES

NATURAL RESOURCES

Impacts on Soils / Geology / Vegetation

Analysis: New construction activities would result in surface disturbance and soil compaction. However, because new development would be limited, this alternative would require the least site grading and would result in the smallest amount of soil disturbance. Impacts on topography would also be the least under this alternative. Visitor and employee use at new and existing facilities would result in localized impacts on soils.

About 2.0 acres of vegetation and soils would be impacted at Rim Village. Approximately 1.2 acres of grassland and 0.8 acre of currently disturbed land would be displaced on the rim by the new visitor contact station, an associated small parking lot, and a new parking loop at the lodge. About 3.1 acres would be rehabilitated following the removal of the large rim parking lot and parking along Rim Village Drive. Removing Rim Dormitory would allow an additional 0.7 acre to be rehabilitated; almost half of which could be restored to pumice flat type vegetation.

With no tours on the lake, the number of hikers on the Cleetwood Trail would be expected to drop, reducing the rate of erosion on the trail. Eliminating concession tractors and using low-impact equipment such as power wheelbarrows would dramatically reduce the amount of erosion on the trail. The trail itself would not be improved under this option, although it would continue to be maintained in its present condition.

Removing the north section of the parking lot at Cleetwood would disturb soil and could result in a higher rate of erosion in the area. However, this erosion potential would be temporary and would be minimized through the use of soil-stabilizing methods and materials. The reintroduction of vegetation would eventually eliminate potential erosion and would reestablish approximately 0.35 acre of wildlife habitat.

Removing the bulkhead used to anchor the dock and restoring the shoreline to blend with the surrounding shoreline would reduce the visual effects of human use on the geology and soils of the area.

This alternative would not result in fill or alteration of wetlands present at the Rim Village or Munson Valley areas.

Because all actions proposed for Munson Valley would use existing facilities, no new impacts on soils, geology, or vegetation would be expected.

Cumulative Impacts: About 5 acres of lodgepole pine forest community would be impacted by the completion of the concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village. There would be no additional impacts on this community type under alternative C.

TABLE 6: ACRES OF VEGETATION DISTURBED OR REMOVED (ALTERNATIVE C)

Area	Vegetation Type								
	MH	LP	MC	PF	DM	OW	G	D	REHAB
Rim Village							1.2	0.8	3.8
Cleetwood			<0.1a			<0.1			
Notes: MH = mountain hemlock; LP = lodgepole pine forest; MC = mixed conifer forest; PF = pumice flat; DM = dry meadow; OW = open water/lake bed; G = grassland; D = disturbed native vegetation/developed; REHAB = acreage restored/revegetated ^a disturbance mostly limited to shrubs / groundcover/barren soil - most or all large trees would remain									

Conclusion: There would be a net decrease in the amount of acreage disturbed by development on the rim, with a loss of 2.0 acres and recovery of 3.8 acres. This would not constitute a significant change in soils or vegetative cover type or extent in the park. The potential for erosion along the Cleetwood Trail would decrease with less foot and maintenance vehicle traffic and with trail improvements.

Impacts on Water Resources

Analysis: About 2.0 acres of impervious surfaces would be created in the park during the construction of new buildings and parking. However, removing the larger parking area, employee dorm, and parking along Rim Village Drive would allow restoration of about 3.8 acres. This restoration would result in an overall decrease in impervious surfaces.

Construction at Rim Village would not take place near nor would it impact the stream and associated wetland west of the Rim Village entrance. Removing the large parking area at the rim would avoid disturbing the stream, the associated wetland, and the small floodplain of the stream. Removing the large parking area and parking along Rim Village Drive would reduce the potential for stormwater runoff and contaminated snow to reach the lake. Removing the parking areas would also eliminate the need for blowing potentially contaminated snow over the edge of the rim.

Removing Rim Dormitory would not impact surface water resources because of the distance of the dormitory from the surface water features.

No construction would occur near Annie Spring or Annie Creek; therefore, the water quality of Annie Creek would not be impacted.

Removal of the bulkhead at Cleetwood would cause temporary clouding of the water near the dock. Removing four large 60-person tour boats would dramatically reduce the potential for fuel spills into the lake. Fewer boats would help to maintain the pristine nature of the lake and the purity of the water. Eliminating tours would benefit water quality by reducing the amount of exhaust emitted into the lake by motorboats. The potential for petroleum leaks from various lubricants needed to operate boats

would also be reduced, as would potential impacts from maintenance materials, including paint and other finishes.

Cumulative Impacts: No cumulative impacts would be expected on water quality.

Conclusion: This alternative would reduce the potential of pollution entering the lake.

**TABLE 7: AVERAGE DAILY SUMMER WATER USE
(GALLONS PER DAY) ALTERNATIVE C**

Rim Village	32,400
Mazama Village	25,900
Munson Valley	10,900
Total	69,200

Impacts on Water Quantity / Annie Creek Flows

Analysis: Table 7 presents the average summer daily water demand that would continue to be supplied from Annie Spring. This alternative would result in the use of about 69,200 gpd. This would be a decrease of about 15,200 gpd from Annie Spring, which would be a 18% decrease over existing water demand.

Water withdrawals would reduce flows in the upper reach of Annie Creek by 4.4%. This would be less than the current 5.4% flow reduction.

Cumulative Impacts: Water demands above would include all existing and proposed facilities. Cumulative impacts on water supply would result in a 18% decrease over existing water demand.

Conclusion: Water demand would result in a 4.4% reduction in the flow of Annie Creek, which would be 18% less than the current reduction.

Impacts on Air Quality

Analysis: Construction activities would result in temporary, short-term adverse impacts on air quality. Emissions would consist primarily of dust generated during grading, as well as nitrogen oxides and reactive organic gas emissions generated from construction equipment. These emissions would only affect areas very near construction sites.

Reducing and reconfiguring parking in the heavily congested Rim Village would have an indirect effect on air quality by reducing traffic and idling times for vehicles, which would reduce hydrocarbon emissions in this area.

Removing motorized tour boats from Crater Lake would be expected to improve air quality in the area because exhaust from the boat engines would be eliminated. Research and rescue boats would continue to emit exhaust fumes; however, these craft would not be expected to have a measurable impact on air quality because they have smaller engines and would run less frequently than tour boats. It should also be noted that there is currently no data to prove that existing boat use in the caldera has a negative effect on air quality.

Reducing traffic congestion at the Cleetwood parking lot would benefit local air quality by further lowering the emissions from gasoline engines. While traffic volumes would go down in the immediate

area, many visitors would continue to visit Cleetwood while on a circuit of Rim Drive, especially if the boat tours were not available.

Cumulative Impacts: No cumulative impacts would be expected under this alternative.

Conclusion: Minor, short-term dust and equipment emissions would affect air quality near construction sites during development. Eliminating boat tours along with improvements to traffic flow and parking would be expected to improve air quality slightly at Cleetwood; however, air quality at Crater Lake National Park would not be expected to measurably change.

Impacts on Special Status Species

Analysis: Because no special status plant species were found in Rim Village, Munson Valley, and Mazama Village, no impacts on threatened and endangered or other sensitive plant species would take place in these three areas. Pacific bleeding heart was found in an area that is not under consideration for any change. Reduced foot traffic in the area would lessen the impact of trampling on the vegetation in the area, thereby reducing the potential for impacts on this species.

Because development would occur mostly on previously disturbed land within existing developed areas, no major impacts would be expected on any species listed by state and federal agencies.

No development would occur in potential northern spotted owl habitat, and no effect on owls would be expected. This alternative would result in very small-scale and localized reduction in habitat for the California wolverine and Pacific fisher. This reduction would not have a significant affect on these species because most development is proposed in areas of previous development and the habitat that would be lost represents a small portion of the average home range size of these species. The American marten is present throughout the park, and the small reduction of habitat would be minor in relation to the amount of habitat available elsewhere.

There would be no measurable affect on Wood River flows under this alternative; therefore, no impacts on Lost River sucker or shortnose sucker or on sucker spawning habitat in Wood River would be expected.

Crater Lake newts have been found at Cleetwood. Impacts along the shoreline, which is newt habitat, would be limited and would primarily occur in the area already disturbed by the dock and associated facilities. A survey of the newt population at Cleetwood would be performed before any construction took place.

Cumulative Impacts: Bull trout used to migrate from Agency/Upper Klamath Lake to spawning beds in Sun Creek by way of Annie Creek and Wood River. However, little or no flows from Annie Creek reach Wood River during drought periods because of water demands in Annie Creek (more than 99% of which occur downstream of the park). This low flow has resulted in the disconnection of the Wood River/Annie Creek/Sun Creek migration route.

The Park Service water withdrawals would decrease under this alternative, which would increase water flows in Annie Creek. This small increase in water flows would not affect the current conditions downstream outside of the park, including the bull trout migration route.

Conclusion: No major impacts on special status plant or animal species would be expected.

Impacts on Wildlife

Analysis: This alternative would result in the long-term removal of up to 2.0 acres of wildlife habitat at Rim Village. The areas proposed for development support a few small mammals and birds, but because of the high elevation and the relatively small area affected, few if any species would be significantly impacted. Abundance and species composition would not be affected. Also, approximately 3.8 acres of grassland and pumice flat vegetation communities would be recovered under this alternative.

Decreased water withdrawal from Annie Creek could increase habitat for fish and aquatic organisms during the low flow periods of August and September. Any beneficial effects would probably be relatively minor because the decrease in the amount of water that would be removed represents only a small portion of the total low-flow volume. Below the point of water withdrawal, the effect would be less significant as more tributaries augment the streamflow.

Cumulative Impacts: Completion of employee facilities and associated infrastructure at Mazama would impact an additional 5 acres of lodgepole pine forest community. This acreage lost would add to previous habitat loss from existing development.

Conclusion: There would be a loss of 2.0 acres and recovery of 3.8 acres in the park, which would not be a significant change in wildlife habitat type or extent.

CULTURAL RESOURCES

Impacts on Prehistoric Resources

As in alternative A, no impacts on prehistoric cultural resources would be expected. There would be no cumulative impacts.

Impacts on Ethnographic Resources

As in alternative A, no impacts on ethnographic cultural resources would be expected. There would be no cumulative impacts.

Impacts on Historic Resources

Analysis: Overall, cultural resources in the potentially eligible Rim Village Historic District would benefit from protection and preservation. However, removing the community house would have a negative effect. Providing a small year-round visitor contact station in the rehabilitated 1928 portion of the cafeteria building would have a beneficial effect on historic resources because the building would be restored to its original size and configuration. The historic designed landscape would further benefit from the rehabilitation of contributing elements such as buildings and structures, vehicle and pedestrian circulation features, and small-scale rustic elements.

Removing the large parking area along the rim edge in front of the cafeteria, as well as along the drive, would have an adverse effect on the proposed historic district because it would change the access, circulation, and parking of the village's historic designed landscape. The new parking lot behind the cafeteria would probably not affect historic resources because most of this lot would be outside the proposed historic district boundaries. Building an additional parking loop south of the existing parking area at the lodge would be appropriate because it is in accordance with the landscape design of the 1939 *Master Plan* for the park.

There is only one known historic resource in the Mazama Village area — a short segment of a historic military wagon road built in 1865. The construction of a new water tank and waterlines for the Mazama Dormitory complex and maintenance facility would not take place near the historic wagon road segment. However, as a precaution, the road segment would be protected from inadvertent damage by installing appropriate fencing.

No actions under this alternative would impact historic resources in the Munson Valley Historic District.

Cumulative Impacts: There would be no cumulative impacts on historic resources.

Conclusion: Returning the Rim Village cafeteria building to its 1928 appearance and configuration would benefit the historic designed landscape of the potentially eligible historic district. The elimination of much of the existing parking would have an adverse effect on the designed landscape. No impacts on historic cultural resources would be expected at other areas.

VISITOR EXPERIENCE

Impacts on Visitors at Rim Village

Analysis: Visitors would benefit from a more relaxed visitor experience in and around Rim Village. This atmosphere would be created in part by removing rim parking, many of the concession services, and the concession-owned dormitory, which would significantly reduce vehicle and pedestrian congestion.

Developing a new visitor contact station in the rehabilitated 1928 cafeteria building would benefit visitors because of its location, vehicle access, and increased size. However, many visitors could be adversely affected because food and merchandise services currently provided in the cafeteria building would be eliminated. These visitors might feel inconvenienced because they would have to drive to Mazama Village (approximately 7 miles from Rim Village) to obtain these services. Visitors would continue to benefit from opportunities for overnight accommodations and fine dining at Crater Lake Lodge.

Providing new wayside exhibits in the village and at Kiser Studio would benefit visitors by increasing interpretive opportunities and understanding of the area's natural and cultural resources.

Cumulative Impacts: No cumulative impacts on the visitor experience at Rim Village would be expected under this alternative.

Conclusion: Visitors at Rim Village would benefit from a more relaxed and less congested experience, better opportunities for NPS contact, and increased interpretation. Most visitors would be

inconvenienced by the relocation of a significant portion of the food and merchandise services to Mazama Village.

Impacts on Visitors at Mazama Village

Analysis: As in alternative A, visitors would have better opportunities for orientation to the park through the provision of a self-service kiosk near the Mazama Village store. Visitors would continue to benefit from interpretive programs at the amphitheater and during nature walks.

Many visitors would benefit from the expanded selection of prepackaged food, sundries, and gift sales at Mazama Village store. However, greater use of the store, including associated parking congestion, might adversely affect some visitors, especially during the day. Eliminating the public showers and laundry from the Mazama Village store would inconvenience visitors seeking these services.

Converting the Mazama Village Motor Inn to a concession employee dormitory could adversely affect some visitors seeking moderately priced overnight accommodations. However, overnight lodging would continue to be available at the Crater Lake Lodge and in the NPS campgrounds. Other moderately priced overnight accommodations would be available outside the park.

Cumulative Impacts: No cumulative impacts on the visitor experience at Mazama Village would be expected under this alternative.

Conclusion: While interpretive opportunities would remain the same, visitors would benefit from information provided at a new self-service kiosk. The effects of expanding selections at the Mazama Village store and removing the shower and laundry facilities would vary depending on the individual. Many visitors could be inconvenienced by the elimination of these services and the moderately priced Mazama Village Motor Inn.

Impacts on Visitors at Cleetwood

Analysis: About 5% of park visitors (28,000 individuals) currently take boat tours each year. Eliminating boat tours would adversely affect the experience of these people. Many visitors view the boat tour as a highlight of their trip to Crater Lake National Park. Boat tours provide a perspective of the natural wonders of Crater Lake that would be lost once tours were eliminated. This might reduce the appreciation that many visitors have for the unique landforms in the caldera. Eliminating boat tours would also end access to Wizard Island, another activity highly enjoyed by many visitors.

While personal interpretive opportunities currently available on tour boats would be lost under this alternative, there could be a greater amount of ranger / visitor contact throughout the rest of the park. Removing the boats from the lake would allow rescheduling of several Park Service interpreters who currently conduct interpretation on the concession boats. This could allow the rescheduled rangers to provide interpretation in areas where they would encounter a higher percentage of park visitors.

Because fewer people would use the Cleetwood Trail, injuries would be reduced and fewer emergency services would be required. The visitor experience on the trail itself would also be improved.

Visitors choosing to remain on the rim would benefit from a more serene, pristine lake appearance. In addition, because there would be a large reduction in fuel needs, the tanks at the top and bottom of the

trail and the gasline running down the caldera wall would be removed, which would improve the aesthetic appeal of this area. A reduction in traffic congestion at the Cleetwood parking lot would also benefit visitors.

Cumulative Impacts: No cumulative impacts on the visitor experience at Cleetwood would be expected under this alternative.

Conclusion: Eliminating boat tours would adversely affect visitors seeking this type of experience. Also lost would be opportunities for visitors to see the caldera up close and to receive NPS interpretation while on the lake. However many other visitors would benefit because the pristine lake environment would be enhanced. Removal of the fuel tanks and gasline would further enhance the aesthetic appeal of the area. Visitors would also benefit elsewhere from more opportunities for NPS contact and education and a reduction in traffic congestion. A reduction in the number of visitors on the Cleetwood Trail would allow for a more peaceful hiking experience.

Impacts on Visitors at Munson Valley

Analysis: Visitors to this area might be inconvenienced because no visitor contact would be offered in the summer at the Steel Information Center. Even though no visitor information about the park would be available here, visitors would probably not be adversely affected because a new year-round visitor contact station would be open at Rim Village. Winter visitors would continue to benefit from the information provided at the Steel Information Center when inclement weather forces the closure of the Rim Village facility.

Cumulative Impacts: No cumulative impacts on the visitor experience at Munson Valley would be expected under this alternative.

Conclusion: Some visitors might be adversely affected by a lack of visitor contact during the summer. Winter visitors would benefit from opportunities for NPS contact at the Steel Information Center, which would serve as a backup visitor contact station.

ALTERNATIVE D: OFFER A VARIETY OF NPS AND COMMERCIAL VISITOR SERVICES

NATURAL RESOURCES

Impacts on Soils / Geology / Vegetation

Analysis: Developments at Rim Village and Mazama Village would take place on relatively flat areas and would not require extensive alteration of topography. Construction activities and visitor and employee use would result in localized surface disturbance and soil compaction.

The visitor contact station and associated parking would result in the loss of about 1.3 acres of grassland and an additional 0.8 acre of previously disturbed ground.

A new road from the proposed visitor contact station to the Crater Lake Lodge would require some cut and fill and possibly some retaining walls, which would alter a portion of the topography in Rim Village. About 0.8 acre of mountain hemlock forest containing Crater Lake currant and 0.2 acre of dry meadow vegetation would be removed during construction. A few large, mature mountain hemlock trees would likely be removed; exact quantities could not be determined until the construction design was finalized.

Developing the new Rim Village parking area would require a large amount of excavation and grading and would alter the topography at the pumice flat area where it is proposed. About 2.5 acres of pumice flat vegetation would also be removed, as well as some small herbaceous or woody-stemmed plants such as pumice sandwort.

Approximately 3.1 acres of vegetation, primarily grassland, would be restored along the rim after the existing parking lot and road between the parking lot and Crater Lake Lodge were removed.

A few mature mountain hemlock and other large trees scattered throughout Mazama Village could be adversely affected by development. Small trees less than 14 inches in diameter would be adversely affected by development in 7.7 acres of lodgepole pine forest.

Improving the retaining walls and stabilizing soils along the Cleetwood Trail would temporarily increase erosion potential. However, the stability of the soil around the trail would be improved after the construction was completed. The addition of 1 to 2 feet of soil and gravel on the surface of the trail, along with a small retaining wall on the outer edge of the trail, would help to prevent erosion from under the present retaining walls on the uphill side of the trail. Accelerated trail erosion from equipment transportation would be reduced by using low-impact vehicles such as power wheelbarrows whenever possible. Installing a grated metal staircase to route visitors away from the slide chute would require bolting into the already fractured andesite rock.

TABLE 8: ACRES OF VEGETATION DISTURBED OR REMOVED (ALTERNATIVE D)

Area	Vegetation Type								
	MH	LP	MC	PF	DM	OW	G	D	REHAB
Rim Village	0.8			2.5	0.2		1.3	0.8	3.1
Mazama Village		7.7 ^a							
Cleetwood			<0.1			<0.1			
Notes: MH = mountain hemlock; LP = lodgepole pine forest; MC = mixed conifer forest; PF = pumice flat; DM = dry meadow; OW = open water/lake bed; G = grassland; D = disturbed native vegetation/unvegetated ^a disturbance mostly limited to shrubs/ groundcover/barren soil - most or all large trees would remain									

Reconstructing the retaining walls along the Cleetwood Trail would have short-term adverse impacts on vegetation. However, vegetation lost or damaged would eventually be replaced by new growth after the construction was finished.

Implementing this alternative would not result in fill or alterations of wetlands present at the Rim Village or Munson Valley areas.

Because all actions proposed for Munson Valley would use existing facilities, no new impacts on soils, geology, or vegetation would be expected.

Cumulative Impacts: The concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village was approved as part of the 1995 *Development Concept Plan* and is currently under construction. The size of the dormitory and maintenance facility would vary by alternative; however, the gross area impacted in the lodgepole pine forest would still be about 5 acres. This acreage lost would be in addition to the 7.7 acres of lodgepole pine forest that would be impacted under this alternative.

Conclusion: About 13.3 acres of vegetation and soil would be adversely impacted at Rim Village and Mazama Village from new construction and additional foot traffic; however, about 3.1 acres would be recovered. The potential for erosion along the Cleetwood Trail would be reduced following the construction of new retaining walls; during construction there would be a short-term increase in erosion potential along the trail.

Incremental increases in the disturbance of soils and vegetation at Rim Village and Mazama Village and along the Cleetwood Trail from continued visitor use would not be a significant change in vegetative cover type or extent.

Impacts on Water Resources

Analysis: Constructing buildings, roads, parking, and associated developments would increase impervious surfaces at Rim Village (including the new parking area). However, because of the porous nature of the soils, stormwater runoff impacts would be minimal because the runoff would probably infiltrate quickly into the soil. Where soils are not porous, or where potential erosion problems exist, standard best management practices would be followed as appropriate for specific soil types and as specified in the erosion control plans for the site.

The proposed developments at Rim Village would not be near nor would they impact the stream and associated wetland west of the Rim Village entrance. Removing the large parking area at the rim would be planned to avoid disturbing the stream, its associated wetland, and the small floodplain of the stream. The potential for stormwater runoff and contaminated snow to reach the lake would be reduced by removing the large parking area near the rim and relocating Rim Village Drive. Removing the parking area and road would benefit water quality in the lake because the potential for stormwater runoff to reach the lake would be reduced. Removing the parking area would also eliminate the need for blowing potentially contaminated snow over the edge of the rim.

The new parking area would be constructed back from the rim, east of the stream channel below Rim Drive and would not encroach on the stream or its floodplain. The pedestrian pathway between the new parking area and the visitor contact station would cross the stream channel south of Rim Drive and would require a minor amount of fill in the narrow floodplain of the stream. To maintain sufficient flow through the stream during high precipitation events, a culvert would be installed. The new access road to the lodge would be constructed immediately west of the drainage swale above the Rim Drive but would not encroach on the swale.

Removing Rim Dormitory would not impact surface water resources because the facility is far from the surface water features.

Based on the nearly level topography of sites proposed for development at Mazama Village, the porous nature of the soils, and because no construction would occur near Annie Spring or Annie Creek, the water quality of Annie Creek would not be impacted.

Extending the bulkhead 20 feet into the lake would have temporary adverse impacts on water quality in the lake. The effect on lake waters would probably be similar to small rock slides that fall into the lake through natural means each year.

The current single-walled fuel line that runs down the caldera walls would be replaced in 1998 with a double-walled line. The new line would reduce potential adverse impacts on water quality because it would be more resistant to rock impacts. However, if there was a leak in the inner hose it would not be as readily apparent in a double-walled line. It should be noted that risks associated with the fuel lines would be minimal because there would be very little time that gas was actually in the hose, and it would be completely empty after fuel was delivered to the tank below. All components of the fuel system would continue to be brought into EPA compliance as funding becomes available.

Risks of petroleum spills from gasoline powered tour boats, as well as the risk of water pollution from routine maintenance of the boats, such as from paint and solvents, would be slightly reduced because there would be fewer boat tours. Effects on the water quality of the lake resulting from motorboat exhaust would also be slightly reduced.

Cumulative Impacts: Completing the concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village would not likely affect surface waters because the area is relatively level, well drained, and contains no nearby surface water features. Consequently, no cumulative impacts would be expected on streams or water quality. No cumulative impacts on water quality would be anticipated at Cleetwood.

TABLE 9: AVERAGE DAILY SUMMER WATER USE (GALLONS PER DAY) ALTERNATIVE D

Rim Village	48,400
Mazama Village	44,400
Munson Valley	10,900
Total	103,700

Conclusion: Potential adverse impacts on water quality would be expected to decrease slightly under this alternative.

Impacts on Water Quantity / Annie Creek Flows

Analysis: Table 9 presents the average summer daily water demand that would continue to be supplied from Annie Spring. This alternative would result in the use of approximately 103,700 gpd. This would be an increase of about 19,300 gpd from Annie Spring, which would be a 23% increase over existing water demand. Increased water withdrawal rates could reduce flows in the upper reach of Annie Creek by 6.6%.

Cumulative Impacts: Water demands above include all existing and proposed facilities. Cumulative impacts on water supply would result in a 23% increase over existing water demand.

Conclusion: Water demand would cause a 6.6% reduction in the flow of Annie Creek, which is 23% over the current reduction.

Impacts on Air Quality

Analysis: Short-term adverse impacts on air quality would occur from construction activities. Emissions would consist primarily of dust generated during grading, as well as nitrogen oxides and reactive organic gas emissions generated from construction equipment. These impacts would only affect areas very near construction sites.

The heavily congested Rim Village traffic situation would be relieved by the new parking area, which would reduce idling times for vehicles, thereby improving hydrocarbon emissions in this area. More efficient traffic flow would result, and less pollution from emissions from nonmoving traffic would occur.

Air quality at Cleetwood would improve because traffic congestion would be alleviated. Developing additional spaces in the present parking lot would result in fewer people idling in their cars while waiting for a parking space or waiting for traffic to continue moving.

Continued operation of gasoline-powered tour boats and research boats on the lake would contribute carbon monoxide, particulate matter, and other effects of internal-combustion engine exhaust. Small spills from fueling operations would also continue to play a part in reduced air quality in the area.

Cumulative Impacts: No cumulative impacts on air quality would be expected under this alternative.

Conclusion: Minor, short-term dust and equipment emissions would adversely affect air quality near construction sites during construction; however, air quality at Crater Lake National Park would not be expected to measurably change.

Impacts on Special Status Species

Analysis: Because no special status plant species were found in Rim Village, Munson Valley, and Mazama Village, no impacts on threatened and endangered or other sensitive plant species would take place in these three areas. There would be no construction impacts in the area where Pacific bleeding heart has been documented.

Development would take place mainly on previously disturbed areas. None of the areas contain habitat suitable for northern spotted owls, and no effect on owls would be expected.

About 7.7 acres of northern goshawk habitat at Mazama Village would be removed. Because a pair of northern goshawks may range up to 6,000 acres, this level of habitat loss would represent a small fraction of a single pair's territory. This loss of habitat would not adversely affect any nesting pairs or individuals in the Rim Village or Munson Valley area because no suitable habitat is present. The loss of northern goshawk habitat would most likely not affect the populations either at the regional level or at the park level. Only a minor fraction of an average territory size would be impacted at Mazama Village.

The removal of 7.7 acres of habitat at Mazama Village could also affect three state sensitive species, including pileated woodpecker, three-toed wood pecker, and black-backed woodpecker. Because similar habitat is common throughout the park, impacts would be small in scale and localized.

This alternative would result in slightly greater reduction in habitat for the California wolverine and Pacific fisher than under the other alternatives. However, this reduction would not have a significant affect on these species because most development is proposed in areas of previous development and the habitat that would be lost represents a small portion of the average home range size of these species. The American marten is also present throughout the park, and the reduction of habitat would be minor in relation to the amount of habitat available elsewhere.

There would be no measurable effect on Wood River flows under this alternative; therefore, no impacts on Lost River sucker or shortnose sucker or on sucker spawning habitat would be expected.

Crater Lake newts have been found at Cleetwood. Development impacts along the shoreline, which is newt habitat, would be limited and would primarily occur in the area already disturbed by the existing dock and associated facilities. A survey of the newt population at Cleetwood would be performed before any construction took place.

Cumulative Impacts: Bull trout used to migrate from Agency/Upper Klamath Lake to spawning beds in Sun Creek by way of Annie Creek and the Wood River. However, little or no flows from Annie Creek reach the Wood River during drought periods because of water demands in Annie Creek (more than 99% of which occur downstream of the park). This low flow has resulted in the disconnection of the Wood River / Annie Creek / Sun Creek migration route.

NPS water withdrawals would further reduce water flows. However, the disconnection of the bull trout migration route would continue with or without water withdrawals by the park. Total park use under this alternative represents about 4/1,000 of the lowest flow amount reported at Annie Creek as it leaves the park (NPS 1995). Water withdrawal from the park would contribute to the cumulative negative effects on water flows in this drainage system, which have had a significant effect on fish migration and bull trout restoration efforts.

Conclusion: The small incremental loss in habitat would not have a significant impact to special status plant or animal species.

Impacts on Wildlife

Analysis: Alternative D would result in the long-term removal of up to 5.6 acres of habitat at Rim Village, 7.7 acres of habitat at Mazama Village, and less than 0.1 acre at Cleetwood. At Rim Village and Cleetwood, the areas proposed for development support a few small mammals and birds, but because of the high elevation and the relatively small area affected, few if any species would be significantly impacted. Abundance and species composition would not be affected in these areas. Constructing the new parking area below Rim Village would remove a potential foraging area for red-tailed hawk, horned lark, Cassin's finch, dark-eyed junco, and chipping sparrow. The loss of 2.5 acres of such habitat would be minor in relation to that which is available throughout the park.

Habitat impacted at Mazama Village would be lodgepole pine, which supports a variety of animals. However, in relation to the regional distribution of these habitat types and associated species, this impact would be small scale and local and would not result in a major decline in populations in the park or region.

If trees or other vegetation are cleared during the breeding season (generally May through June), bird nests or mammal dens could be destroyed. During construction of facilities, noise, machinery, and workers would cause some animals to avoid otherwise suitable habitat near construction sites. This impact would probably be minor because many animals tolerate nonthreatening disturbance, including construction activity.

The indirect impacts of disturbance would impact some wildlife species. People and noise could cause large animals, such as deer, to avoid developed sites or might encourage "begger" individuals to frequent the development sites in search for food. Other smaller mammals and some birds might avoid otherwise suitable habitat near the developed areas; however, it is probable that they would seek suitable habitat nearby. Development in areas used by bear or cougar would increase the risk of negative interactions between these animals and humans.

Increased water withdrawal from Annie Creek would reduce habitat for fish and aquatic organisms during the low flow periods of August and September. The consequences of habitat loss from water withdrawal could include reductions in abundance, biomass, reproductive success, and survival of aquatic life. The magnitude of this reduction cannot be fully predicted because of the complex nature of the system. The effects would probably be relatively minor because the amount of water that would be removed represents only a small portion of the total low-flow volume. Below the point of water withdrawal, the effect would be less significant as more tributaries augment the streamflow.

Cumulative Impacts: Completion of employee facilities and associated infrastructure at Mazama Village would impact an additional 5 acres of lodgepole pine forest community. This acreage lost

would add to previous habitat loss from existing development, as well as the 7.7 acres of lodgepole pine forest type that would be impacted under this alternative.

Conclusion: There would be an incremental increase in the loss of wildlife habitat and human disturbance at developed areas. The loss of 13.3 acres and recovery of 3.1 acres in the park would not be a significant change in wildlife habitat type or extent.

CULTURAL RESOURCES

Impacts on Prehistoric Resources

As in alternative A, there would be no impacts on prehistoric cultural resources. No cumulative impacts would be expected.

Impacts on Ethnographic Resources

As in alternative A, there would be no impacts on ethnographic cultural resources. No cumulative impacts would be expected.

Impacts on Historic Resources

Analysis: Removing the cafeteria and the community house, constructing a new visitor contact facility, removing Rim Village Drive and its rustic stone curbing, developing a new access road from the visitor contact station to the lodge, and constructing a small parking lot behind the visitor contact station and a new parking lot off the rim would have adverse impacts on historic resources at Rim Village. Constructing additional parking for the lodge would not be expected to impact historic resources. All other impacts would be the same as those described under alternative A.

Cumulative Impacts: No cumulative impacts on historic resources would be expected.

Conclusion: The actions at Rim Village would have an adverse effect on the historic designed landscape of the potentially eligible historic district. No impacts on historic cultural resources would be expected at other areas.

VISITOR EXPERIENCE

Impacts on Visitors at Rim Village

Analysis: A greater number of visitors would benefit from being able to receive information and orientation materials at the new year-round visitor contact station because of its location, vehicle access, and increased size. The new facility would also benefit visitors by offering a better opportunity to view the lake during the winter.

Interpretation and visitor understanding of the area's natural and cultural resources would be significantly enhanced with the addition of interpretive exhibits (winter and summer), evening

programs at the rehabilitated community house, and geology and lake ecosystem exhibits at Sinnott Memorial.

Vehicle and pedestrian congestion would be reduced with the relocation of rim parking, the removal of Rim Dormitory and the cafeteria building, the realignment of Rim Village Drive, and the reduction of concessioner food and merchandise services. More open space would be available for pedestrian use and enjoyment.

Visitors would continue to benefit from opportunities for seasonal lodging at Crater Lake Lodge, and the lodge dining room would continue to provide patrons fine dining during the summer. Lodge visitors would continue to have good views of the lake.

Reducing some concessioner food and merchandise services would probably not adversely affect visitors because a new facility would be built at Rim Village to provide year-round cafeteria and merchandise sales. Visitors to this facility would benefit from opportunities to rent recreation equipment such as bicycles, cross-country skis, and snowshoes.

Cumulative Impacts: No cumulative impacts on the visitor experience at Rim Village would be expected under this alternative.

Conclusion: Visitors at Rim Village would benefit from enhanced information and interpretive opportunities at the new visitor contact station and other sites, reduced congestion, and continued opportunities for lodging and fine dining at Crater Lake Lodge. Visitors would benefit from more open space with the removal of the community house and cafeteria building. Visitors would also benefit from opportunities to buy food and merchandise and to rent recreation equipment out of a new facility.

Impacts on Visitors at Mazama Village

Providing a self-service kiosk near the Mazama Village store would benefit visitors by providing park orientation. Relocating the amphitheater would allow for easier visitor access.

Providing a new year-round cafeteria would benefit visitors seeking food services. Maintaining groceries, camper supplies, and gift sales at the Mazama Village store would continue to benefit many visitors. Recreation equipment rentals would also be available, which would benefit some visitors. Visitors would benefit from the continued sale of gasoline, as well as emergency road services and supplies. Retaining the public laundry and showers would benefit visitors accustomed to these facilities. Greater use of the store, including associated parking congestion, might inconvenience some visitors.

Visitors seeking overnight accommodation would benefit under this alternative because the 40-unit Mazama Village Motor Inn would be retained. In addition, a new 40-unit year-round facility would be constructed, with kitchenettes. Visitors would be able to visit, recreate, and stay overnight in the park year-round.

Increasing the size of the campground by adding two group campsites would enhance the camping experience of some visitors.

Cumulative Impacts: No cumulative impacts on the visitor experience at Mazama Village would be expected under this alternative.

Conclusion: Visitors would benefit from information provided at the new self-service kiosk, and the relocated amphitheatre would provide visitors with easier access to programs. Visitors seeking lodging would benefit from the continued operation of the Mazama Village Motor Inn, the development of 40 new year-round lodging units, and the addition of two group sites at the campground. Visitors would also benefit from a new year-round cafeteria and the continued provision of merchandise sales and services at the camper store. The addition of rental equipment at the Mazama Village store would also benefit visitors.

Impacts on Visitors at Cleetwood

Removing the current temporary retail structure and redesigning the trailhead area would benefit visitors by making the rim area safer and more aesthetically pleasing. Building structures at the rim and at the lakeside could adversely affect the aesthetic appeal of the area. However, visual impacts would be minimized by using the rustic architectural style traditionally associated with Crater Lake National Park. Installing photovoltaic panels to power the new facilities would not have an adverse effect on the visual character of the area because they would be placed among the trees in an appropriate location.

Restriping the parking lot would increase the number of spaces without increasing the physical size of the parking lot. This would be beneficial because more vehicles could park in the existing lot. However, the narrow spaces might inhibit the drivers of larger vehicles. Individuals driving RVs would continue to have to park parallel to the curb taking up 4 stalls each, which could affect drivers of smaller vehicles searching for a space when the main lot was full.

Parking along Rim Drive during peak periods would continue to cause congestion and result in safety problems for pedestrians at the trailhead parking lot.

Installing signs at the trail entrance would benefit visitors by warning them in advance of the hazards on the trail from rockfall, dehydration, and low-impact vehicles. Other signs along the trail would benefit visitors by describing the geology, hydrology, botany, and cultural history of Crater Lake.

An aboveground fuel storage tank near the rim could intrude on the visual scene. This would be minimized by placing the tank on the north side of Rim Drive and screening it. Double-wall fuel lines are currently bright blue or bright green. This type of fuel line would be easily seen by visitors as it lies on the surface of the caldera wall. This impact could be mitigated by placing the line in an unobtrusive location. Screening the tank inside a permanent structure at the lakeside would improve the visual quality of the area.

Replacing the aging retaining walls in a single style would improve the aesthetics along the Cleetwood Trail. Replacing the old wood cribbing with a material common to all the retaining walls would create a continuity that is currently lacking along the trail. The removal of the crib walls would also eliminate the smell of creosote, which many visitors find offensive.

Installing a metal staircase prior to the rockslide area would provide maximum safety for visitors; however, the staircase might be physically difficult for some visitors. The staircase would be an engineered device in a natural setting, which could adversely affect the aesthetic experience of some visitors.

Some visitors would continue to benefit from the boat tours provided by the concessioner; however the number of tours would be slightly reduced from current levels. Some visitors would appreciate the reservation system and onsite ticket sales for boat tours. However, with a reduction in the number of boat tours, it is expected that some visitors would be adversely affected by not being able to take a boat tour on a given day because of limited seating. Visitors taking the tour would continue to benefit from NPS interpretation onboard the tour boat, as well as on Wizard Island.

Constructing a new bulkhead and dock would improve the visitor safety and the appearance of the lake edge. The new larger bulkhead and dock would extend an additional 20 feet into the lake and would ensure that tours would not need to be canceled because of water level changes. However, some visitors would be adversely affected by the intrusion of boats on the pristine lake environment.

Constructing a shade structure on the lakeside would benefit visitors in hot or rainy weather. However, this structure could adversely affect some visitors because it but would subtract from the natural appearance of the lake edge. Visual impacts would be minimized by using materials that were colored to blend with the surrounding rock so that the structure would not be clearly visible from other points along Rim Drive. Constructing an additional open-air seating area would benefit some visitors by providing additional seating once they reach the lake edge.

Cumulative Impacts: No cumulative impacts on the visitor experience at Cleetwood would be expected under this alternative.

Conclusion: Restriping the parking lot would alleviate parking deficiencies to a large degree; however, the narrow spaces could adversely affect those driving large vehicles and RVs. Overflow parking along Rim Drive would continue to cause congestion and result in pedestrian safety problems during peak periods. Development along the rim and the lakeside, including two new permanent structures, a shade structure, and a new dock and bulkhead, would have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Improvements to the boat tour fuel system would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Boat tours would continue, which would benefit some visitors while adversely effecting the pristine lake viewing experience sought by others. Improvements to the trailhead and the trail, including the installation of a staircase, would improve visitor safety. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island.

Impacts on Visitors at Munson Valley

Analysis: Visitors to this area might be inconvenienced because no visitor contact would be offered in the summer at the Steel Information Center. Even though no visitor information about the park would be available here, visitors would probably not be adversely affected because a new year-round visitor contact station would be open at Rim Village. Winter visitors would continue to benefit from the information provided at the Steel Information Center when inclement weather forces the closure of the Rim Village facility.

Cumulative Impacts: No cumulative impacts on the visitor experience at Munson Valley would be expected under this alternative.

Conclusion: Some visitors might be adversely affected by a lack of visitor contact during the summer. Winter visitors would benefit from opportunities for NPS contact at the Steel Information Center, which would serve as a backup visitor contact station.

ALTERNATIVE E: FOCUS VISITOR SERVICES AT RIM VILLAGE

NATURAL RESOURCES

Impacts on Soils / Geology / Vegetation

Analysis: Developments at Rim Village and Mazama Village would take place on relatively flat areas and would not require extensive alteration of the topography. Construction activities and visitor and employee use would result in localized surface disturbance and soil compaction.

Developing a new three-level parking structure at Rim Village would require a large amount of excavation and grading and would alter the topography at the pumice flat area where it is proposed. About 2.5 acres of pumice flat vegetation would also be removed during construction. Vegetation that would be permanently removed would include small herbaceous or woody-stemmed plants such as pumice sandwort.

Developing the new road to the rim would require cut and fill, as well as retaining walls, which would permanently alter the topography on the slope below Rim Village. About 1.2 acres of mountain hemlock forest containing Crater Lake currant and 0.2 acre of dry meadow vegetation would be removed during the construction of an access road and pedestrian walkway between the new parking structure and Crater Lake Lodge. A few of large, mature mountain hemlock trees would likely be removed; exact quantities could not be determined until the construction design was finalized.

Constructing the new activity center would result in the loss of 0.25 acre of grassland; however, this development would take place in a previously disturbed area.

About 3.0 acres of vegetation would be restored along the rim after the existing parking lot and road between the parking lot and Crater Lake Lodge were removed. Removing the dormitory and road to the dormitory would provide the opportunity to restore an additional 0.7 acre of pumice flat and shrub vegetation.

A few mature mountain hemlock and other large trees scattered throughout Mazama Village could be adversely affected by development. Small trees less than 14 inches in diameter would be adversely affected by development proposed in 7.7 acres of lodgepole pine forest.

Relocating the lower section of the Cleetwood trail would have an adverse impact on the geology and soils of the area near the trail. A new section of trail would expose a new area to increased erosion. The section of trail that would be abandoned and rehabilitated would allow for the eventual continuation of natural erosional processes, without the accelerated effects that the presence of a trail produces. Also, by encouraging greater use and access of this area, this alternative would increase the

TABLE 10: ACRES OF VEGETATION DISTURBED OR REMOVED (ALTERNATIVE E)

Area	Vegetation Type								
	MH	LP	MC	PF	DM	OW	G	D	REHAB
Rim Village	1.2			2.5	0.2		0.25	0.25	3.7
Mazama Village		7.7 ^a							
Cleetwood			<0.1 ^a			<0.1 ^a			
Notes: MH = mountain hemlock; LP = lodgepole pine forest; MC = mixed conifer forest; PF = pumice flat; DM = dry meadow; OW = open water/lake bed; G = grassland; D = disturbed native vegetation / unvegetated; REHAB = acreage restored/revegetated ^a disturbance mostly limited to shrubs/ groundcover/barren soil - most or all large trees would remain									

amount of people on the trail. This would increase the disturbance of soil around the parking lot and on the trail. Erosion problems on the trail itself would be mitigated by the hardening of the surface. However, impacts along side the trail could undermine the improvements made to the trail. This, in combination with the relatively unstable nature of the geology at Cleetwood could lead to further erosion of the trail and failure of the new hardened surface.

Expanding the Cleetwood parking lot would reduce the need for overflow parking on the road shoulder. This would reduce erosion along the road and eliminate continued soil compaction associated with vehicle travel off the road bed. Expanding the parking lot would require the removal of some of the young trees east of the present parking lot. Less than 0.1 acre of mixed conifer forest vegetation would be lost along the forest edge bordering the parking area.

Implementing this alternative would not result in fill or alterations of wetlands present at the Rim Village or Munson Valley areas.

Because all actions proposed for Munson Valley would use existing facilities, no new impacts on soils, geology, or vegetation would be expected.

Cumulative Impacts: Completing the concession employee dormitory and RV sites, concession maintenance area, and associated infrastructure at Mazama Village would impact about 5 acres of lodgepole pine forest community. This acreage lost would be in addition to the 7.7 acres of lodgepole pine forest type impacted under this alternative.

Conclusion: About 12 acres of vegetation and soil would be adversely impacted at Rim Village and Mazama Village from new development and additional foot traffic; however about 3.7 acres would be recovered within the park.

Incremental increases in the disturbance of soils and vegetation within Rim Village and Mazama Village and along the Cleetwood Trail from continued visitor use would not be a significant change in vegetative cover type or extent.

Impacts on Water Resources

Analysis: Constructing buildings, roads, parking, and associated developments would increase impervious surfaces at Rim Village. However, because of the porous nature of the soils, stormwater runoff impacts would be minimal because the runoff would probably infiltrate quickly into the soil. Where soils are not porous, or where potential erosion problems exist, standard best management practices would be followed as appropriate for specific soil types and as specified in the erosion control plans for the site.

The proposed developments at Rim Village would not be near nor would they impact the stream and associated wetland west of the Rim Village entrance. Removing the large parking area at the rim would be planned to avoid disturbing the stream, its associated wetland, and the small floodplain of the stream. The potential for stormwater runoff and contaminated snow to reach the lake would be reduced by removing the large parking area near the rim and removing Rim Village Drive. Removing the parking area and road would benefit water quality in the lake because the potential for stormwater runoff to reach the lake would be reduced. Removing the parking area would also eliminate the need for blowing potentially contaminated snow over the edge of the rim.

The new parking area would be constructed back from the rim, east of the stream channel below Rim Drive and would not encroach on the stream or its floodplain. The pedestrian pathway between the new parking area and activity center would cross the stream channel south of Rim Drive and would require a minor amount of fill in the narrow floodplain of the stream. Installing a culvert to maintain sufficient flow through the stream during high precipitation events would also result in short-term adverse impacts. The new access road to the lodge would be constructed immediately west of the drainage swale above the Rim Drive but would not encroach on the swale.

Removing Rim Dormitory would not impact surface water resources because the facility is far from the surface water features.

Based on the nearly level topography of sites proposed for development at Mazama Village, the porous nature of the soils, and because no construction would occur near Annie Spring or Annie Creek, the water quality of Annie Creek would not be impacted.

Extension / expansion of the bulkhead at Cleetwood and the installation of a new dock would have temporary adverse impacts on water quality in the lake. The effect on lake waters would probably be similar to small rock slides that fall into the lake through natural means each year.

Risks of petroleum spills from gasoline powered tour boats, as well as the risk of water pollution from routine maintenance of the boats, such as from paint and solvents, would remain at present levels. The effects on the water quality of the lake from motorboat exhaust would also remain at current levels.

The current single-walled fuel line that runs down the caldera walls would be replaced in 1998 with a double-walled line. The new line would reduce potential adverse impacts on water quality because it would be more resistant to rock impacts. However, if there was a leak in the inner hose it would not be as readily apparent in a double-walled line. It should be noted that risks associated with the fuel lines would be minimal because there would be very little time that gas was actually in the hose, and it would be completely empty after fuel was delivered to the tank below. All components of the fuel system would be brought into EPA and ODEQ compliance.

Cumulative Impacts: No cumulative impacts on streams or water quality would be under this alternative.

Conclusion: Potential adverse impacts on water quality would be expected to decrease.

Impacts on Water Quantity / Annie Creek Flows

TABLE 11: AVERAGE DAILY SUMMER WATER USE (GALLONS PER DAY) ALTERNATIVE E

Rim Village	53,200
Mazama Village	44,400
Munson Valley	10,900
Total	108,500

Analysis: Table 11 presents the average summer daily water demand that would continue to be supplied from Annie Spring. This alternative would result in the use of approximately 108,500 gpd. This would be an increase of about 24,100 gpd from Annie Spring, which would be a 29% increase over existing water demand. Increased water withdrawal rates could reduce flows in the upper reach of Annie Creek by 7%.

Cumulative Impacts: Water demands above include all existing and proposed facilities. Cumulative impacts on water supply would result in a 29% increase over existing water demand.

Conclusion: Water demand would cause a 7% reduction in the flow of Annie Creek, which is 29% over the current reduction.

Impacts on Air Quality

Analysis: Short-term adverse impacts on air quality would occur from construction activities. Emissions would consist primarily of dust generated during grading, as well as nitrogen oxides and reactive organic gas emissions generated from construction equipment. These impacts would only affect areas very near construction sites.

After the completion of redevelopment activities at the rim, air quality at Rim Village and Cleetwood would improve because vehicle access to the rim would be limited to shuttle buses, which would reduce gridlock at the cove. In addition, the heavily congested Rim Village traffic situation would be relieved by the new parking facility, which would reduce idling times for vehicles, thereby improving hydrocarbon emissions in this area. At both sites more efficient traffic flow would result and less pollution from emissions would occur from nonmoving traffic. At Cleetwood, there would be the potential for gridlock to increase because access to the site by way of private vehicle would be encouraged. Localized increases in pollutants from automobiles would likely occur at Cleetwood in the future.

Gasoline-powered tour boats and research boats on the lake would continue to adversely affect air quality by contributing carbon monoxide, particulate matter, and other types of internal-combustion engine exhaust. Small spills from fueling operations would also continue to have minor negative effects on air quality in the area.

Cumulative Impacts: No cumulative impacts would be expected.

Conclusion: Minor, short-term dust and equipment emissions would occur during construction; however, air quality at Crater Lake National Park would not be expected to measurably change.

Impacts on Special Status Species

Analysis: Because no special-status plant species were found in Rim Village, Munson Valley, and Mazama Village, no impacts on threatened and endangered or other sensitive plant species would occur in these three areas. The Pacific bleeding heart has been documented near the parking lot and along the Cleetwood Trail. The plant could be subjected to increased trampling from more people using the picnic area and the Cleetwood Trail.

None of the areas where proposed development would occur contain habitat suitable for spotted owl and no effect on owls would be expected. Tour boats would continue to be restricted from areas on the lake near the peregrine falcon nest site. Bald eagle use near the lake is transient in nature and boat use has not been a problem.

Approximately 7.7 acres of northern goshawk habitat at Mazama Village would be removed. Because a pair of northern goshawks may range up to 6,000 acres, this level of habitat loss represents a small fraction of a single pair's territory. This loss of habitat for northern goshawk would not adversely affect any nesting pairs or individuals in the Rim Village or Munson Valley area because no suitable habitat is present. The loss of northern goshawk habitat would probably not affect the populations either at the regional level or at the park level. Only a minor fraction of an average territory size would be impacted at Mazama Village.

The removal of 7.7 acres of habitat at Mazama Village could also adversely affect three species listed as sensitive by the state, including pileated woodpecker, three-toed woodpecker, and black-backed woodpecker. Because similar habitat is common throughout the park, impacts would be small in scale and localized.

This alternative would result in moderately more reduction in habitat for the California wolverine and Pacific fisher than under any of the other alternatives except for alternative C. However, this reduction would not have a significant affect on these species because most development would take place in areas of previous development, and the habitat that would be lost represents a small portion of the average home range size of these species. The American marten is also present throughout the park, and the reduction of habitat would be minor in relation to the amount of habitat available elsewhere.

There would be no measurable effect on Wood River flows under this alternative; therefore, no impacts on Lost River sucker or shortnose sucker or on sucker spawning habitat would be expected.

Crater Lake newts have been found at Cleetwood. Development impacts along the shoreline, which is newt habitat, would be limited and would primarily occur in the area already disturbed by the existing dock and associated facilities. A survey of the newt population at Cleetwood would be done before any construction took place.

Cumulative Impacts: Bull trout used to migrate from Agency / Upper Klamath Lake to spawning beds in Sun Creek by way of Annie Creek and the Wood River. However, little or no flows from Annie Creek reach the Wood River during drought periods because of water demands in Annie Creek (more than 99% of which occur downstream of the park). This low flow has resulted in the disconnection of the Wood River / Annie Creek / Sun Creek migration route.

The Park Service water withdrawals would further reduce water flows. However, the disconnection of the bull trout migration route would continue to occur, with or without water withdrawals by the park.

Total park use under this alternative represents about 4/1,000 of the lowest flow amount reported at Annie Creek as it leaves the park (NPS 1995). Water withdrawal from the park would contribute to the cumulative negative effects on water flows in this drainage system, which have had a significant effect on fish migration and bull trout restoration efforts.

Conclusion: The small incremental loss in habitat would not have a significant impact on special status plant or animal species.

Impacts on Wildlife

Analysis: Alternative E would result in the long-term removal of up to 4.4 acres of habitat at Rim Village, 7.7 acres of habitat at Mazama Village, and less than 0.1 acre at Cleetwood. At Rim Village and Cleetwood, the areas proposed for development support a few small mammals and birds, but because of the high elevation and the relatively small area affected, few if any species would be adversely impacted. Abundance and species composition would not be affected in these areas. Building the new parking structure below Rim Village would remove a potential foraging area for red-tailed hawk, horned lark, Cassin's finch, dark-eyed junco, and chipping sparrow. The loss of 2.5 acres of such habitat is minor in relation to that which is available throughout the park.

Habitat impacted at Mazama Village would be lodgepole pine and mountain hemlock forest, which supports a variety of animals. However, in relation to the regional distribution of these habitat types and associated species, this impact would be small scale and local and would not result in a major decline in populations in the park or region.

If trees or other vegetation are cleared during the breeding season (generally May through June), bird nests or mammal dens could be destroyed. During construction of facilities, noise, machinery, and workers would cause some animals to avoid otherwise suitable habitat near construction sites. This impact would probably be minor because many animals tolerate nonthreatening disturbance, including construction activity. For example, many species of birds can be observed in the park near roads, the Mazama campground, and other developed areas.

The indirect impacts of disturbance would adversely impact some wildlife species. People and noise could cause large animals, such as deer, to avoid developed sites or might encourage "begger" individuals to frequent the site in search for food. Other smaller mammals and some birds might also avoid otherwise suitable habitat near the developed areas; however, it is probable that they would seek suitable habitat nearby. Development in areas used by bear or cougar would increase the risk of negative interactions between these animals and humans.

Increased water withdrawal from Annie Creek would reduce habitat for fish and aquatic organisms during the low flow periods of August and September. The consequences of habitat loss because of water withdrawal could include reductions in abundance, biomass, reproductive success, and survival of aquatic life. The magnitude of this reduction cannot be fully predicted because of the complex nature of the system. The effects would probably be relatively minor because the amount of water that would be removed represents only a small portion of the total low-flow volume. Below the point of water withdrawal, the effect would be less significant as more tributaries augment the streamflow.

Cumulative Impacts: Completion of employee facilities and associated infrastructure at Mazama Village would impact an additional 5 acres of lodgepole pine forest community. This acreage lost

would add to previous habitat loss from existing development, as well as the 7.7 acres of lodgepole pine forest type that would be impacted under this alternative.

Conclusion: There would be an incremental increase in loss of wildlife habitat and human disturbance in the developed areas. The loss of 12 acres and recovery of 3.7 acres in the park would not be a significant change in wildlife habitat type or extent.

CULTURAL RESOURCES

Impacts on Prehistoric Resources

As in alternative A, there would be no impacts on prehistoric cultural resources. No cumulative impacts would be expected.

Impacts on Ethnographic Resources

As in alternative A, there would be no impacts on ethnographic cultural resources. No cumulative impacts would be expected.

Impacts on Historic Resources

Analysis: Historic resources in the potentially eligible Rim Village Historic District would be adversely affected by the development of a new activity center at Rim Village, construction of a new access road that would connect the parking structure and activity center with the lodge, and the removal of the community house and cafeteria building. All other impacts on historic resources would be the same as those described in alternative A.

Cumulative Impacts: No cumulative impacts on historic resources would be expected under this alternative.

Conclusion: The actions at Rim Village would have an adverse effect on the historic designed landscape of the potentially eligible historic district. No impacts on historic cultural resources are expected at other areas.

VISITOR EXPERIENCE

Impacts on Visitors at Rim Village

Analysis: The level of visitor contact and interpretation would be the greatest under this alternative, which would benefit visitors by enhancing opportunities for them to learn about and understand the park's natural and cultural resources.

The visitor experience would improve because vehicular congestion would be significantly reduced with the elimination of rim parking and the construction of a three-level parking structure just off the rim. A free shuttle service to the new activity center and lodge would further reduce vehicle numbers

and would be the principle means of transportation. Some visitors might be adversely affected by the increased level of pedestrian crowding that would probably occur because of the concentration of nearly all of the day use visitor services and activities at the new activity center.

Visitors would continue to benefit from opportunities for seasonal lodging at Crater Lake Lodge, and the lodge dining room would continue to provide patrons fine dining during the summer. Lodge visitors would continue to have good views of the lake.

Visitors would continue to benefit from opportunities to eat at a restaurant or cafeteria. However, these opportunities would be available at the new activity center instead of the existing cafeteria building. Visitors would continue to benefit from a limited selection of groceries, merchandise, and sundries. In addition, the new activity center would provide rental equipment, which would benefit some visitors.

Cumulative Impacts: No cumulative impacts on the visitor experience at Rim Village would be expected under this alternative.

Conclusion: Visitors would benefit from more activities, a full-range of services, and increased levels of interpretation at a new activity center. Crater Lake Lodge would continue to provide seasonal overnight accommodations and fine dining. Vehicle congestion at Rim Village would be greatly reduced; however, some visitors might be adversely affected by increased levels of pedestrian traffic, which would probably result from the concentration of activities and services.

Impacts on Visitors at Mazama Village

Analysis: Providing a self-service kiosk near the Mazama Village store would benefit visitors by providing better park orientation. Relocating the amphitheater would allow for easier visitor access.

Providing a new year-round, full-service restaurant would benefit visitors seeking food services. Maintaining groceries, camper supplies, and gift sales at the Mazama Village store would continue to benefit many visitors. Recreation equipment rentals would also be available, which would benefit some visitors. Visitors would benefit from the continued sale of gasoline, as well as emergency road services and supplies. Greater use of the store, including associated parking congestion, might inconvenience some visitors.

Most visitors staying at the NPS campground would continue to benefit from public laundry and showers at the camper store.

Visitors seeking overnight accommodation would benefit under this alternative because the 40-unit Mazama Village Motor Inn would be retained. In addition, a new 40-unit year-round facility would be constructed, with kitchenettes. Visitors would be able to visit, recreate, and stay overnight in the park year-round.

Increasing the size of the campground by adding two group campsites would enhance the camping experience of some visitors.

Cumulative Impacts: No cumulative impacts on the visitor experience at Mazama Village would be expected under this alternative.

Conclusion: Visitors would benefit from improved visitor contact at the new kiosk, and the relocated amphitheatre would provide visitors with easier access to evening programs. Visitors seeking overnight accommodations would benefit from the continued operation of the Mazama Village Motor Inn, the development of 40 new year-round lodging units, and the addition of two group campsites in the campground. Visitors would also benefit from a new full-service restaurant that would operate year round. The addition of rental equipment at the Mazama Village store would also benefit visitors. This alternative would have a beneficial effect on the visitor experience at Mazama Village.

Impacts on Visitors at Cleetwood

Analysis: Development on the rim and lakeside could have adverse visual impacts. However, a rustic architectural style would be used in the design of these structures to minimize adverse visual impacts.

Visitors would benefit from an increase in the number of interpretive signs on the rim and lakeside and along the trail.

Restriping and expanding the current parking lot by 16 feet would have a slight visual impact. However, an increased number of parking spaces, including 11 RV spaces, would reduce overall congestion, thereby creating a more relaxed atmosphere in Cleetwood. Because it could accommodate more vehicles, the parking lot would benefit visitors by eliminating the need for some visitors to park on the shoulders of Rim Drive and by increasing the aesthetic appeal of that road. Pedestrian safety would also be improved with the reconfiguration of the parking lot.

Constructing a permanent structure just off Rim Drive could adversely affect the visual experience of some visitors traveling along the road. Visitors would benefit from services available in the new building, including concession ticket and sundries sales, and an area for shelter. A reservation system would benefit visitors by allowing them to book tours ahead of time.

Burying the fuel line in the trail would remove it from sight, which would improve the visual quality of Cleetwood. However, there would be about 20 sumps along the trail for monitoring fuel leakage. These sumps would be visible to the visitor.

Constructing a new bulkhead and dock would improve the visitor safety and the appearance of the lake edge. The new larger bulkhead and dock would extend an additional 20 feet into the lake and would ensure that tours would not need to be canceled because of water level changes.

Boat tours would continue at current levels, which would benefit visitors seeking this type of experience. Visitors taking the tour would benefit from NPS interpretation onboard the tour boat, as well as on Wizard Island. However, some visitors would be adversely affected by the intrusion of boats on the pristine lake environment.

Constructing a shade structure on the lakeside would benefit some visitors in hot or rainy weather. Visual impacts of the lakeshore structure would be minimized by using materials that were colored to blend with the surrounding rock so that the structure would not be clearly visible from other points along Rim Drive.

Moving the picnic area to an overlook on the rim could cause more people to stop at Cleetwood, thereby increasing traffic congestion.

Replacing the temporary retail structure and redesigning the trailhead area would benefit visitors because the trailhead would be more aesthetically pleasing and safer. Visitors would benefit from new vault toilets near the entrance of the parking lot.

Reconstructing the retaining walls in a single style along the Cleetwood Trail would benefit visitors by improving the aesthetics along the trail. Replacing the old wood cribbing with a material that is common to all the retaining walls would create a continuity that is currently lacking along the trail. The removal of the crib walls would also eliminate the smell of creosote, which many people find offensive.

Cumulative Impacts: No cumulative impacts on the visitor experience at Cleetwood would be expected under this alternative.

Conclusion: Enlarging and restriping the parking lot would greatly alleviate congestion and would reduce the need for additional parking along Rim Drive. Development along the rim and the lakeside, including a new permanent structure, vault toilets, storage facilities, a shade structure, and a new dock, could have adverse visual impacts. However these impacts would be minimized through, rustic design, building materials, and location. Improvements to the boat tour fuel system would reduce the potential for fuel spills and would protect the pristine quality of Crater Lake. Boat tours would continue, which would benefit some visitors while adversely affecting the pristine lake viewing experience sought by others. Improvements to the trailhead and the trail would benefit visitors by making both areas more visually appealing and safer. Visitors would benefit from increased interpretation through more exhibits on the rim and lakeside and along the trail. Visitors taking boat tours would benefit from interpretation on the boat and at Wizard Island.

Impacts on Visitors at Munson Valley

Analysis: Visitors to this area might be inconvenienced because no visitor contact would be offered in the summer at the Steel Information Center. Even though no visitor information about the park would be available here, visitors would probably not be adversely affected because a new year-round visitor contact station would be open at Rim Village. Winter visitors would continue to benefit from the information provided at the Steel Information Center when inclement weather forces the closure of the Rim Village facility.

Cumulative Impacts: No cumulative impacts on the visitor experience at Munson Valley would be expected under this alternative.

Conclusion: Some visitors might be adversely affected by a lack of visitor contact during the summer. Winter visitors would benefit from opportunities for NPS contact at the Steel Information Center, which would serve as a backup visitor contact station.

COMPLIANCE

CULTURAL RESOURCES

Archeology

All of the actions proposed in this plan will comply with the Archeological and Preservation Act of 1974 (16 USC 469), the Archeological Resources Protection Act of 1979 (16 USC 470), the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.), and the American Indian Religious Freedom Act (42 USC 1996).

Ethnography

The National Park Service initiated consultation with the Klamath-Modoc-Yahooskin cultural committee at Chiloquin on March 12, 1997, meeting with Barbara Kirk, executive committee secretary and head of tribal operations.

The National Park Service conducted consultations with the same tribal organization preparatory to the completion of the 1995 *Development Concept Plan / Amendment to the General Management Plan / Environmental Impact Statement*. That document was concerned with issues and actions at Rim Village that are the same as those of this visitor services plan. Although the National Park Service provided the Klamath an opportunity to comment on the 1995 plan, the tribe did not choose to comment.

History

On October 11, 1996, the National Park Service formally notified the Oregon State Historic Preservation Office that it was starting the planning process for a visitor services plan for Crater Lake National Park. On November 21, 1996, the Oregon State Historic Preservation Office acknowledged the notification and agreed to participate in the planning process.

All actions under this plan will comply with the National Historic Preservation Act of 1966 (NHPA; 16 USC 470 et seq.), as amended; the Advisory Council on Historic Preservation's implementing regulations, 36 CFR Part 800, Protection of Historic Properties; the 1995 Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers; and the National Park Service Cultural Resource Management Guideline, NPS-28 (Release No. 4, September 23, 1994).

Under Section 110 of the NHPA, all federal agencies must carry out their cultural resource management programs according to national historic preservation policy. Section 106 of the NHPA requires federal agencies to consider the effects of their actions on historic properties and seek comments from the Advisory Council on Historic Preservation. The purpose of Section 106 is to avoid unnecessary harm to historic properties.

The methodology for assessing impacts on cultural resources involves several steps. These include: (1) identification of the location of a proposed action; (2) comparison of that location with the location of

resources listed on, or eligible for listing on, the National Register of Historic Places; (3) identification of the extent and type of impact of the proposed action on National Register-listed or eligible properties; and (4) assessment of those effects according to procedures established in 36 CFR Part 800, Protection of Historic Properties.

A proposed undertaking is considered to have an “effect” on a historic property if it may in any way change the characteristics that qualify that property for inclusion on the National Register of Historic Places. If the undertaking would diminish the integrity of the property, it is considered to have an “adverse effect.” Historic properties for the purpose of the regulations are those prehistoric or historic districts, sites, buildings, structures, or objects listed on, or eligible for listing on, the National Register of Historic Places.

NATURAL RESOURCES

In implementing this plan, the Park Service would comply with all applicable laws and executive orders, including the following.

Architectural Barriers Act of 1968 (42 USC 4151 et seq.) and Rehabilitation Act of 1973 (29 USC 701 et seq.) — All facilities and programs developed would be accessible to visitors with disabilities.

Clean Air Act, as amended (42 USC 7401 et seq.) — Crater Lake National Park is designated as a class I clean air area. Maximum allowable increases (increments) of sulfur dioxide (SO₂), particulate matter (TSP), and nitrogen oxides (NO_x) beyond baseline concentrations established for class I areas cannot be exceeded. Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations.

Endangered Species Act of 1973, as amended (16 USC 1531 et seq.) — Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat. Informal consultation with the U.S. Fish and Wildlife Service occurred in November 1996 with a request for a list of species that may be present in the project area or that may be affected by the project. Before construction and during the design phase, further surveys and consultation would occur to protect these species. Consultation with the U.S. Fish and Wildlife Service would be carried out before construction to ensure that no new listed species have been found on site.

Executive Order 11988, “Floodplain Management” — This order requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Executive Order 11990, “Protection of Wetlands” — This order requires federal agencies to avoid, where possible, impacts on wetlands. No known wetlands would be affected by the proposed action. Trails are exempted from compliance under NPS guidelines for implementing this executive order. During the design phase of any development, the most recent wetland maps shall be consulted to ensure that facilities are sited outside of any wetlands.

The following additional actions would be taken to ensure compliance with federal, state, and city laws and regulations.

During design, consultation with the state of Oregon and the U.S. Corp of Engineers shall be accomplished to ensure compliance with the state's 401 water quality certification program, the National Pollution Discharge Elimination System (NPDES) for stormwater discharge, and the state's groundwater protection program.

If any unknown hazardous waste is found in areas proposed for development or visitor use, the National Park Service would comply with the Comprehensive Environmental Response Compensation and Liability Act (42 USC 9601 et seq.) to determine if resources are being polluted by the substance or if it presents a health and safety issue. If any excavated material is determined to be hazardous, the National Park Service would comply with the Resource Conservation and Recovery Act (42 USC 6901 et seq.)

CONSULTATION AND COORDINATION

The National Park Service issued a Federal Register Notice (189 FR 50866) September 27, 1996, announcing its intent to prepare an environmental impact statement for a visitor services plan for Crater Lake National Park. The notice indicated that the environmental impact statement would focus on Park Service interpretive services and commercial concessioner services, and that the Park Service intended to conduct scoping, or issue identification with interested agencies, organizations, and individuals. This notice was augmented by a scoping letter dated September 26, 1996 which was mailed out to approximately 500 organizations and individuals to announce the beginning of the planning effort, explain the rationale for conducting the study, and define the major issues to be resolved. The letter requested public comments about the scope of the plan. Five responses were received.

The Park Service subsequently formulated a range of draft alternatives. An alternatives booklet was prepared that briefly outlined the concept behind each alternative and what components would follow from it in a visitor services plan/environmental impact statement. The booklet was distributed in November 1996 to interested publics for their comments. Approximately 100 responses were received. In addition, a series of public open house meetings followed in December 1996. During these meetings, the alternative concepts and range of actions being considered were presented to the public. The meetings provided an opportunity for the public to make comments or ask questions about the alternatives. After reviewing and incorporating public comments, a preferred alternative was developed for the draft visitor services plan/environmental impact statement.

LIST OF AGENCIES AND ORGANIZATIONS TO WHOM COPIES OF THE DRAFT DOCUMENT HAVE BEEN SENT

Oregon Congressional Delegation

Former Senator Mark Hatfield
Senator Ron Wydon
Senator Gordon Smith
Congressman Bob Smith

Federal Agencies

Advisory Council on Historic Preservation
BLM, Grants Pass Resource Area
BLM, Klamath Falls Resource Area (Lakeview District)
BLM, Medford District Office
NPS, WRD Water Rights Branch
NPS, Office of Public Affairs
NPS, Office of the Solicitor, Pacific Northwest Branch (USDI)
NPS, Oregon Caves National Monument
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
USFS Chemult Ranger District
USFS Chiloquin Ranger District
USFS Diamond Lake Ranger District
USFS Klamath Ranger District
USFS Rogue River National Forest
USFS Toketee Ranger District
USFS Umpqua National Forest
USFS Winema National Forest

State Agencies

Oregon Department of Economic Development
Oregon Department of Environmental Quality
Oregon Department of Forestry (Sun Point State Forest)
Oregon Department of Transportation
Oregon Department of Fish and Wildlife
Oregon Parks and Recreation Department
Oregon State Historical Preservation Office

Local Agencies

The cities of:
Bend
Chiloquin
Klamath Falls
Medford
Roseberg
Shady Cove
Deschutes County Library
Douglas County Library
Douglas County Museum

ENVIRONMENTAL CONSEQUENCES

Eugene Library
Jackson County Commissioners
Jackson County Library
Josephing County Library
Klamath County Commissioners
Klamath County Economic Development Association
Klamath County Library
Klamath County Museum
Klamath County Planning Department
Rogue Valley Council of Governments
Roseburg Area Chamber of Commerce
Salem Library
Corvallis Library

Native Indian Tribes

Klamath Tribes

Organizations

Allamage Ski Club
Audubon (Klamath Basin and/or Rogue Valley)
Broken Arrowhead Ranch
CC Riders Snowmobile Club
C. I. Club, Fort Klamath
Century West
Chiloquin Ridge Riders
Coalition of Equestrians Club
Concerned Friends of Winema
Diamond Lake Homeowners
Diamond Lake Resort
Edelweiss Ski Club
Europa-Let
Friends of Crater Lake National Park
Friends of the Earth
Future Farmers of America
Grants Pass Nordic Ski Club
Historical Preservation League of Oregon
Klamath Basin Snowdrifters
Klamath Bow Hunters
Klamath Motor Sports
Lake Quinalt Lodge
Landau Associates
League of Women Voters
LMJ Cattle Company
Mazamas
Medford Visitors Convention Bureau
Mt. Hood Snowmobile
National Parks & Conservation Association
Native Plant Society of Oregon
Oregon Historical Society
Oregon Hunter's Association

List of Agencies and Organizations to whom Copies of the Draft Document have been Sent

Oregon Natural Resource Council
Oregon Nordic Club
Oregon Parks Foundation, Inc.
Oregon State Snowmobile Association (OSSA)
Rivers of Light Ranch
Rogue Group Sierra Club
Rogue Snowmobile Club
Sierra Club
Sierra Club, Klamath Group
Siskiyou Audubon Society
Siskiyou Regional Education Project
Sledheads Snowmobile Club
Snowdrifters
Southern Oregon Alliance for Res.
Southern Oregon Historical Society
Southern Oregon Nordic Club
The Estey Corporation
The High Desert Museum
The Nature Conservancy
Upper Rogue Regional Tourism Alliance
Water Color Society of Oregon
W.H.A.T.
Zaik/Miller/Dibenedetto

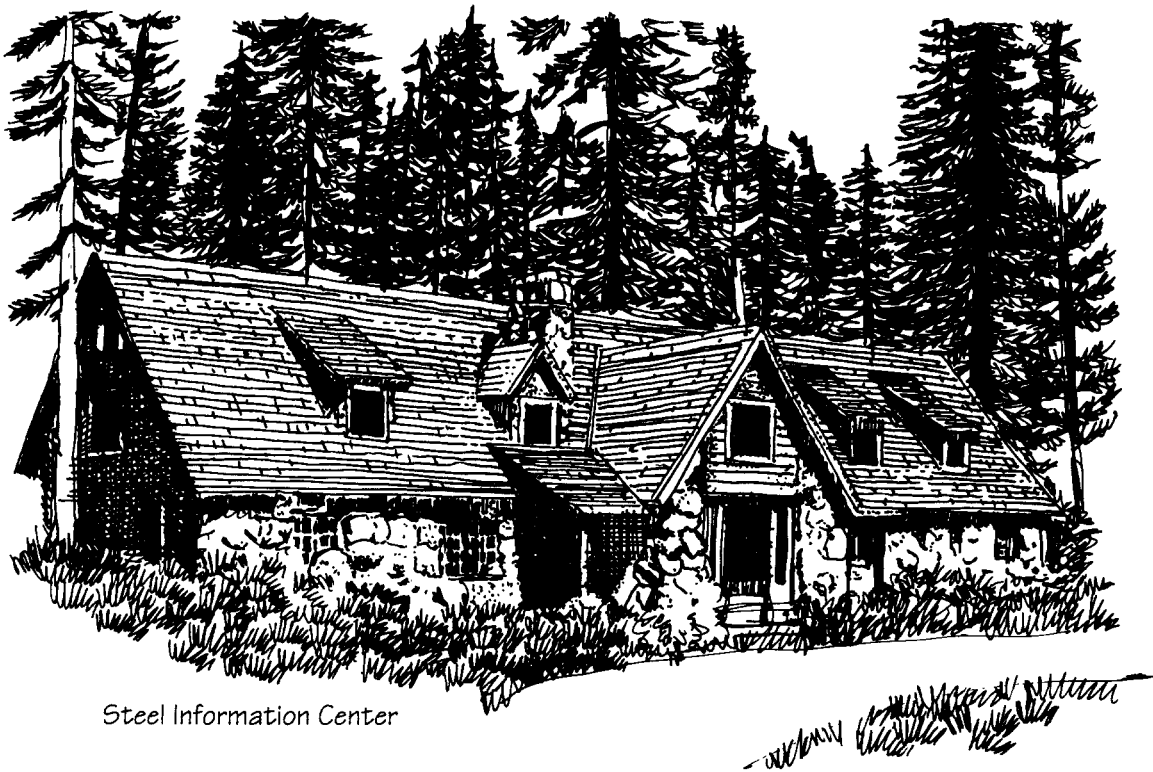
Schools

Chiloquin
City Schools
Fort Hays State University
Klamath Community College
Northwestern University
Oregon Institute of Technology
Oregon State University
Oregon State University, College of Oceanography
Prospect Schools
Rogue Community College
Southern Oregon University

Media

Herald and News (KF, Ore.)
Mail Tribune (Medford, Oregon)
News Review (Roseberg, Oregon)
KAGO
KDRV, Channel 12
KENO
KOTI-TV
KPIC, Channel 4
KTVL, Channel 10





Steel Information Center

SELECTED REFERENCES, PREPARERS, INDEX

SELECTED REFERENCES

Air Resource Specialists, Inc.

- 1988a "Oregon Visibility Monitoring Network Data, 1987 Monitoring Season." Prepared in Portland, OR, for National Park Service, Pacific Northwest Region Department of Environmental Quality. CRLA-0613. Photographs.

Report contains air quality monitoring data for Oregon, including site prints and specifications, standard visual range, and analysis. Copy not complete, but contains data for Crater Lake National Park and region.

- 1988b "Visibility Monitoring and Data Analysis Report for Crater Lake National Park: Dutton Ridge." Report prepared for Crater Lake National Park. CRLA-0607. Slides.

Documentation for air quality monitoring program at Dutton Ridge, Crater Lake National Park; results and analysis of slides taken 3 times per day. (Also see CRLA-0608). Also contains slides for project from years 1987–1989. Geographic location: Crater Lake National Park, Dutton Ridge to Yamsey Mountain.

- 1989 "Visibility Monitoring Network Data Compilation for the State of Oregon, 1988 Monitoring Season: Crater Lake Excerpt." Report prepared for National Park Service, Pacific Northwest Region Department of Environmental Quality. CRLA-0612. Photographs.

Air quality standard visual range and analysis. Copy only has section on Crater Lake National Park and region.

Bacon, Charles R.

- 1996 Personal communication: electronic mail correspondence.

- 1987 "Mount Mazama and Crater Lake Caldera, Oregon." In *Centennial Guide* by Geological Society of America, 301–306.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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