



G-6-1 Road Removal Environmental Assessment

**Redwood National Park
Humboldt County, California
February, 2020**

Estimated NPS Total Cost
Associated with Developing and
Producing this EA is \$163,000

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Introduction

Redwood National Park was established by Congress in 1968 to "preserve significant examples of the coastal redwood ... forests and the streams and seashores with which they are associated for purposes of public inspiration, enjoyment, and scientific study." (Public Law 90-545).

In 1978, Congress expanded the national park, in part "to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors." (Public Law 95-250). The expansion area included 50,000 acres of privately owned timber lands that had been logged and a road network that had been constructed to provide access to timber. Many miles of these roads were abandoned when the timber companies vacated the land and are referred to as legacy logging roads. Without regular maintenance of surfaces and drainage structures, the rate of erosion from legacy roads increases. Eventually, the roads fail and eroded sediment washes into stream courses during storm events.

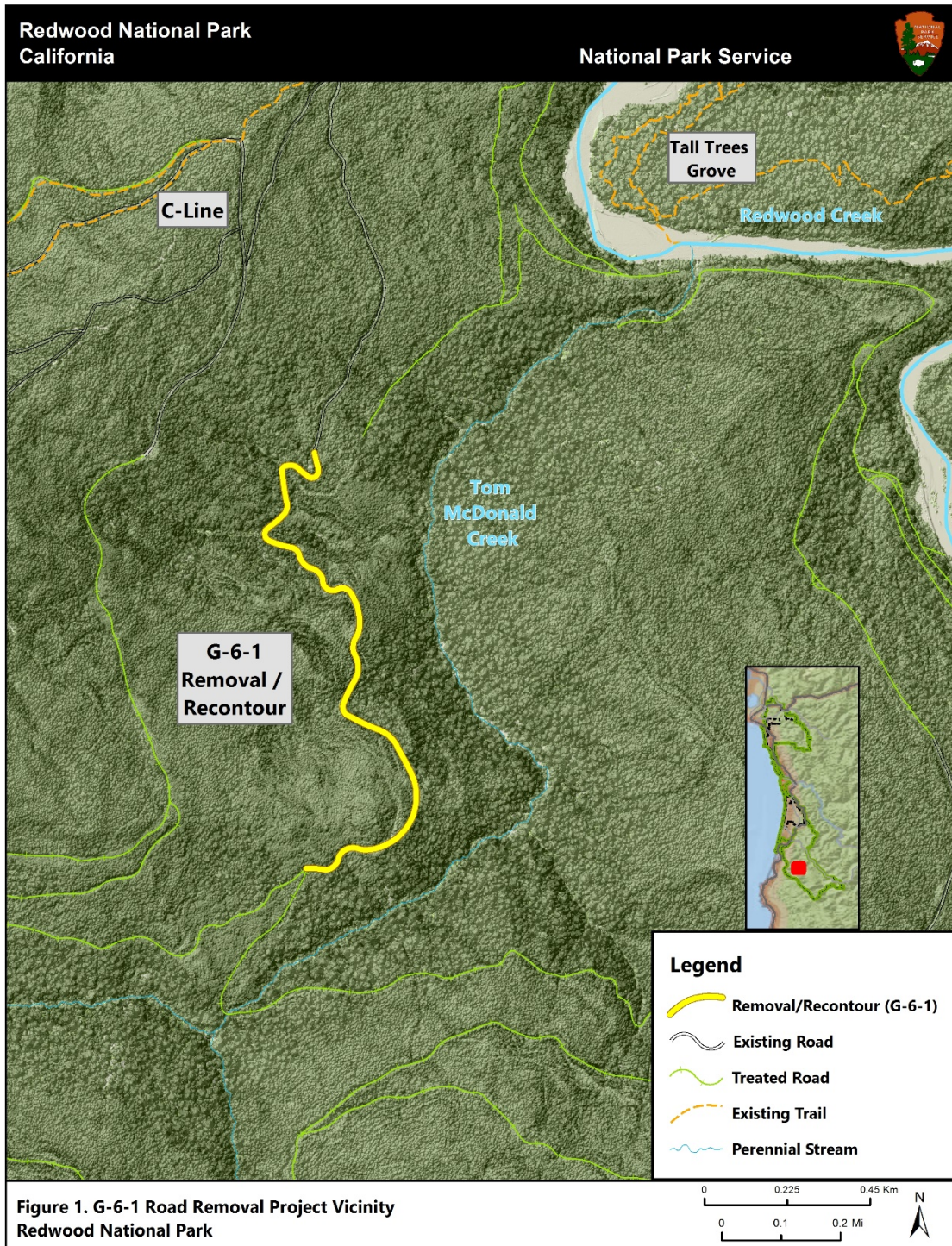
Erosion and sedimentation from legacy logging roads pose threats to water quality of streams and aquatic resources including anadromous salmonids, which require good water quality and clean gravel for spawning. The 1978 park expansion legislation directed the National Park Service (NPS) to develop and implement "a program for the rehabilitation of areas within and upstream from the park contributing significant sedimentation because of past logging disturbances and road conditions..." to protect the existing irreplaceable park resources, including redwood forests and streams. Since 1978, the NPS has implemented a program to remove legacy logging roads to protect park resources and restore watersheds that were degraded by logging and associated roads.

This environmental assessment analyzing a watershed restoration project is tiered off the Redwood National and State Parks 1999 *Final General Management Plan/General Plan, Environmental Impact Statement/Environmental Impact Report* (GMP/FEIS). Under the 1999 GMP/FEIS, watershed restoration work within the park emphasizes partial landform restoration, with complete removal of all major logging roads and limited removal of minor roads that pose the greatest threat to parks resources. The actions proposed in this EA are consistent with the GMP/FEIS direction and provides analysis specific to the rehabilitation and removal of a segment of the G-6-1 road.

The proposed action is to remove a 1 mile segment of the G-6-1 road (Figure 1). This segment of road is not needed for access for future watershed restoration or other administrative uses. The proposed road removal will not affect publicly accessible trails or other visitor services. Additional details of the proposed action are included below under alternatives.

Purpose and Need for Action

The purpose of the project is to reduce erosion and restore hydrologic function in the Tom McDonald Creek drainage where the former logging haul road called G-6-1 traverses parkland. The National Park Service needs to take this action to reduce impacts to streams and fish habitat, drainage patterns and hydrologic flowpaths from these roads. The NPS also needs to take this action to reduce the threat of sediment delivery from road crossing and failing culverts.



Compliance with Floodplains and Wetlands Executive Orders

The NPS carries out its responsibilities to manage floodplains and wetlands in compliance with Executive Orders 11988 “Floodplain Management” and 11990 “Protection of Wetlands” under procedures described in Director’s Orders #77-1 Wetland Protection and #77-2 Floodplain Management and their associated implementation manuals. The purpose of the proposed action is to remove a legacy, logging haul road and associated compromised drainage structures to protect and restore riparian habitat within Tom McDonald Creek. No floodplain or wetlands will be directly impacted by this action, therefore a floodplains and wetlands statement of findings (SOF) will not be prepared for this project.

Alternatives

This environmental assessment analyzes two alternatives, Alternative 1: No Action and Alternative 2: Proposed Action.

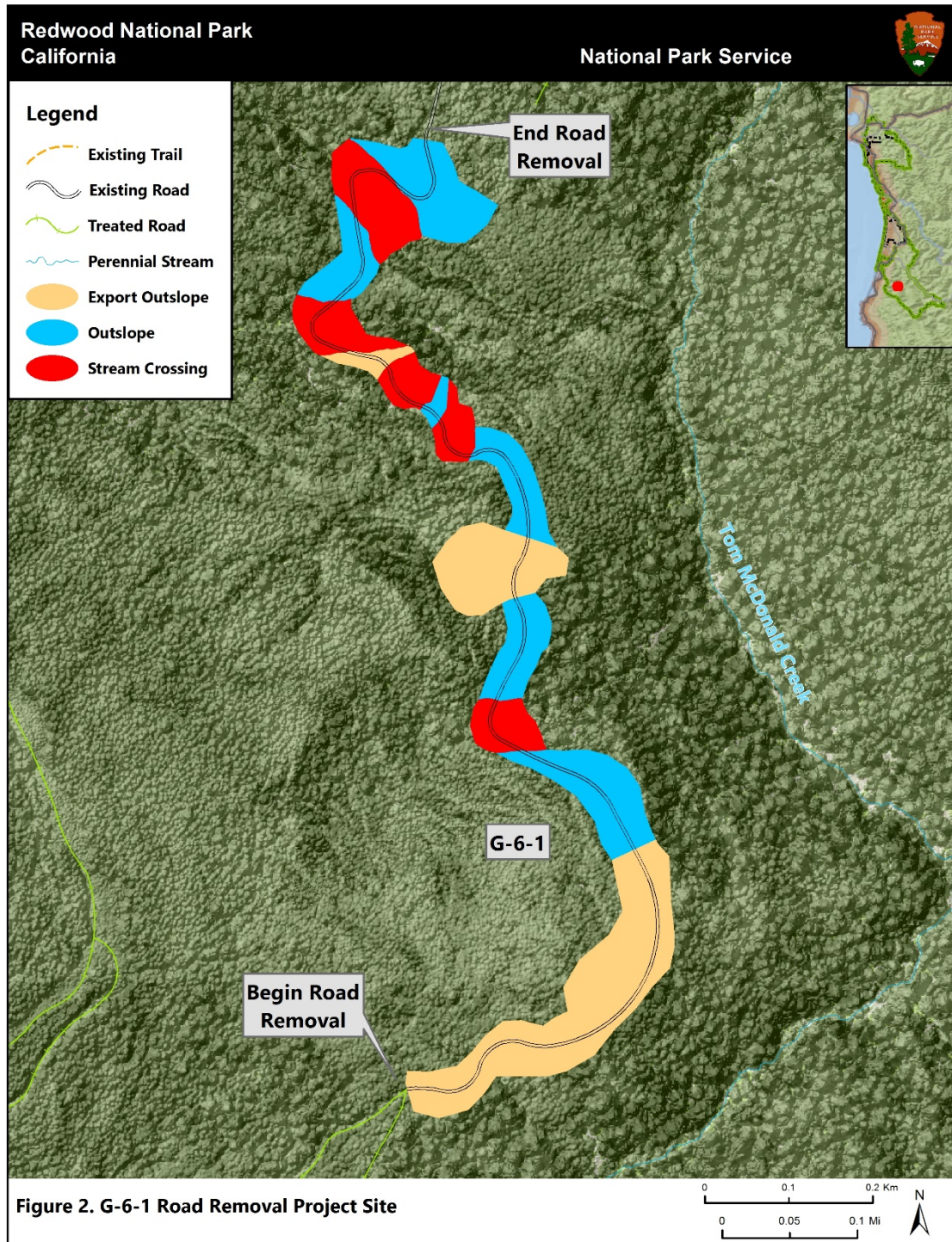
Alternative 1: No Action

Under the No Action alternative, no roads would be removed. The G-6-1 is currently not used by NPS staff or the public. Road surface and drainage structures would receive maintenance only if funding was available after all other higher priority assets were brought into good condition. When culverts fail, they would be replaced if funding and heavy equipment access are available. It is unlikely that funding would be available for maintenance or removal of this segment of road, culvert replacement, or other drainage improvement, because of its low ranking on park facility management priorities.

Alternative 2 (Proposed Action): G-6-1 Road Removal

Under the Proposed Action, one mile of the G-6-1 road would be removed, and the original topography and drainage pattern restored to the extent practicable (Figure 2). Approximately 42,500 cubic yards (cy) of earthen fill material would be excavated from legacy roads, stream crossings, swales, and unstable slopes during road removal. About 25.4 acres would be affected by excavation and placement of excavated soil (Table 1). All work described below would occur between August 1 and October 15, and daily limited operating periods for heavy equipment and vehicle access and operation would be implemented between February 15 and September 15.

Road removal entails removing fill from stream channels, excavating sidecast fill material, and restoring natural hillslope topography and drainage patterns to reduce the potential for sediment to erode and be deposited in streams. Landforms that existed prior to road construction would be recreated to the extent feasible. Stream crossings would be excavated as closely and as practicable to original width, depth, and slope to expose the natural channel gravels and uncover buried soils on original stream valley side slopes. During excavation the elevation of the original channel can be identified by the uncovering of stream gravels and woody material.



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Material excavated from the stream channels would be placed in stable locations away from drainage channels and streams. Road reaches between stream crossings would be treated by excavating road fill from the outboard side of the road. Buried redwood stumps would be used to help define the original slope. Excavated material would be placed against the cut bank to create an outsloped edge (OS) to allow water to drain. Where the road bench or slopes are potentially unstable, excavated outslope material would be exported to stable locations where material would not have the potential to fail (EOS). All excavated material would be shaped to blend with the surrounding topography to reestablish natural landforms and drainage patterns. The original topsoil and channel beneath road fill that is exposed during excavation are left intact. Large wood debris uncovered during the excavation is placed in the restored channel and on the side slopes to minimize sediment transport and to increase habitat complexity.

A total volume of about 42,500 cy of fill would be excavated and placed in stable locations for all activities. An estimated 25,800 cy of fill from crossings and approximately 16,700 cy of fill from road reaches between stream crossings would be excavated. In total, the road removal would prevent approximately 24,290 cy of sediment from eroding and being delivered to streams, including 19,350 cy from stream crossings and 4,940 cy from road reaches.

Approximately 25.4 acres of second growth forest growing in the road corridor and cut and fill slopes would be disturbed for road removal. About 7.0 acres are within 100 feet of streams that are presently buried by road fill or impounded sediment upstream of stream crossings.

Table 1—Treatments of the G-6-1 road (Proposed Action)¹

G-6-1 Complete Road Removal Reach	
Length of road completely removed (linear feet)	5,280
Stream Crossings	
Crossings removed	5
Stream crossing fill volume to excavate on G-6-1 road removal reach	25,800
Sediment volume prevented from eroding and delivered to stream channels	19,350
Road reaches between stream crossings	
Road length removed and recontoured (linear feet)	4,800
Road fill volume to excavate EOS ² = 9,450; OS ³ = 7,275	16,700
Sediment volume that would be prevented from eroding and prevented from transport downslope EOS = 3,120; OS = 1,820	4,940
Sediment volume from stream crossing and road reaches prevented from eroding	24,290
Total volume of sediment excavated	42,500

¹ Volumes in cubic yards (cy)

² EOS = Export Outslope

³ OS = Outslope

Vegetation to be removed is shrubby understory and second growth forest that has regrown in and around the road corridor. Vegetation is composed of native tree species including redwood, Douglas fir and true firs, alder, tan oak, and a shrubby understory. Bare areas would be mulched with stockpiled vegetation as well as supplemented with other locally obtained mulch, as needed. Topsoil recovered from excavation contains a seed bank of local native plants. Repositioning the topsoil, mulching with local native plant materials, combined with cool mesic conditions encourages natural revegetation and avoids the need for purchasing or growing plants, importing vegetation from elsewhere in the park, and manual replanting.

Detailed descriptions of road removal treatment are also found in the Biological Assessments submitted to NMFS (NPS 2016) and the USFWS (NPS 2017a).

Environmental Consequences

This section examines the effects of the alternatives for removal of the G-6-1 road. The preamble to the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA states that an agency “may contrast the impacts of the proposed action and alternatives with the current and expected future conditions of the affected environment in the absence of the action, which constitutes consideration of a No Action alternative” (85 FR 43304, at 43323). Under the No Action alternative (Alternative A), no road removal would occur. Implementation of the No Action alternative would result in continued threats of catastrophic road failure with resulting sediment input into Tom McDonald Creek and potentially Redwood Creek. The information in this section captures all impacts on park resources that would occur under the No Action and Action alternatives. Effects are determined by comparing the current to other past, present, and reasonably foreseeable actions related to the alternatives and to the resources in the parks and the region.

Air Quality and Climate

In general, air quality in Redwood National Park and the surrounding area meets or exceeds standards set by the US Environmental Protection Agency (EPA). The prevailing winds come from the northwest across the ocean where there are no emission sources. Air quality returns quickly to very good to excellent condition after vehicles and equipment cease operating.

Sources of air pollution in or near the park are constant and would continue including emissions generated by vehicles using public roads and highways that pass through the park, emissions from wood stoves, and dust from vehicles on unsurfaced roads in and adjacent to the park. State air quality standards outside the project area are rarely violated by these sources.

Smoke from prescribed and wildland fires in and around the park is temporary and generally localized. However, large wildland fires can create unhealthy air quality that persists for several weeks, particularly in the Klamath and Trinity River valleys east of the parks and the Smith River valley to the north. Wildland fires typically occur during late summer and early fall, prior to the onset of the rainy season. Prescribed burns are conducted under permit from the North Coast Regional Air Quality Control Board, which monitors air quality to ensure that air quality is protected. The primary source of air pollution in the vicinity of the project area is smoke from wildfires and prescribed burns, which are temporary. State air quality standards in the project

area are rarely violated by other sources such as vehicle emissions, smoke from woodstoves and residential burn piles, and dust from unpaved roads.

Alternative 1 (No Action) - Current and expected future conditions of the environment

Under this alternative, there would be no dust generated or emissions from vehicles and heavy equipment used for restoration.

Alternative 2 (Proposed Action)

Under the proposed action, there would be emissions from vehicles, heavy equipment, and gas-powered tools. Vehicle and equipment emissions would meet air quality standards required for operation in California. The emissions from this alternative would be localized, temporary, and negligible.

Conclusions: Effects on Air Quality

Emissions and dust would be localized, temporary while work is performed, and repeated for the duration of the project. Emissions from vehicles and from gas-powered tools would be negligible, provided the vehicles and tools are in good working order.

The overall effect on air quality would be adverse and temporary because no significant air quality related values would be affected outside the immediate area where work is being conducted and the dust would be a temporary condition.

The proposed action would not have long-term or widespread adverse effects on air quality or air quality related values in the parks. Therefore, the adverse effect on air quality and air quality-related values would be negligible under the proposed action.

Topography and Soils

The topography of project area is characterized by gently sloping stable ridges that quickly transition to steep slopes and narrow confined canyons. Elevations in the project area range from about 500 to 1100 feet above sea level. The geomorphic features and the processes acting within the project area are a direct result of the tectonic activity and faulting, high rainfall, and disturbance by intensive logging and road building activities.

Topography and soils in the Redwood Creek basin is heavily impacted from road construction associated with logging and ranching prior to park establishment and expansion. Road failures associated with unmaintained legacy roads are widespread and adverse over about 50,000 acres. These effects have persisted over more than 60 years since logging occurred, and in many cases worsened as legacy roads failed. These effects are gradually being reduced as watershed restoration and road removal projects are undertaken, as vegetation reestablishes, and as soils recover (NPS 2006a, 2007a, 2009c, 2010a).

The topography and soils of the project area were shaped by road construction associated with logging prior to park establishment and expansion. Topography in the project area was altered by construction of the roads, and by road-related landslides and slumps. Poor road construction standards and design features, coupled with lack of attention has created conditions where mass movement of unstable crossings and slopes originating from project roads can be expected.

Soils in the project area were altered by tractor logging and road construction prior to park establishment that resulted in erosion of bare soils, alteration of soil horizons, and interruption of soil formation processes. Soils in the project area disturbed by road construction and tractor logging are recovering after 60 years post logging, although original soil horizons have been moved into new positions from excavations to construct the roads.

Alternative 1 (No Action) - Current and expected future conditions of the environment

Under the No Action alternative, current impacts and trends to topography and soils would continue. Soils would continue to degrade until the erosion potential is eliminated. Soil development would be set back in any location where large landslides occur.

The G-6-1 road with its failing culverts would continue to degrade and eventually fail. Failure of the road fill prism would cause moderate to significant damage to topography and soils, depending on the magnitude of the failure. Likewise, fluvial erosion processes associated with disrupted hydrology due road construction would continue to enlarge gullies and promote mass movement of unstable slopes.

Alternative 2 (Proposed Action)

Removing 1.0 mile of road would reduce the potential for road failures and fluvial erosion that adversely affect soils and topography. The removal would restore the topography to resemble original conditions.

Approximately 42,500 cy of earthen fill material would be excavated along slopes, swales, and stream crossings for road removal. The estimated area of disturbance is about 25.4 acres in total. Approximately 24,290 cy of sediment from stream crossing and road segments will be saved from entering aquatic habitat from road removal activities. Depth of excavation varies by site, depending on the depth of the original natural (pre-road) ground surface along a slope, swale, or stream crossing. Overall, this alternative would have short term, localized, adverse impact on topography and soils but these effects would be minor because they are occurring on previously disturbed lands.

Project description detailing the actions proposed to prevent surface soil loss from project activity is provided on pages 5 through 8 of this EA, and is further discussed in Biological Assessments submitted to NMFS (NPS 2016) and the USFWS (NPS 2017a).

Conclusions: Effects on Topography and Soils

Under the proposed action, road removal would have short-term localized adverse effects on soils from excavation of 42,500 cy over 25.4 acres. These effects are minor because the soils are previously disturbed. Long-term effects on soils and topography from removing road segments would be beneficial throughout the project area by reducing erosion and the likelihood of road failures that cause landslides, and by recovering and repositioning topsoil to speed regrowth of vegetation. Removing 1 mile of road and restoring the original landform would be a long-term benefit to topography in the former road corridor. In conclusion, compared to the no action, the proposed action would improve topography and soil conditions over the long term, while resulting in some temporary adverse impacts.

Hydrology and Water Quality

Redwood Creek and tributaries in the basin have been identified as temperature- and sediment-impaired by the U.S. Environmental Protection Agency (EPA). In 1998, EPA Region 9 established a Total Maximum Daily Load (TMDL) for sediment for Redwood Creek under Section 303(d)(1)(A) of the Clean Water Act, which requires that “Each State shall identify those waters within its boundaries for which the effluent limitations...are not stringent enough to implement any water quality standard applicable to such waters.”

The Redwood Creek TMDL is used as a reference to ensure that watershed restoration in tributaries is consistent with the recommendations of the TMDL to protect the beneficial uses of Redwood Creek, particularly the cold water fishery. The Redwood Creek TMDL is primarily concerned with the conditions on the mainstem of Redwood Creek that result from the effects of land use and natural conditions on the mainstem and all the tributaries. The proposed removal of the G-6-1 is fully consistent with the recommendations in the Redwood Creek TMDL.

Hydrology and water quality in Redwood Creek and tributaries, including the streams in the project area, were affected by road construction, clear-cut logging, and subsequent erosion and sedimentation. These effects were widespread, adverse, and significant over about 50,000 acres of what is now park and occurred between the 1950s and 1978 park expansion. These effects are gradually being reduced as watershed restoration and road removal projects are completed within the park (NPS 2006a, 2007a, 2009c, 2010a), and as forest practices on private timberlands upstream of the park incorporate more effective erosion control and water quality protection measures.

Alternative 1 (No Action) - Current and expected future conditions of the environment

Untreated legacy roads would continue to erode, with short-term and long-term adverse effects, depending on frequency, magnitude, and duration of storm events. These effects would accelerate over the long-term as unmaintained roads age. This alternative would not meet the intent of the 1978 park expansion legislation or achieve the goals of the Redwood Creek Total Maximum Daily Loads (TMDL) to reduce sediment sources that have in the past or are presently impacting the stream system and to implement associated reductions necessary to attain the numeric targets of the TMDL.

Hydrology and drainage patterns would continue to be altered by the presence of legacy roads across the slope and by inadequate drainage structures. Disrupted surface hydrology would continue to promote erosion and sediment delivery to streams, degrading water quality and critical habitat.

Alternative 2 (Proposed Action)

Removing 25,800 cy of fill from 5 stream crossings would prevent an estimated 19,350 cy of sediment from eroding and entering Tom McDonald Creek, and eventually Redwood Creek. Excavating approximately 16,725 cy of fill for removal of 4,800 linear feet of road reach between stream crossings would prevent an additional 4,940 cy of sediment from eroding into Tom McDonald Creek. All told 24,290 cy of fill from road removal activities would be prevented from eroding and potentially entering streams or being transported downslope in

landslides. The proposed removal of the G-6-1 is fully consistent with the recommendations to reduce sediment input into the creek as recommended in the Redwood Creek TMDL. Table 2 summarizes the crossing excavations in relation to channel length, riparian disturbance area, and distance to the mainstem of Tom McDonald Creek.

Best Management Practices would minimize short-term impacts to water quality from bare surfaces created during road removal. Some of these BMPs include mulching bare areas with stockpiled vegetation as well as supplemented with other locally obtained mulch, and in excavated channels large wood debris uncovered during the excavation would be placed in the restored channel and on the side slopes to minimize sediment transport. BMPs to protect water quality are described more fully in the project description in this EA and in detail in the BA (and references) submitted to NOAA Fisheries (NPS 2016) and summarized in the NOAA Fisheries letter of concurrent (NOAA 2016).

Table 2. Stream crossing excavations on the G-6-1 road removal reach (south to north)

Stream crossing ID no.	Excavation volume (cy)	Disturbance area within 100 ft either side of stream (ac)	Channel excavation length (ft)	Channel distance to mainstem ¹ (ft)
4	3,900	1.1	260	940
8	4,360	0.8	300	1,130
10	4,500	0.8	200	1,160
12	9,690	1.3	280	1,430
14	3,350	2.1	470	1,280
Totals	25,800	6.1	1,510	[NA]

¹ Distance to Tom McDonald Creek mainstem.

Conclusions: Effects on Hydrology and Water Quality

Under the Proposed Action, although small in size and scope, restoration would nevertheless contribute to the lasting improvement in natural hydrologic functioning and water quality in the Tom McDonald Creek watershed from past park restoration efforts in the basin that has reduced road failures and delivery of sediment to streams. The beneficial effect along the 1.0 mile of road and stream crossings that would be completely removed is permanent. Sediment, however, will continue to erode into the mainstem of Redwood Creek from other untreated legacy roads that are in and upstream of the park in the larger Redwood Creek basin. Fine sediment stored in the mainstem Redwood Creek channel is slowly migrating downstream and this will continue to compromise Redwood Creek's water quality until it exits the system. The proposed removal of the G-6-1 is fully consistent with the recommendations in the Redwood Creek TMDL to reduce sediment input into Redwood Creek and its tributaries.

Floodplains and Wetlands

Within the project footprint there are no wetlands or floodplains. The project has degraded riparian habitat where crossings have been built and vegetation removed to create the road prism. At these drainage crossings, culverts are failing, threatening delivery of sediment to important aquatic resources downslope in Redwood Creek.

From a wider perspective, upstream of the park boundary, new roads are being constructed to current standards under the State of California's Forest Practice Rules. This affords greater, lasting protection to the aquatic resources of Redwood Creek, which continues to recover from the effects of widespread logging and poorly constructed roads, combined with episodic large damaging floods.

Existing damage and degradation to aquatic resources in Redwood Creek, are gradually diminishing as riparian areas recover from the disturbance of the pre and early park era, and as watershed restoration projects, inside and outside the park, are undertaken to address the chronic threat of poorly constructed, legacy logging roads. The floodplain of Redwood Creek was severely damaged by erosion and sedimentation from logging and road-related erosion, in combination with major floods, especially in 1955, 1964, and 1975. The interaction between the floodplain and channel is improving as legacy sediment continues to move downstream during storm events and flush out of the system.

Alternative 1 (No Action) - Current and expected future conditions of the environment

There would be no adverse effects on floodplains or wetlands under the No Action alternative as there are none on-site. Small intermittent stream channels in the project area have steep gradients and do not have floodplains or wetlands. Landslides originating from this road would continue to threaten the mainstem of Redwood Creek, downslope of the project site.

Alternative 2 (Proposed Action)

There would be no adverse effects on floodplains or wetlands under the Proposed Action alternative as there are none on-site. Small intermittent stream channels in the project area have steep gradients and do not have floodplains or wetlands. There would be short-term negligible adverse effect on about 7 acres of riparian vegetation, along both sides of intermittent streams crossing the G-6-1 road, by project activities. There would be long-term beneficial impact to riparian vegetation as removal of the road will allow growth and development of the riparian zone after removal of crossings that prevent their occurrence. The long-term benefit to park resources outside the project footprint would be the reduction in threat from sediment deliver to downslope floodplain resources on the mainstem of Redwood Creek.

The project description detailing BMPs to protect the action area are provided on pages 5 through 8 of this EA, and is further discussed in Biological Assessments submitted to NMFS (NPS 2016) and the USFWS (NPS 2017a).

Conclusions: Effects on Floodplains and Wetlands

This project would have no effect on floodplains and wetlands, as none exist on-site. Overall there would be long-term benefit to riparian habitat, as removal of the road would allow for recovery of riparian vegetation at crossings where none currently exist. The longer-term and wider benefit of the project will occur outside of the project footprint, and relies on the effectiveness of this action at preventing erosion from landslides that could bury the floodplain and wetlands on the mainstem of Redwood Creek.

Vegetation

The proposed project is within second growth forests. The Tom McDonald Creek watershed was managed for timber production until park expansion in 1978. Various portions of Tom McDonald Creek watershed was logged between 1954 and 1976. The most recent timber harvest in the project area occurred in the early 1960s. Vegetation growing on the road and cut or fill slopes consists of an understory component of fern, huckleberry, salmonberry, elderberry, cascara, and an overstory of alder, tan oak and conifers including redwood, hemlock, Douglas fir and true firs.

Significant adverse effects on vegetation, including old growth redwood forests, in what is now Redwood National Park resulted from intensive widespread logging prior to park establishment and expansion. These effects are gradually being reduced through active forest management, primarily thinning in the Mill Creek, Lost Man Creek, Streelaw Creek, and Prairie Creek watersheds of the park. There is no active forest management in the Tom McDonald Creek watershed.

In the unlikely event of a wildfire in the project area, the 2020 Fire Management Plan calls for immediate suppression. Prescribed fire in the park is used primarily to maintain grasslands and oak woodlands in the Bald Hills and would not affect the project area. The NPS actively manages invasive plants throughout Redwood National Park to protect native plant species and native ecosystems, especially in the Bald Hills area of the national park and the ocean dunes along the beaches.

Sudden Oak Death occurs in the park in the Redwood Creek watershed and is spread by windborne spores. The infestation can have potentially serious consequences on tanoak resources in the park. Tanoak is an important food source for a variety of birds and mammals, as well as providing structural habitat for wildlife and arthropods. Loss or decline of this keystone species would have indirect impact on other species at all trophic levels as tanoak has no replacement in the assemblage of tree species that typically occur in the redwood forests of Redwood National Park. Tanoak is also an important traditional food resource, considered sacred by Native peoples. Tanoak extirpation, whether localized or otherwise, could represent a major cultural impact to American Indians whose ancestral territory is in what is now Redwood National Park.

Alternative 1 (No Action)- Current and expected future conditions of the environment

There would be no effect on vegetation from road removal under the No Action alternative. As the road continues to deteriorate without maintenance, failures have the potential to cause landslides that would topple or bury vegetation. The intensity of impact on vegetation from these landslides would vary from negligible to severe, depending on the volume and surficial area of the landslide.

Alternative 2 (Proposed Action)

The proposed project is within second growth forest. The old growth forest is located adjacent to the lower slope on the southern section of the G-6-1; no old growth or large mature trees would be removed under the proposed action.

Approximately 25.4 acres of second growth trees on cut and fill slopes would be removed to restore the landform along 1.0 mile of the G-6-1 road to be removed. Vegetation to be removed consists of an understory component of fern, huckleberry, salmonberry, elderberry, cascara, and an overstory of alder, tan oak and conifers including redwood, hemlock, Douglas fir and true firs, growing on road tread, fill slopes, and cut banks (NPS 2017). After removal of the road, vegetation would regrow on about 20.5 acres of the restored landform immediately. Alders would be the first tree species to recolonize the restored area, followed by conifers. The shrub layer will respond with significant cover in the first couple years.

Park contracts for restoration work require removal of all vegetative matter or mud from the undercarriage or tracks of vehicles and equipment to prevent transmission of invasive plants or pathogens, especially the pathogens (*Phytophthora* spp.) that cause Port-Orford-cedar root disease and Sudden Oak Death (SOD). Vehicles or equipment that travel through or from infected areas in California or Oregon during project implementation would be cleaned before entering the park.

Conclusions: Effects on Vegetation

Removal of 25.4 acres of vegetation under the proposed action would be a short-term localized adverse effect lasting only a few years as revegetation occurs rapidly. Removal of vegetation associated with the proposed action would not impact any rare vegetation types. All vegetation affected is common in the park and the region. Therefore, the proposed action is not expected to have any meaningful impact on vegetation communities in the park or even the project area. No old growth trees would be removed. Trees to be removed have regrown after logging and road construction ceased in the 1960s and 1970s. The short-term impacts of vegetation removal would be negligible in the context of existing park vegetation and revegetation is expected to occur immediately. Vegetation would regrow on about 20.5 acres where the G-6-1 is removed resulting in minor but long-term benefits.

Fish and Wildlife

The project area contains suitable habitat for torrent salamander (*Rhyacotriton variegatus*), coastal giant salamander, ensatina, and coastal tailed frog. Bird species confirmed in the project area include marbled murrelet, band-tailed pigeon, northern pygmy owl, pileated woodpecker, hairy woodpecker, Pacific-slope flycatcher, chestnut-backed chickadee, Steller's jay, common raven, wrentit, brown creeper, Pacific wren, varied thrush, hermit thrush, Swainson's thrush, golden-crowned kinglet, ruby-crowned kinglet, Hutton's vireo, Wilson's warbler, red crossbill, fox sparrow, and song sparrow. Mammals likely to occupy the project area include gray fox, mountain lion, black bear, bobcat, coyote, long-tailed weasel, raccoon, striped skunk, chipmunk, Douglas squirrel, brush rabbit, woodrat, flying squirrel, vole, shrew, deer mouse, and several species of bats.

The logging that occurred in the project area prior to park establishment and expansion had significant adverse effects on certain terrestrial and aquatic species of wildlife. Small terrestrial species that are less mobile were directly affected by logging. More mobile wildlife species were indirectly affected by widespread loss of forest habitat. Aquatic species were directly affected where stream channels were blocked with Humboldt crossings and by sedimentation of streams from landslides and erosion from bare slopes, and indirectly affected by loss of shade after the

forest canopy was removed, which caused the stream temperature to increase. The adverse effects of sedimentation continued after forest vegetation regrew. Several species that suffered major population declines from loss of forest habitat due to logging throughout their range were listed as threatened under the federal or California endangered species acts.

Alternative 1 (No Action) - Current and expected future conditions of the environment

There would be no new construction-related effects to fish and wildlife. Roads and drainage structures would continue to age, erode, and eventually fail. Erosion from unmaintained roads and drainage structures would continue to threaten aquatic species.

Alternative 2 (Proposed Action):

The proposed project would be implemented during the driest part of the year (August through mid-October). By this time, nesting migratory birds have fledged, and there are no dens in the project area. The project is expected to have short-term localized effects on wildlife from noise and disturbance from heavy equipment during construction. Some individuals of small, less mobile species such as invertebrates, amphibians, and small mammals would be displaced, or killed by heavy equipment. These species are common and widespread throughout the park and the region. Larger more mobile wildlife would move out of the construction area during the day. Following construction activities, these species would repopulate areas disturbed by construction.

Conclusions: Effects on Fish and Wildlife

There would be short-term localized adverse effects on some aquatic species where stream crossings are excavated; excavations would occur during periods of low flow or when the intermittent streams are not flowing. There would be short-term adverse effects on wildlife from noise and vegetation removal in construction areas. Some individuals of aquatic species and small wildlife that are common in the area would be killed by heavy equipment. Wildlife would move back into the area following construction. The effects on wildlife are negligible over the long-term.

Rare, Threatened, and Endangered Species

Three species of anadromous salmonids and two birds listed as threatened or endangered are addressed in the biological assessments submitted to USFWS and NMFS. For detailed information on life history, habitat requirements, status, and designated critical habitat for these species, refer to the biological assessments and reference document prepared by the NPS (NPS 2013, 2015, 2016, 2017a) and biological opinions or letters of concurrence (NMFS 2015, 2016; USFWS 2017). Additionally the recently listed Humboldt marten is considered in this impact analysis.

Listed threatened fish and wildlife species have been and are continuing to be impacted by land use activities that have occurred throughout the region for over 100 years, including timber harvesting and associated road construction, development, farming, ranching, and water diversions. More generally, threatened fish populations have also been affected by dams on streams and rivers outside park boundaries. Activities that have taken place throughout the ranges of fish and wildlife species have resulted in population declines and listing of species

under the Endangered Species Act of 1973, as amended (ESA). Impacts of the activities on species resulting in listing under the ESA are considered adverse, wide-spread, and significant.

Road removal projects in the park would continue to have long-term benefits to threatened fish and fish habitat from reducing the potential for sediment delivery into aquatic ecosystems caused by failure of roads and drainage structures.

For listed bird species, the NPS reported incidental take of marbled murrelets and northern spotted owls authorized by the USFWS for park programs and activities conducted in 2016, including annual maintenance of facilities, roads, and trails, and visitor use of campgrounds, trails, picnic areas, and trailheads. Approximately 3,271 acres of potentially occupied suitable marbled murrelet habitat at or within 500 feet to 0.25 mile, depending on the loudness of the noise source emanating from project activities, were potentially impacted by noise disturbance. Approximately 10,544 acres of suitable marbled murrelet habitat were subjected to an increased predation threat due to project activities and/or park visitor use. Approximately 2,214 acres of unsurveyed spotted owl habitat at or within 500 feet to 0.25 miles, depending on the decibel rating of the noise source emanating from project activities, were potentially impacted by noise disturbance.

The NPS has partnered with the USFWS and Yurok Tribe to reintroduce California condors (*Gymnogyps californianus*) in the Bald Hills region of Redwood National Park. The proposed action has the potential to result in improved conditions for the California condor. Foraging areas for condors are in open grasslands, beaches, and smaller meadows, and can be far from primary nesting sites, requiring substantial daily commutes. Roosting is an important behavior and habitat need requiring certain sized trees conducive to landing and alighting. These roosting areas allow condors to rest in between flights. Condors nest mainly in natural cavities or caves in cliffs, although they use trees, such as coast redwood, when available. As the reintroduction project increases the number of condors locally, there is the possibility they may utilize redwood trees in greater numbers. Projects restoring native redwood forest conditions would favor and benefit condors long-term.

Alternative 1 (No Action)- Current and expected future conditions of the environment

There would be no construction-related effects on fish or wildlife species listed as threatened, or other special status fish and wildlife species. The No Action alternative would not provide protection for threatened salmon and steelhead, because the roads and culverts would continue to degrade without maintenance and would eventually deliver sediment to reaches of the stream where listed fish are present. Eventual failure of the roadbed could cause moderate damage to fish habitat downstream of the project area, if the failure is large enough to deliver large volumes of sediment.

Alternative 2 (Proposed Action)

The proposed action would take place within the Tom McDonald Creek watershed. The proposed action would not affect fish or their designated critical habitat in other tributaries of Redwood Creek or in the main channel of Redwood Creek upstream of Tom McDonald Creek.

Fish

Effects on listed fish and their designated critical habitat from the proposed action are described in detail in the BA submitted to NMFS (NPS 2016). NMFS issued a Letter of Concurrence (NMFS 2016) that summarizes impacts and mitigation measures.

NMFS concurred with the NPS determination that the proposed action may affect but is not likely to adversely affect Southern Oregon/Northern California Coast coho salmon, California Coastal Chinook salmon, or Northern California steelhead by producing small, temporary pulses in suspended sediment from excavation in stream channels, or by input of petroleum products from heavy equipment or power tools into stream courses.

To reduce potential adverse effects on fish and fish habitat, the project would be conducted during late summer/early fall during low-flow periods when dry weather is expected. Exposed soils would be mulched with local vegetation removed as part of the project. Large woody debris would be placed in stream crossing excavations to minimize erosion and create structural elements needed to re-establish natural channel morphology. Minimization measures and BMPs would be implemented to reduce the likelihood of petroleum products entering stream courses.

Wildlife

Effects on marbled murrelets and northern spotted owls are described in detail in the BA submitted to the USFWS (NPS 2017a). No critical habitat for either northern spotted owls or marbled murrelets would be affected.

Marbled murrelets would be subject to elevated levels of noise on 286.4 acres of nesting habitat from heavy equipment operation and vehicle access during the breeding season. Noise would be mitigated through timing of work, including implementation of daily limited operating periods between February 15 and September 15 to reduce noise during dawn and dusk when murrelets arrive and depart from nests, including the move-in of heavy equipment to the site. Although the breeding season ends September 15, the proposed start date for this project would be August 1 in order to complete the project in one year rather than two years, to shorten the overall time that murrelets would be affected. Corvids, especially Steller's jays, are the primary nest predators on murrelets. Jays are more abundant along forest edges bordered by early seral vegetation. Removal of vegetation for road removal would increase edge habitat favored by jays. The lack of marbled murrelet nesting habitat in close proximity, however, to the project is expected to minimize corvid activity and reduce the potential for nest predation. No murrelet habitat would be removed. The USFWS authorized incidental take of marbled murrelets in the form of noise disturbance to an incubating adult and subsequent harm to eggs or chicks on 286.4 acres of murrelet nesting habitat under the proposed action.

Effects on northern spotted owls would result from slight degradation of suitable nesting, roosting, and foraging habitat. Approximately 25.4 acres of second growth forest and understory vegetation would be affected by the proposed action. The second growth is mostly 50 years old with an understory of shrubs, small alder trees, and herbaceous vegetation. An insignificant amount (2.85 acres) of spotted owl habitat would be removed. Woody debris salvaged from the project would be spread as mulch on newly disturbed soils, providing habitat for small mammals

on which owls forage. The project area would be monitored for owls using bioacoustical equipment. Any owl detections would trigger additional surveys. Project-generated noise above ambient levels would occur outside the owl breeding season.

For the Humboldt marten (*Martes caurina humboldtensis*) the proposed action would have no negative effects because of the location, date of project implementation (after August 1st), and road removal implementation will be completed within one season. Martens have currently only been found within the Prairie Creek watershed, approximately 10 miles from the project area. The likelihood of a marten being present at the project site in the next two years is extremely low. The project will commence after marten kits have become highly mobile and kits and females have left maternal dens (the period when they are most sensitive to disturbance or harm). Additionally, all the road work is occurring outside of or immediately adjacent to old growth (but not within), meaning no denning habitat will be removed or altered. The proposed action therefore will result in long-term net benefit to the Humboldt marten, as threats to downslope old growth forests are reduced and the recovery of redwood forests on the former G-6-1 road is set in motion.

For California condors, the proposed action, would result in a net benefit to condors long-term, by reducing threats to old growth redwoods trees downhill of the project site and restoring optimum conditions for recovery of old growth redwood forests on the former road prism.

Conclusions: Effects on Rare, Threatened, and Endangered Species

Based on the work period timing, implementation methods, and the use of BMPs and minimization measures to protect aquatic habitat, the proposed action may affect but is not likely to adversely affect listed fish. NMFS concluded that the adverse effects on salmonids from a temporary increase in turbidity are negligible; and that the potential for input of petroleum products into stream channels is very low and that the potential for impacts to any life stage of salmonid is discountable. The long-term impacts to listed fish from the proposed action are beneficial and minor within the Tom McDonald Creek watershed where work would be undertaken, beneficial and negligible within Redwood Creek proper.

For marbled murrelets, effects from noise disturbance under the proposed action are adverse, short-term during construction, and moderate. The USFWS authorized incidental take of marbled murrelets due to noise disturbance on 286.4 acres of murrelet habitat. Noise effects would be mitigated through implementation of daily limited operating periods and beginning construction on August 1 in order to complete the construction in a single season, rather than two seasons. Effects on murrelets from increased threat of corvid predation and habitat degradation are adverse, long-term, and negligible.

The proposed action may affect but is not likely to adversely affect northern spotted owls directly over the long term. There is a slight possibility of nesting owls going undetected and there will be minor amount of habitat degradation from removal of trees along the G-6-1 road segment to be removed (25.4 acres). The effects of habitat degradation are adverse, short-term, and negligible in the project area during construction and in the long-term the effects are negligible compared to the amount of suitable habitat throughout the park.

The proposed alternative would not affect martens or condors. There may be longer term benefits to condors as forest conditions are restored on the former road prism leading to greater nesting, roosting, foraging habitat in the form of old growth redwood trees.

Cultural Resources

The project is located in Yurok ancestral territory and the NPS initiated consultation with federally recognized American Indian Tribes of the Big Lagoon Rancheria, Resighini Rancheria, Trinidad Rancheria, and Yurok Tribe. Consultation with the Yurok Tribal Heritage Preservation Officer and the Yurok Tribe's Culture Committee of Tribal elders was conducted on March 23, 2018. No concerns were noted regarding the project.

Cultural resource investigations were conducted in the APE in accordance with Section 106 of the National Historic Preservation Act. The investigation was completed in November 2016 by Humboldt State University's Cultural Resource Facility (HSU CRF). Approximately 36 acres were surveyed in the project area.

In summary no historic properties were identified from surveys conducted for this project within the project APE. The NPS evaluated and concluded that the G-6-1 Road was ineligible for listing in the National Register of Historic Places (NHRP). Although existing portions of the Trinidad Trail in Redwood National Park, (approximately 0.5 mile from the APE) may be eligible for listing in the NRHP, no segment of the Trinidad Trail was identified in the project APE.

Alternative 1 (No Action) - Current and expected future conditions of the environment

There would be No Effect to Historic Properties from this alternative. Roads and drainage structures would continue to age, erode, and eventually fail.

Alternative 2 (Proposed Action)

No properties of historic or cultural significance were identified in the project APE, therefore the NPS finds there would be No Effect to Historic Properties from the Proposed Action alternative.

In the unlikely event that human remains are encountered during project implementation all work would be suspended, law enforcement and NPS cultural resources staff or other Secretary of Interior qualified personnel (e.g. a Regional Cultural Resources Specialist) would be notified, and the find evaluated. Measures would be taken immediately to close off the area and inadvertent discovery procedures and plans would be implemented. Consultation with the Yurok would be initiated.

In the unlikely event that previously undocumented archeological resources, including but not limited to flaked stone artifacts (arrowheads or flakes), shellfish, bone, deposits of old bottles and cans, and wooden or rock structural debris, are encountered during project implementation, work in that location would be suspended until an archeologist meeting the Secretary of Interior Standards has evaluated the find in consultation with California SHPO and Yurok THPO.

Conclusions: Effects on Cultural Resources

The proposed action would have no effect on cultural resources. Although cultural resources may occur in the vicinity of the project that may be important, no known significant cultural resources

are located within the project area. In addition, the proposed action would not change the treatment and/or management of archeological resources in Redwood National Park. Cultural resources throughout the remainder of the Redwood National Park would be unaffected. Under the terminology of the implementing regulations of Section 106 of the National Historic Preservation Act (36 CR 800), no historic properties, determined eligible for or listed on the National Register of Historic Places, would be affected by the proposed action or No Action alternative.

Visitor Use and Experience

There would be no effect on visitor use or experience from either the No Action alternative or the proposed action. The project site is not visited, not located on any visitor map, has no on-site resource to entice visitors, and is not located adjacent to any trail. Visitor experience may be impacted from road failures destroying park habitat and resources, if readily observable from a known trail or Redwood Creek. Otherwise visitors would have no knowledge of this road in the park.

Socioeconomics

There would be no growth-inducing effects under either the No Action alternative or the proposed action.

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Appendix A. Consultation with Other Agencies

Endangered Species Consultations

The NPS initiated consultation under Section 7 of the Endangered Species Act (ESA) with personnel from the Arcata offices of the US Fish and Wildlife Service (USFWS) and Arcata NOAA Fisheries (National Marine Fisheries Service-NMFS) on May 15, 2015. USFWS and NMFS attended a field review on September 15, 2015. Additional meetings were held on May 17, 2016. The NPS and USFWS visited the proposed project site on May 31, 2017.

Effects and mitigations for effects to listed aquatic and terrestrial species are described in detail in the BAs submitted to NMFS (NPS 2015) and USFWS (NPS 2017a), respectively.

The NMFS issued a LOC and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response covering the G-6-1 Road Removal project (NMFS No. WCR-2016-5964) on December 20, 2016. NMFS concurred with the NPS determination that the proposed action is not likely to adversely affect coastal California Chinook, Southern Oregon/Northern California Coast coho salmon, or northern California steelhead, or their designated critical habitat, under section 7(a)(2) of the Endangered Species Act. NMFS also reviewed the proposed action for potential effects on Essential Fish Habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act, and concluded that the project would adversely affect EFH. NMFS determined that the Best Management Practices (BMP), project design features and measures incorporated into the proposed action will minimize adverse effects to EFH, and recommended no additional conservation measures.

The NPS submitted a BA to USFWS on July 17, 2017. The USFWS issued a Biological Opinion (BO) on September 21, 2017 that concurred with the NPS determination that the proposed action may affect and is likely to adversely affect marbled murrelets from noise disturbance on 286.4 acres of habitat, and may affect but is not likely to adversely affect murrelets from a potential increase in nest predation from removal of protective vegetation that screens nests (AFWO-17B0032-17F0293). Adverse effects on marbled murrelets from noise disturbance result from heavy equipment operation and vehicle access during the nesting season, and would be minimized through implementation of daily limited operating periods to reduce noise during dawn and dusk when murrelets are most active in the forests. The USFWS authorized incidental take of marbled murrelets in the form of noise disturbance that could lead to nest abandonment on 286.4 acres of murrelet nesting habitat.

The USFWS concurred that the proposed action may affect but is not likely to adversely affect northern spotted owls based on removal of an insignificant amount (2.85 acres) of owl habitat, the slight possibility of nesting owls going undetected, a slight amount of habitat degradation that would be offset by placement of large woody debris and other types of mulch that would provide habitat for owl prey, and because project-generated noise above ambient levels would occur outside the breeding season.

Cultural Resource Consultations

In accordance with Section 106 of the National Historic Preservation Act (NHPA), the NPS consulted with the California State Historic Preservation Officer (SHPO) on October 16, 2019

and sought concurrence with the NPS finding of No Historic Properties Affected from the proposed action. The SHPO had no objections with the NPS finding on November 15, 2019 (NPS_2019_1018_002).

In addition, the NPS consulted, in accordance with Section 106 NHPA, with four tribal governments whose members have ties to lands within the project area and the vicinity. Big Lagoon Rancheria, Resighini Rancheria, Trinidad Rancheria, and Yurok Tribe received letters on October 16, 2019 that an environmental assessment was being prepared and with an offer to meet on a government to government basis. The NPS met with the Yurok Tribe's Culture Committee on March 23, 2018 regarding the project. One elder expressed knowledge about the historic Trinidad Trail in the project vicinity. The NPS determined that the trail route was near to but outside the project Area of Potential Effect (APE). No other comments or concerns were received about the project.

Cultural resource inventory reports were prepared for the project inclusive of a Historic Property Survey Report for the G-6-1 Road Removal Project (Steele, et al. 2016), and Trip Report for Remove Failing Road G-6-1 and Stabilize Erosional Threat Above Tall Trees Grove - (NPS PEPC No. 56791).

Appendix B. Public Involvement

Since 2007, the NPS has received public input on many projects involving watershed and stream restoration in the lower Prairie Creek, Lost Man Creek, and Redwood Creek watersheds:

- In Lost Man Creek, about 24 miles of road were removed or treated to reduce erosion between 2000 and 2004, with an additional 11.4 miles removed and 11 miles treated to reduce erosion by 2009 (NPS 2006a, b).
- On Streelow Creek Trail, a portion of an abandoned logging road was converted to a trail, with the remaining section stabilized and upgraded to accommodate planned watershed restoration access; (NPS 2010a, b).
- The Strawberry Creek Restoration project included removal of upslope logging roads to reduce erosion potential (NPS 2014a, b).
- The Lower B500 road removal project included removal of 0.8 mile of legacy logging roads and 4 stream crossings along Larry Damm Creek (NPS 2019).
- The Greater Prairie Creek and Greater Mill Creek Ecosystem Restoration Projects include removal of many miles of legacy logging roads in Prairie Creek and Mill Creek watersheds (NPS 2019a, b).

Public comments received on the programmatic watershed restoration proposal in the 1999 GMP/FEIS, the watershed restoration projects listed above, and similar road removal and watershed restoration projects throughout the north coast region aimed at restoration of salmonid habitat indicate broad public support for such projects. The impact topics addressed in this EA are the same as those addressed in the other restoration projects.

The EA will be sent to local and regional offices of federal and state agencies, American Indian tribes in whose ancestral territory the project area is located or who might be interested, local organizations, and individuals. Copies will be available in local libraries and at park offices, and on the internet on the NPS Planning, Environment, and Public Comment (PEPC) site at <http://parkplanning.nps.gov/G61>. Letters announcing the availability of the EA will be sent to elected officials, tribes, organizations, and individuals who have expressed interest in similar projects. Anyone who comments will receive a copy of the decision document, which will also be posted to PEPC on the project home page and announced through a press release.