



FINDING OF NO SIGNIFICANT IMPACT

AUGMENT ANNIE SPRINGS WATER SUPPLY and INSTALL PCT SITE IMPROVEMENTS

May 2016

Purpose and Need for Federal Action

Crater Lake National Park (CRLA) is seeking an additional source of potable water to ensure an adequate long term supply for the park's developed areas. The existing water system is served by a single point of diversion from a sole surface water source at Annie Springs, which feeds Annie Creek. The National Park Service (NPS) proposes to utilize an existing exploratory well as a new ground water source for potable water that can either supplement the Annie Springs surface water source or provide a sole source of supply to the park water system should Annie Springs not be available. This action is needed to ensure a safe, reliable water supply for domestic and commercial uses at these facilities. The purpose of this action is to supplement the Annie Springs source in CRLA to ensure sufficient water for human consumption, sanitation, life safety, and fire protection, including historic structure protection.

ALTERNATIVES

The environmental assessment (EA) analyzed two alternatives, including the *No-Action Alternative* (existing water system conditions and management; no new infrastructure) and the *Production Well with Pipeline along Original Highway Alignment Alternative*, which is the selected alternative. The *Production Well with Pipeline along Original Highway Alignment Alternative* is the NPS Selected Action because it best meets the purpose and need for the project as well as the project objectives to:

- Obtain an alternate source of potable water to prevent a possible shut-down of the existing park water system or a park closure from an extended drought and a possible reduction in the water supply,
- Provide adequate quantity and quality of water,
- Be within reasonable distance of park headquarters and Mazama Village where most of the water distribution infrastructure is located; outside the potential wilderness boundary established in 1974; and reasonably accessible for maintenance especially under winter conditions.

Selected Action

The *Production Well with Pipeline along Original Highway Alignment Alternative* is the NPS Selected Action as detailed in the Environmental Assessment released in March 2016. No substantive comments were received during public review that required the EA to be modified.

Under the selected action, an exploratory well located at the Pacific Crest Trail (PCT) trailhead along Highway 62 will become the sole source of potable water when the Annie Springs source cannot be used because of extreme low flows, water rights call, system maintenance or other

reasons. New infrastructure will be constructed to connect the well to the existing distribution system near Annie Springs.

The PCT production well will fill the Mazama Tanks (200,000 gallons total storage) rather than operating the Mazama booster station pump to bring Annie Springs water to the Mazama tanks.

The Mazama Tanks will supply both the Annie Springs Booster Station and the Mazama Service Area. To minimize new disturbance and maximize use of existing infrastructure that provides water to headquarters/Munson Valley area and the Rim, the piping system will be modified so that the valve sequences (direction of water flow) can be operated from either the Annie Springs equipment or from the well. Storage capacity will remain at 585,000 gallons.

To implement this proposal, both new infrastructure and modifications to existing infrastructure will be required. New infrastructure that requires ground disturbance includes:

- A well house at the PCT well, along with concrete pads for a transformer and a portable back-up generator.
- A trench for a new waterline from the well along the existing and obliterated highway alignments to connect to the existing Mazama Tank fill line.
- A common utility trench containing pull boxes for conduit containing power and fiber-optic communication lines adjacent to the waterline trench. A fiber optic communication line in conduit will control well pump based on tank level inputs to Mazama Booster Station and read system parameters (pressure, flow) remotely from Mazama or Annie Springs booster stations.
- A new valve vault.
- The expansion of the PCT trailhead parking by approximately 3,300 sf to accommodate the area lost to well house and to improve vehicle circulation and provide additional amenities.
- Replacement of existing 6-inch gate valve (1.5 sf) on the supply line to from Annie Spring to the booster stations under Annie Creek bridge, with (2) new 6-inch gate valves and (1) swing check valve (4 sf) prevent pushing water backward into the spring during well supply operations. The existing valves and piping are partially imbedded (50%) within the stream bed behind the wier impoundment. Replacement valves will likewise be submerged to protect from freezing, but visible to allow for operations, service and inspections.

New infrastructure that will be installed without additional ground disturbance includes:

- One 10 horsepower 4-inch submersible pump capable of pumping 50 gpm installed in the PCT well.
- Piping modifications inside the existing concrete vault (vault #2) near the Annie Creek Bridge to connect the suction side of Annie Springs Booster Station to the 6-inch water distribution line from Mazama Water Tanks to bypass the Annie Spring source supply line to the booster station.
- Piping, communications and controls modifications inside Mazama booster station to shut off Annie Spring source when the well and Mazama tanks are used as the supply water source.
- Transformer and power supply modifications to the existing on the northwest road side near Annie Creek Bridge to extend underground primary power supply to the new well site.

The water distribution system requires two parallel trenches to connect the well to the existing water distribution system. The water line is laid in one trench and a second common utility trench for power and communication lines used to manage the water flow. A minimum 3-foot separation is required between the two trenches. The width of the disturbance for excavation is estimated to be about 12 feet to accommodate the heavy equipment (excavator) needed. The trenches will be excavated in previously disturbed areas adjacent to the existing and former highway alignment. Under the proposed action, the trenches will run north from the well underneath the highway, turn east along the existing highway, turn north following the curve of the obliterated old highway, and turn east above the site of the old Mazama campground to connect to the existing 4-inch cast iron Mazama Tank Fill Line .

The trench underneath the highway will require removal and replacement of asphalt at the highway crossing. Mitigation measures will be in place to reduce erosion and inhibit dispersion and establishment of invasive plants in soils disturbed by construction.

Power supply to new facilities under the proposed action requires a Pacific Power and Light (PPL) Right-of-Way. Annual power consumption for use of the new well is estimated to be 32,225 kW-h.

Additional parking and space for turning a stock trailer will be added at the PCT trailhead to replace the area that will be used for a well house. Additionally, boulders will be placed around the well house to protect well infrastructure that will further reduce the available parking. The new parking area is estimated to require about 3,300 square feet (sf), which will be added on the south and west side of the existing parking area. The expanded area will require minor grading and the removal of approximately 17 trees all under 18 inches in diameter, with the average diameter being 11 inches. Currently the parking area has a gravel surface, though the lot will eventually be paved with asphalt to provide the ability to stripe parking spots and reduce the long term maintenance costs. In the long-term, trailhead amenities will also be added to include picnic tables, hitching posts, signage and a vault toilet. These additional amenities will be added as funding becomes available.

The NPS is pursuing a state permit to withdraw water from the proposed well concurrent with the environmental compliance process. The NPS submitted a water-use permit application to the State of Oregon Water Resource Department (WRD) requesting a permit for 0.34 CFS of water for year-round domestic use and 1.0 CFS for fire protection. In a letter from the WRD on October 23, 2015, the park was informed that this appropriation was not allowable because "Domestic water use is defined as the use of water for human consumption, household purposes, domestic animal consumption that is ancillary to residential use of the property or related accessory uses." The letter went on to say that requesting a permit for commercial use may be allowable because "Pursuant to OAR 690-300-0010(6), commercial water use is defined as the use of water related to the production, sale or delivery of goods, services or commodities by a public or private entity. These uses include, but are not limited to, construction, operation and maintenance of commercial facilities, including fire protection." The park resubmitted the application to reclassify the proposed use from residential to commercial and is awaiting a determination. The permitting process will be completed prior to placing the well into service.

Mitigation Measures

The following mitigation measures will be implemented during the project. The NPS employee assigned to ensure mitigation measures are implemented and effective are noted in brackets.

Air Quality

- Excess dust will be mitigated by water sprinkling as needed. [Project COR]
- Vehicle emissions will be limited through use of vehicles licensed to meet state air quality standards. [Project COR]

Soils

- Construction equipment will be inspected daily to check for leaks. [Project COR]
- Potential effects on soils from leaks of petroleum and equipment fluids will be avoided through containment devices. [Project COR]
- All equipment will be stored, serviced, and fueled on tarps or other containment devices. [Project COR]
- Any incidental drips will be collected in containers and tarps underneath the equipment and transported out of the park for disposal in an acceptable location. [Project COR]
- A spill prevention plan will be in place. [Project COR]
- A Storm Water Pollution Prevention Plan will be prepared and will identify erosion and sediment control requirements. [Project COR]

Water Quality

- A Storm Water Pollution Prevention Plan will be prepared and will identify erosion and sediment control requirements. [Project COR]
- If soil disturbance has the potential for run-off into temporary water courses, mulch will be applied to reduce run-off until soils stabilize in one to two years. Mulch will be from brush cleared as a result of construction and applied in consultation with park botanist. [Park Botanist]

Vegetation

- All construction equipment, vehicles, tools, gear, etc. will arrive in the park clean and free of off-site soil and/or organic debris. If any construction equipment, vehicles, tools, gear, etc. leaves the park, it will need to be re-cleaned prior to subsequent reentry. [Project COR]
- Disturbed soils will be revegetated with native materials collected on-site. [Project COR]
- Existing invasive plant populations will be marked and avoided as much as possible to avoid spreading invasive plants further within the project area. [Park Botanist]
- Construction zones will be monitored for invasive plant introductions for three years following project completion to detect the inadvertent introduction or spread of invasive plant species. If exotic plants are detected they will be controlled or contained as specified in the park's Invasive Plant Management Plan and the site will continued to be monitored until exotic plants are no longer detected. [Park Botanist]
- No imported earthen or base materials will be allowed without prior approval from park staff in consultation with the Park Botanist. If weed-free sources cannot be obtained additional mitigations will be required such as pre-treating source material with herbicide prior to transporting to the park, washing of gravel sources, specifying how material will be mined at the site, etc., to prevent the introduction and spread of invasive plants. No use of straw or hay is permitted. Any erosion control materials needed for project implementation will be approved by park staff in consultation with the Park Botanist. [Project COR and Park Botanist]

Wildlife

- Seasonal restrictions on noise and habitat disturbance to protect nesting birds is required under the action alternative. The NPS avoids impacts to birds protected under the Migratory Bird Treaty Act by avoiding removal of vegetation suitable for nesting during the primary nesting season for most migratory birds (May 1– July 31). [Park Ecologist]

Sensitive, Threatened, and Endangered Species

- Because northern spotted owls (NSO) habitat occurs within the vicinity of the project area, the site will be sampled following US Fish and Wildlife Service guidance prior to beginning the project to ensure NSOs have not started to occupy the project area. [Park Ecologist]
- No gray wolf dens are known to occur in the project area. Should there be evidence of wolves occupying the project area before construction, the US Fish and Wildlife Service will be consulted before any project work commences. [Park Ecologist]

Cultural Resources

- Archaeological sites and sensitive cultural features will be excluded from the project construction boundary by fencing along the service road to the water tanks. [Park Archeologist]
- Cultural resource monitors will be utilized during the construction phase. [Park Archeologist]
- Should cultural resources be discovered during project activities, the project must halt and a professional archeologist must be contacted for identification and evaluation of any finds. [Park Archeologist]

Visitor Use and Experience

- The PCT parking lot will be expanded and improved to accommodate any loss of parking and turn-around space resulting from well infrastructure. [Project COR]

Alternatives Considered

Two alternatives were evaluated in the EA including the no action alternative and one action alternative. Five additional alternatives were considered but dismissed from further analysis as they did not meet project needs or objectives. Under the No-Action Alternative (existing water system conditions and management; no new infrastructure) the primary source of potable water to serve CRLA would continue to be surface water from Annie Springs. No new infrastructure (access roads; power; water treatment, storage, and distribution facilities) would be constructed. Existing storage would remain at 535,000 gallons. The NPS would continue to encourage water conservation by park visitors, staff, and concession employees.

In addition to the alternatives analyzed in the EA, five additional alternatives were considered but dismissed from further review, as they would not meet the purpose, need or objectives of the proposed project. These alternatives consisted of developing a production well at the same location proposed under the selected action, with the pipeline following the modern highway alignment; a well in the Castle Creek drainage; increasing water storage by building a pond or

reservoir; hauling potable water to the park, and; closing park facilities or implementing visitor use limits.

The *Production Well with Pipeline along Original Highway Alignment Alternative* is the Selected Alternative as described in the previous section.

Why the Selected Action Will Not Have a Significant Effect on the Human Environment

CEQ regulations at 40 CFR Section 1508.27 identify ten criteria for determining whether the Selected Action will have a significant effect on the human environment. The NPS reviewed each of these criteria given the environmental impacts described in the EA and concluded there will be no significant impacts for any of the criteria. The criteria most relevant to this determination are addressed more fully below.

Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

Implementation of the Selected Action will result in some adverse impacts and some beneficial impacts; however, it will not result in any significant adverse impacts.

Summary of Adverse Impacts

Under the selected alternative, there could be temporary and localized adverse effects during construction. These include dust and emissions generated by construction equipment, impacts to soils and topography, and the potential to injure, displace or kill small sedentary animals that are unable to move away from the construction zone. There may also be short-term impacts to the visitor experience from delays resulting from one-way traffic or temporary road closures on Highway 62 during construction.

Longer term adverse impacts from construction under the approved actions include removal of approximately 17 lodgepole pines less than 18 inches in diameter and a sparse understory of shrubs, negligible effects on northern spotted owls and Pacific fishers from short-term noise and disturbance related to operation and maintenance of a new water distribution system and an increase in cost from operation and maintenance of additional water system components.

Summary of Beneficial Impacts

Under the selected alternative there will be long-term beneficial impacts. These include an additional source of water would be available for fire protection, including historic structures, from both structural fire and wildfire; the expansion of the PCT parking area that will improve parking, stock trailer access and provide improved visitor amenities; and avoiding potential impacts on the local and regional economy resulting from visitor facilities closures, should surface water withdrawals be curtailed.

Degree of effect on public health or safety

As noted above, the selected alternative will provide an additional source of water for fire protection. An additional benefit not analyzed in the EA is having an alternative supply of potable water should a source became unavailable due to a maintenance issue, contamination, or some other unanticipated factor.

Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas

Archaeological survey for the proposed waterline project was undertaken to meet regulatory requirements to identify cultural resources and evaluate potential impacts to these resources within the context of proposed project activities. A literature review, records search, and field survey and documentation of cultural resources identified the types of cultural resources expected to occur. Three sites were documented within the project Area of Potential Effect. None of the sites are eligible for inclusion in the National Register of Historic Places based on lack of integrity. An evaluation of potential adverse effects led to general management recommendations and project-specific NHPA compliance stipulations. Strategies to minimize or negate known potential adverse effects to these sites from project activities were developed and will be implemented as noted in the mitigations section.

Degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historical resources

The selected action has the potential to affect the Fort Klamath–Rouge River Wagon Road which is adjacent to the area where trenching for the waterline is proposed. This road was built in 1865 and is a recorded historic period site previously determined eligible for listing in the National Register of Historic Places (NRHP). The wagon road would be protected from disturbance by construction fencing with on-site monitors during ground disturbance activities. The NPS archaeological survey has determined that the proposed action will not adversely affect the Wagon Road or alter the features that make it eligible for listing in the NRHP.

Whether the action is related to other actions with individually insignificant, but cumulatively significant, impacts

Cumulative effects were analyzed in the EA and no significant cumulative impacts were identified.

The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

The selected action does not have the potential to affect bull trout, or their designated critical habitat. No suitable habitat for northern spotted owls (nesting, foraging) or Pacific fishers (denning, foraging) would be removed due to project implementation. Ungulates are the primary food source for gray wolves. The limited amount of disturbance associated with this project will not have an effect on the deer and elk populations in the park. Therefore, this project will not affect gray wolves. Based on the availability of abundant habitat throughout the park, this project is not likely to have adverse effects on black-backed woodpeckers. While the project area is likely within the home range of several individuals of the Sierra Nevada red fox, the small scope of disturbance associated with this project is unlikely to have a negative effect on this species.

Public Involvement and Native American Consultation

The EA was made available for public review and comment during a 30-day period ending April 4, 2016. A press release was distributed to several media outlets and electronically to the park

public information email list (containing over 200 individuals and organizations). The press release was also posted to the park website. The press release was highlighted on some media websites including National Parks Traveler, and was featured locally in the Chiloquin News. All media provided by the NPS contained a link to comment page of the NPS Planning, Environment, and Public Comment (PEPC) website. A hard copy was made available at park headquarters and the press release indicated hard copies could be requested if desired.

Crater Lake National Park staff notified the Klamath Tribes and the Cow Creek Band of Umpqua Tribe of Indians as required by 36 CFR 800. Hard copies were sent to both tribes along with a letter requesting comment and neither tribe raised concerns about the action. The NPS submitted a survey report and site records related to this project to the Oregon state historic preservation officer (SHPO) on February 19, 2015. In a letter dated March 30, 2015 (SHPO Case No. 15-0268) the Oregon SHPO agreed with the NPS determination that no impacts to any significant cultural resources would occur as a result of the proposed action, provided that avoidance recommendations detailed in the NPS report (SHPO no. 27194) are followed.

One comment was received via PEPC and expressed support for the proposed action.

Conclusion

As described above, the Selected Alternative does not constitute an action meeting the criteria that normally require preparation of an environmental impact statement (EIS). The Selected Alternative will not have a significant effect on the human environment in accordance with Section 102(2)(c) of NEPA. This finding is supported by the environmental analysis completed and documented in the Environmental Assessment prepared for this project and through the consideration of stakeholder input received during scoping and public review. The NPS also established and is capable of implementing the mitigations described in this document to avoid, reduce or eliminate impacts to park resources resulting from implementing the Selected Alternative.

Based on the foregoing, the NPS has determined that an EIS is not required for this project and thus will not be prepared.

Recommended:



Craig Ackerman
Superintendent, Crater Lake National Park

5/19/16
Date

Approved:

for 

Laura E. Joss
Director, Pacific West Region, National Park Service

5/26/16
Date

Errata Sheets
Augment Annie Springs Water Supply
Crater Lake National Park

TEXT CHANGES

A small number of text changes have been made to the EA to correct minor editorial or typographical errors.

Page 9, para 5, line 4

The high elevation location of the Rim generally ensures good visibility. Klamath Falls south of the park is a non-attainment area for PM_{2.5} (particulate matter less than 2.5 microns) due primarily to inversions that trap woodsmoke in the low-lying valley.

Page 22, para 2, line 1

~~Under both alternatives,~~ The trench underneath the highway would require removal and replacement of asphalt at the highway crossing. The area of asphalt to be excavated and replaced is estimated to be about 30 ft by 6 ft (150 sf).

Page 28, Para 4, line 11

While no NSO have been documented to date, because NSO habitat occurs within the vicinity of the project area the site will be sampled following USFWS guidance prior to beginning the project to ensure NSOs have not started to occupying the project area.

AUGMENT ANNIE SPRINGS WATER SUPPLY
Determination of No Impairment
May 2016

National Park Service's *Management Policies, 2006* require analysis of potential effects to determine whether or not actions will impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may, but does not necessarily, constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated.

The park resources and values that are subject to the no-impairment standard include:

- the park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and

- any additional attributes encompassed by the specific values and purposes for which the park was established.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. The NPS's threshold or considering whether there could be impairment is based on whether an action will have significant effects.

Impairment findings are not necessary for visitor use and experience, socioeconomics, public health and safety, environmental justice, land use, and park operations, because impairment findings relates back to park resources and values, and these impact areas are not generally considered park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values. After dismissing the above topics, topics remaining to be evaluated for impairment include Air Quality; Soils and Topography; Water Quality and Quantity; Vegetation; Fish and Wildlife; Sensitive, Threatened and Endangered Species and Cultural Resources.

Fundamental resources and values for Crater Lake National Park are discussed in the 2005 General Management Plan and 2015 Foundation Document, these inform the consideration of the specific purposes of the park in the NEPA analysis. All but one of the impact topics (park operations) carried forward in this EA are necessary to fulfill specific purposes identified in the establishing legislation of the park; are key to the natural or cultural integrity of the park; and/or are identified in the park's general management plan or other relevant NPS planning document.

Air Quality

Crater Lake National Park is designated as a class I airshed pursuant to Part C of the Clean Air Act, as amended (42 USC 7401 et seq.). Class I designations are given to areas where air quality is cleaner than the national ambient air quality standards. Class I areas have the most stringent regulations for the protection of air quality, permitting the lowest increments of air quality degradation. Primary sources of pollution in the park are smoke from wildfires, prescribed fires, campfires, and vehicle emissions. Pollution varies seasonally. The primary air quality related values for the park are the views of the lake and surrounding area from the rim, and other visibility-related values. The high elevation location of the Rim generally ensures good visibility. Klamath Falls south of the park is a non-attainment area for PM_{2.5} (particulate matter less than 2.5 microns) due primarily to inversions that trap woodsmoke in the low-lying valley. Non-attainment means that a geographic area has not consistently met the clear air levels set by the US Environmental Protection Agency (EPA) in the National Air Quality Standards. The part of Klamath County in which the park is located is excluded from the non-attainment area designated by the EPA. The air quality in Klamath Falls is improving under an attainment plan adopted in 2012 by the Oregon Department of Environmental Quality. All other regulated air pollutants in the area surrounding the park are within Federal standards.

Under the proposed action, there would be temporary and localized adverse effects during construction from dust and emissions generated by construction equipment. Excess dust would be mitigated by water sprinkling as needed. Vehicle emissions would be limited through use of vehicles licensed to meet state air quality standards. There would be no detectable long-term adverse effects from operation and maintenance of a new water line, or from the existing supply and distribution system. Therefore, the selected action will not lead to an impairment of air quality.

Soils and Topography

Crater Lake National Park is the remains of Mount Mazama, one of the volcanic peaks of the Cascade Range, which extends from Mount Lassen in northern California to southern British Columbia. Mount Mazama erupted violently about 7,700 years ago. New vents encircling the peak brought hot flows of pumice, ash, and gas down the steep flanks. The peak subsided under its own weight, leaving a deep caldera. Centuries of melted snow and rain filled the caldera to create the deepest lake in the U.S.

The topography of the park is dominated by volcanic peaks and cones that rise steeply above the surrounding plateau. The highest elevation in the park is 8,829-foot Mt. Scott east of the rim. The highest elevation on the rim is Garfield Peak (8,054 ft) reached by a trail from the Rim Village and Lodge. The volcanic soils of Mt. Mazama are easily eroded, forming pinnacles, spires, bluffs, and buttes. Soils include pumice, ash, and cinders. Basalt outcrops are harder material that does not weather as easily as other volcanic material ejected in the eruption.

Under the selected action, soils would be affected for construction of a well housing at the PCT trailhead, for installation of new water line and adjacent power and communication lines in adjacent trenches, for installation of pull boxes for power lines along the new water line, and to enlarge the parking area to accommodate a horse trailer at the PCT trailhead to replace the area affected by the well housing.

The 4-inch water line would be buried a minimum of 48 inches deep, requiring a total estimated depth of 54 inches for the trench. The trench is estimated to be a minimum of 18 inches wide. The common utility trench for power and communication lines would be a minimum of 18 inches wide. To accommodate the minimum 3-ft separation required between the two 18-inch-wide trenches, the minimum width of disturbance would be 6 feet. Access for heavy equipment needed to excavate the two trenches would require a minimum width of twelve feet. Under the selected action, the total length of the trenches in which the water and utility lines would be buried would be about 3,940 lf. The total area of disturbance for trenching for water lines would be approximately 1.1 ac, all of which is currently or previously disturbed for road construction.

The trench would follow the obliterated highway to connect to the existing water line to the Mazama tanks. The curve on the obliterated highway was constructed as a road cut as the old alignment descends a slope. The road cut was filled in with debris and rocks pushed onto the road bed in an attempt to hide the scar of the road cut. Several large rocks on the surface are estimated to be similar in size to 1-ton rock slope protection (RSP) material. The length of this section of trenching is about 1,800 feet. Removal of debris or large rocks buried in the debris could result in a disturbed area more than twelve feet in width. The trench underneath the highway would require removal and replacement of asphalt at the highway crossing. The area of asphalt to be excavated and replaced is estimated to be about 30 ft by 6 ft (150 sf).

Soils affected for construction of the well housing are already disturbed by the existing PCT graveled trailhead parking area. Enlarging the parking area to allow a horse trailer to maneuver would affect an additional 3,300 sf adjacent to the existing parking area to replace parking area lost to the new fenced well housing and provide needed trailhead amenities. Soils affected by trenching for the new water, power, and communication lines are in the previously disturbed highway corridor. About 1,970 lf of the trenching would occur within the corridor of the existing highway that is routinely maintained, including snow-plowing, brushing, and resurfacing.

Soils affected by trenching would be stockpiled next the trench and used to backfill the trench.

Impacts to soils from construction of a well housing at the PCT trailhead and trenching along the current and obliterated highway alignment for new lines would be localized, long-term, and adverse to the extent that soil disturbance is considered an adverse effect in comparison to undisturbed soil. Additional disturbance to 1.1 acres of soils in a previously disturbed highway corridor is a negligible adverse effect.

Construction equipment would be inspected daily to check for leaks. Potential effects on soils from leaks of petroleum and equipment fluids would be avoided through containment devices. All equipment would be stored, serviced, and fueled on tarps or other containment devices. Any incidental drips would be collected in containers and tarps underneath the equipment and transported out of the park for disposal in an acceptable location. A spill prevention plan would be in place.

None of the alternatives would require more than minor alterations to the natural topography. Effects to topography would be long-term and localized within the existing or former highway corridor. The greatest alteration to topography would occur along the road cut of the obliterated highway where rocks and soil have been placed downslope onto the original roadbed and where minor grading is necessary in the expanded parking area. These effects are considered adverse to the extent that existing topography would be slightly altered. However, the topography where the water line and parking area would be installed was previously altered for construction of the highway and other administrative purposes.

The overall effect on soils and topography from new construction, and continued operation and maintenance of a water supply and distribution system in the park would be negligible and will not result in the impairment of these resources.

Water Quality and Quantity

Snowmelt and rainfall are the primary sources of water for Crater Lake itself and the springs and streams that emerge from Mt. Mazama. Annie Springs at 6000 feet elevation produces year-round flow. Water quantity is measured at the USGS gage located 0.1 mile downstream from the spring (USGS HUC 18010203, 5,982.65 NVGD29). For the 30-year period of record (water years 1978-2004, 2011-2013), the average discharge is 2.83 cubic feet per second (cfs) for an annual discharge of 2,050 acre-feet/year, adjusted for diversion from the spring. (See Appendix 1 for conversion factors between water quantities and volumes.) Maximum discharge of 18 cfs was recorded on July 6, 1984. A minimum discharge of 0.23 cfs was measured on several days in March and April 2002. In 2013, after several years of low precipitation, the maximum discharge was measured at 6.0 cfs in May, with a minimum discharge of 0.72 cfs on March 30. The highest flows generally occur from mid-June through early July from snowmelt. Minimum flows occur from mid-October through April as snowmelt declines. Several small tributaries contribute to the flow of Annie Creek below the spring.

The Crater Lake public water system is served by a single point of diversion prior to a sole surface water source at Annie Springs supplying Annie Creek. Annie Creek is a headwater tributary of the Wood River, which flows into Upper Klamath Lake via Agency Lake and is a major tributary of the Klamath River. There is high demand for water in the Klamath River Basin for residential, agricultural, commercial, and industrial uses. Water is also used to sustain fish and wildlife and for recreation.

The NPS holds federal reserved water rights for Annie Creek and its tributaries within the boundary of Crater Lake National Park dating from 1902 and 1932 for "preservation and protection of all natural and historic objects, timber and wildlife, and conservation of scenery."

Of the original 730 claims to water from the Klamath Basin, the NPS holds what is considered a senior, but not the most senior, right. The Klamath Tribes hold the most senior claims dating from "time immemorial" for certain reaches of the major tributaries to Upper Klamath Lake. The Wood River is one of those tributaries. The Tribes also hold other senior claims for lands within the boundaries of the former Klamath Indian Reservation that carry an 1864 priority date based on the 1864 Klamath Treaty. Most of the Klamath Tribes rights are "non-consumptive" and provide for in-stream retention. Therefore, those rights are not available for lease or transfer for consumptive use.

Trenching to install the water, power, and communication lines under the selected action would have very localized effects from run-off of newly disturbed soils for several years until herbaceous plants and grasses regrow in the disturbed soil. If soil disturbance has the potential for run-off into temporary water courses, mulch would be applied to reduce run-off until soils stabilize in one to two years. There are no permanent streams in the project area that would be affected by run-off from newly disturbed soils. Potential effects on water quality from leaks of petroleum and equipment fluids would be avoided as described above for soils. Impacts to water quality from construction under the selected action would be negligible and will not lead to an impairment of these resources.

Under the selected action, withdrawal from the PCT well is planned to meet the design demand of 50 gpm under intermittent withdrawal periods which will adequately provide for a 7-Day Average Maximum demand of 55,300 gpd.

Withdrawals from the PCT well will lower water levels in the area around the well and may eventually result in a reduction in groundwater discharge to surface streams. Drawdown due to pumping was estimated using an analytical model based on the Theis equation and site specific information (i.e., well logs, aquifer testing, water-quality sampling, geologic mapping, etc.). The results of the modeling indicate that the cone of depression formed by the well after pumping an average day demand (50,000 gpd) for 180 days could extend over 1 mile from the well site.

Due to the complexity of local geology and position of the well on the Pacific Crest, the magnitude, timing, and location of streamflow depletions cannot be predicted with certainty. Depletions could occur in streams in the Rogue Basin, the Klamath Basin, or both. Streamflow depletions will be attenuated by the distance between the well and points of groundwater discharge. The instantaneous depletion to all impacted streams will not exceed the pumping rate from the well and the impacts of the selected withdrawals from the PCT well on Annie Creek will be less than the impacts of diverting water directly from Annie Spring. Therefore, the selected action will not lead to an impairment of water quantity.

Vegetation

The dominant vegetation at Annie Springs is lodgepole pine (*Pinus contorta* var. *latifolia*) with some red fir (*Abies magnifica* x *procera*) and mountain hemlock (*Tsuga mertensiana*), and scattered Western white pine (*Pinus monticola*). The vegetation on the plateau west of Annie Springs is similar with lodgepole pine more abundant. The flat areas tend to be lodgepole pine-dominated, with a greater mixture of species near the riparian areas. As one proceeds upslope, vegetation transitions to mountain hemlock. Understory species include pinemat manzanita

(*Arctostaphylos nevadensis*) and long-stoloned sedge (*Carex inops* ssp. *inops*), with higher diversity of herbaceous species around the spring and the headwaters of Annie Creek. Invasive plant introductions are a documented threat to the diversity of native vegetation in the park.

Under the selected action, all construction equipment would be required to be cleaned to remove invasive plants or seeds prior to being used in the park. The vegetation that would be affected by trenching along the road shoulder in the existing highway corridor and the obliterated highway alignment is primarily regrowth of lodgepole pines, hemlocks, and red fir less than 10 feet in height. The vegetation affected by installing the water line from the obliterated highway down the slope to the tank access road includes sparse understory of shrubs such as pinemat manzanita, herbaceous species, and grasses. Under the selected action, approximately 1.1 acre of vegetation would be affected by construction of the water line and associated common utility trench from the PCT trailhead along the Highway 62 alignment to the obliterated highway alignment to connect with the existing water line at the Mazama tanks access road.

Approximately 17 lodgepole pines less than 18 inches in diameter and a sparse understory of shrubs would be removed at the PCT trailhead to replace lost parking spaces and to allow for maneuvering of stock trailers. The vegetation to be removed consists of common species that are widespread in similar habitats in the park. Lodgepole pine along the highway corridor and in developed areas like the campground are routinely cut to reduce fire hazard and for hazard tree removal in the campground.

After the water line is installed, understory vegetation would regrow; small trees would be removed to maintain the functionality of the water line. The effect on native vegetation from construction under the action alternatives is long-term from tree removal; short-term for understory species; localized in 1.1 acres; adverse; and negligible.

The effect on native vegetation from the potential for introduction of invasive plants that could be carried in on construction equipment and in soils disturbed by construction is adverse, long-term, and minor. All construction equipment is required to be cleaned to remove invasive plants or seeds prior to being used in the park. Requiring construction equipment used in the park to be free of invasive plant seeds, active revegetation of disturbed soils, and monitoring of disturbed soils and control of any invasive plants discovered would reduce the adverse effect of invasive plant introduction to negligible.

The overall effects on vegetation in the park from construction associated with the action alternatives is negligible, assuming that disturbed soils are revegetated and invasive plants are controlled. Therefore, the selected action will not lead to an impairment of vegetation.

Fish and Wildlife

The streams in the project area are naturally fishless due to their location above steep falls that are natural fish barriers. Annie Falls is a fish barrier. Eastern brook trout have been introduced in many park streams, including Annie Creek and its tributary Munson Creek. Brook trout are now present upstream of Annie Falls and in Munson Creek around HQ. Bull trout, a threatened species, is discussed below under Threatened and Endangered Species. The riparian areas along Annie Creek, including the project area, are inhabited by Cascade frogs (*Rana cascadae*), Pacific treefrogs (*Pseudacris regilla*), and western toads (*Anaxyrus boreas*). Long-toed salamanders (*Ambystoma macrodactylum*) are possibly present although no surveys have been done specifically targeting this species. Birds (resident and migratory) and mammals in the

project area include species that commonly occur in similar forest types and elevations throughout the park.

Cascade frogs breed in ponds and move out of the ponds to occupy riparian areas. There are no ponds within the project area that are suitable breeding habitat for this species. Cascade frogs inhabit riparian areas along Annie Creek in the project area. This species does not currently have any protected status but is considered sensitive because of population declines in other western national parks, such as Lassen Volcanic in northern California, and because of general concerns about documented declines of amphibian populations worldwide.

The selected action would affect approximately 1.1 ac of wildlife habitat. The habitat along the highway road shoulders is very poor quality because it is subject to noise and disturbance from vehicle traffic on the highway and the vegetation is sparse. The trees to be removed along the obliterated road cut are larger and grow more densely than the trees along Highway 62, and constitute slightly better habitat for nesting migratory birds. The Migratory Bird Treaty Act (MBTA) protects migratory birds including hawks and songbirds. Several species protected under the MBTA nest in and around the project area. Seasonal restrictions on noise and habitat disturbance to protect nesting birds is required under the action alternative. The NPS avoids impacts to birds protected under the MBTA by avoiding removal of vegetation suitable for nesting during the primary nesting season for most migratory birds (May 1– July 31).

Individuals of small sedentary animals that are unable to move away from the construction zone may be killed or displaced. Larger wildlife would move out of the construction area during heavy equipment operations.

The effect on wildlife under the action alternative would be short-term localized disturbance from noise during construction and minor; and long-term and significant for those individuals of small sedentary species that are killed or permanently displaced. The overall long-term adverse effect on wildlife would be negligible because the construction would occur in a short period of time adjacent to a heavily used highway corridor that is subject to on-going noise and disturbance from vehicle traffic. In conclusion, there will be no resulting impairment of fish or wildlife as a result of implementing the selected action.

Sensitive, Threatened and Endangered Species

There are no sensitive plants in the project area, and therefore, there would be no effects to sensitive plants from construction under the selected action.

The bull trout (*Salvelinus confluentus*) is a federally-listed threatened species that historically occurred in Annie Creek downstream of the project area. Annie Falls is a natural barrier that prevented fish from being in the creek in the project area. Other sensitive species that occur in habitats in the park similar to those in the project area and therefore could potentially be affected include northern spotted owls (*Strix occidentalis caurina*, federally listed as threatened), the gray wolf (*Canis lupus*, federally listed as endangered), and the Pacific fisher (*Pekania [=Martes] pennanti*, proposed for listing as federally threatened). The project area has been surveyed for northern spotted owl following the USFWS spotted owl monitoring protocol since 2010 and no spotted owls have been observed. The closest known location of a spotted owl as of 2014 was in the Bear Bluff Known Owl Site 2.1 miles east of the project area. The last confirmed record was a non-nesting pair that was observed in 1996. No suitable habitat for northern spotted owls (nesting, foraging) or Pacific fishers (denning, foraging) would be removed under the selected action. Noise and disturbance from construction of a water line

would occur at the existing PCT trailhead and along the highway corridor. The trailhead, highway corridor, and the abandoned road cut are affected by vehicle noise and hazard fuel reduction projects. Noise and disturbance from construction would be short-term and localized. There would be negligible short-term effects from construction noise and removal of roadside vegetation and small conifers along the abandoned highway, and negligible long-term effects on northern spotted owls and Pacific fishers from short-term noise and disturbance related to operation and maintenance of a new water distribution system.

In 2014, a gray wolf family group (2 adults, 3 pups) was documented denning outside the boundary of the park. Telemetry data of the male wolf has demonstrated that he has periodically entered the park. It is currently believed that the primary limiting factor for wolves in this region is availability of deer and elk as a food source. Ungulates are the primary food source for gray wolves. The limited amount of disturbance associated with this project will not have an effect on the deer and elk populations in the park. Therefore, this project will not affect gray wolves.

The park contains suitable habitat for wolverines and Canada lynx (federally listed as threatened) but there are no confirmed observations of these species. The rarity of these species and the on-going disturbance from human occupation of the project area make it unlikely that either species occurs in the project area.

In April 2013, the USFWS posted a 90-day finding on a petition to list two populations of Black-backed woodpeckers (*Picoides arcticus*), including the Oregon Cascades population. Black-backed woodpeckers have been documented throughout Crater Lake National Park including a pair observed in 2013 approximately 0.3 miles from the project area (Stephens 2014, Stephens et. al 2011). The black-backed woodpecker is a cavity-nesting bird that nests in late spring, with nest excavation generally occurring from May to July at Crater Lake National Park. This species is most often associated with burned areas and beetle infested areas, but does use undisturbed forest as well. Based on the availability of abundant habitat throughout the park, this project is not likely to have adverse effects on black-backed woodpeckers.

In January 2012, the USFWS posted the 90-day finding on a petition to list the Sierra Nevada red fox (*Vulpes vulpes necator*). In October 2015, the USFWS announced their determination on the listing of the Sierra Nevada red fox as threatened or endangered species. As part of the determination, the population of Sierra Nevada red fox was subdivided into two distinct population segments, one occupying southern California (Sierra Nevada population) and a second located in northern California and Oregon (Southern Cascaded population). It was the determination of the USFWS that the northern distinct population segmented, which includes the population in Crater Lake National Park, did not warrant protection under the Endangered Species Act at this time. Listing of the southern population was determined to be warranted but precluded by higher priority actions and therefore was listed as a Candidate species (USFWS 2015). Through various methods, the park has documented Sierra Nevada red fox throughout much of the southcentral and southeastern portions of the Park. The closest observations were at the Mazama campground approximately 0.3 miles from the project area. Very little is known about this species in the park but it is believed to inhabit meadows, dense mature coniferous forest, and talus slopes, and forage on small rodents and lagomorphs such as pikas and rabbits. While the project area is likely within the home range of several individuals of the Sierra Nevada red fox, the small scope of disturbance associated with this project is unlikely to have a negative effect on this species.

In considering all the potential effects to sensitive species, the limited potential for the selected action to have more than a short-term negligible impact will result in no impairment to any sensitive, threatened or endangered species.

Cultural Resources

Twelve archaeological surveys have been completed within a one-mile radius of Annie Spring since 1985, primarily in anticipation of projects involving ground disturbance. Within this area, a largely unsurveyed polygon of 86.5 acres became the focus of the most recent survey conducted in 2014. This polygon is larger than the project area because the mile around Annie Spring contains the highest concentration of prehistoric sites, historic period sites, and isolated finds so far found in Crater Lake National Park. The survey polygon of 2014 (the area of potential effects [APE] for this project) contains several historic period sites and numerous isolated finds. None of these are eligible for listing in the National Register of Historic Places, but the trenching for the waterline lies in close proximity to the Fort Klamath–Rouge River Wagon Road, a recorded historic period site previously determined eligible for listing in the National Register of Historic Places.

The APE lies adjacent to the Fort Klamath–Rouge River Wagon Road built in 1865 and used by visitors as the main approach route to Crater Lake for the following 40 years. Much of the wagon road remains evident within Crater Lake National Park and was the subject of an intensive recording project completed in 2010. Roughly one-half mile of the wagon road is adjacent to the APE and can be protected from impacts associated with project activities. The only other historic period roads within or proximate to the APE include an half-mile section of Highway 62 constructed in 1926 and abandoned in 1968, and a one-lane route through a former campground. The abandoned road section descends from the present location of Highway 62 toward Annie Spring. Material was pushed down onto the old roadbed in an attempt to hide the scar created by the cutslope. The former campground was initially constructed in 1931, but then drastically reconfigured in 1961. Tables, fireplaces, restrooms and other amenities were removed by 1971, so that this site lacks the integrity needed to make it eligible for the National Register of Historic Places.

Portions of the area located between the Annie Spring entrance station and the bridge over Annie Creek, but east and south of the Munson Valley Road served as the site of Park Headquarters between 1903 and 1924. This locality also contained visitor facilities erected by the first park concessionaire in 1907. Called “Camp Arant,” it and the first park headquarters were later subsumed by several road realignments, and the construction of ranger stations and support facilities by the National Park Service, as well as a Civilian Conservation Corps development called “Camp Annie Spring” that operated between 1934 and 1942. The CCC camp in turn gave way to construction of Mazama Campground starting in 1957, a facility that expanded over the next decade and eventually removed the need for Annie Spring Campground, located across the Munson Valley Road in the APE.

The selected action has the potential to affect the Fort Klamath–Rouge River Wagon Road which is adjacent to the area where trenching for the waterline is proposed. The wagon road would be protected from disturbance by construction fencing with on-site monitors during ground disturbance activities. The NPS archaeological survey has determined that the selected action would have not adversely affect the Wagon Road or alter the features that make it eligible for listing in the National Register of Historic Places. In a letter dated March 30, 2015 (SHPO Case No. 15-0268) the Oregon SHPO agreed with the NPS determination that no impacts to any significant cultural resources would occur as a result of the selected action, provided that

avoidance recommendations detailed in the NPS report (SHPO no. 27194) are followed. Further, there will be no impairment of cultural resources from the selected action.

In conclusion, as guided by this analysis, good science and scholarship, advice from subject matter experts and others who have relevant knowledge and experience, and the results of public involvement activities, it is the Superintendent's professional judgment that there will be no impairment of park resources and values from implementation of the selected action.