



United States Department of the Interior

Redwood National Park
1111 Second Street
Crescent City, California 95531

N1621 (2015 Redwood National Park Fire Management Plan Biological Assessment)

December 16, 2015

Office Supervisor
NOAA Fisheries
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Enclosed you will find a biological assessment (BA) that addresses the impacts of the 2015 Redwood National Park (RNP) Fire Management Plan. The work described in the enclosed BA is planned to occur between 2016 and 2021.

The BA was prepared in accordance with the requirements set forth under section 7 of the Endangered Species Act (19 U.S.C. 1536 (c), 50 CFR 402) and meets the criteria for an informal consultation with NOAA Fisheries. The BA also meets the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et. seq) essential fishery habitat (EFH) consultation requirements (sec. 305 (b)(2) and 305 (b)(4)(B)) and ESA/EFH parallel consultation guidelines established by NOAA Fisheries (USDC 1999c, USDC 2001) for an informal consultation.

Informal consultation on the proposed action occurred during email correspondence in July and August 2015 between Keith Bensen (NPS) and Leslie Wolff and Liz Perkins (NOAA Fisheries) as well as a field meeting on 13 November, 2015.

We have determined that the 2015 RNP Fire Management Plan may affect, but is not likely to adversely affect, the three listed anadromous salmonids found within Redwood National Park.

We are requesting your concurrence relative on this action. If you have any questions, please contact Keith Bensen at (707) 465-7777. Thank you for your assistance.

Sincerely,

Stephen Prokop
Superintendent
Redwood National Park

Enclosure

cc: Keith Bensen, David Roemer

**A Biological Assessment of Impacts to
Threatened Anadromous Salmonids from the
2015 Redwood National Park Fire Management Plan**

December, 2015

I. INTRODUCTION

The purpose of this biological assessment (BA) is to review the proposed Redwood National Park (RNP) 2015 Fire Management Plan (FMP) to determine if the proposed actions may affect any threatened or endangered species and/or their critical habitats. This biological assessment is prepared in accordance with legal requirements set forth under section 7 of the Endangered Species Act (19 U.S.C. 1536 (c), 50 CFR 402), and meets the criteria for informal consultation with NOAA Fisheries. This document also meets the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et. seq) essential fishery habitat (EFH) consultation requirements (sec. 305 (b)(2) and 305 (b)(4)(B)) and ESA/EFH parallel consultation guidelines established by NOAA Fisheries (USDC 1999c, USDC 2001). The 2015 RNP FMP actions are expected to take place through 2020.

II. CONSULTATION TO DATE

RNP currently has three species of anadromous salmonids belonging to three different evolutionary significant units (ESU) that are listed as threatened under the Endangered Species Act and that could potentially be affected by the proposed actions:

1. California Coastal (CC) Chinook Salmon (*Oncorhynchus tshawytscha*) (USDC 1999a.)
2. Northern California (NC) Steelhead (*Oncorhynchus mykiss*) (USDC 2000)
3. Southern Oregon/Northern California Coasts (SONCC) Coho Salmon (USDC (*Oncorhynchus kisutch*) (USDC 1999b)

Critical habitat is currently designated for all three species.

Previous Pertinent Consultations

The first previous pertinent consultation on many similar fire management proposed actions to those proposed in the 2010 RNP FMP was completed in 2002. The subsequent letter of concurrence from NOAA Fisheries was dated 10 June 2002 (NOAA Fisheries Administrative File # 51422SWR02AR6328).

A second previous consultation that was very similar or in many cases identical to the fire management proposed actions described in the 2015 RNP FMP was completed in January 2005. The subsequent letter of concurrence from NOAA Fisheries was dated 21 January 2005 (NOAA Fisheries Administrative File # 151422SWR04AR9140:BW).

A third previous consultation that was also very similar or in many cases identical to the fire management proposed actions described in the 2015 RNP FMP was completed in February 2010. The subsequent biological opinion from NOAA Fisheries was dated 9 February 2010 (NOAA Fisheries Administrative File #2009/04519 or 151422SWR2009AR00052).

A large number of verbal and written communications were associated with the past consultation efforts. All pertinent NOAA Fisheries recommendations and concerns from the past consultations have been incorporated into this project.

Current Consultation

A draft biological assessment was sent to the NOAA Fisheries on 28 August 2015 and comments were received on 12 November 2015.

III. CURRENT MANAGEMENT DIRECTION

RNSP is located in Humboldt and Del Norte Counties in northwestern California and encompass 105,516 acres of land. Numerous federal and state laws, regulations, and policies guide management.

The National Park Service (NPS) Organic Act of 1916 states that national parks will be managed “to conserve the scenery and the natural and historic objects, and the wildlife therein, and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

The management of Redwood National Park is guided by the 1968 enabling legislation (PL 90-545) in which Congress established the Park to preserve significant examples of primeval coast redwood forest, and the streams and seashores with which they are associated, for purposes of public inspiration, enjoyment, and scientific study. The 1978 park expansion legislation (PL 95-250) added lands to create a more meaningful park for the use and enjoyment of the visitors, and directed the NPS to implement a watershed rehabilitation program to reduce erosion caused primarily by roads built in association with timber harvest. Title 36, *Code of Federal Regulations*, Parts 1 through 7 gives the park Superintendent discretionary authority regarding designations, closures, permits, and miscellaneous restrictions. These items are described in a compendium that provides direction for a wide variety of public activities that may occur within the national park.

The *General Management Plan/General Plan and Environmental Impact Statement/Report for Redwood National and State Parks* (USDI and CDPR 1999) provides comprehensive guidance for managing the national and state parks as one complex with similar resources. The General Management Plan/ General Plan (GMP) provides overall vision and direction for the parks and identifies future planning needs. Under the GMP, the agencies will emphasize the protection of resources and will also provide a variety of opportunities for visitors to enjoy the parks. New visitor services and facilities will be provided to enhance the visitor experience if these services and facilities do not impact sensitive resources. The park agencies will cooperate with adjacent communities and landowners, local American Indian tribes, and other government agencies to accomplish long-range resource management planning to reduce threats to Redwood National Park resources. Hiking, mountain biking, and camping are currently important components of the activities available to people that visit RNSP. No areas within RNP are closed to visitor use but many areas are managed to exclude public use of motor vehicles and bicycles.

The GMP identifies individual action plans needed to address specific RNP actions such as estuary, second growth, trail, fire and fuels, vegetation, back-country visitor use, and transportation management. Relative to management of listed threatened and endangered species the GMP directs RNP staff to “...avoid, minimize, rectify, reduce, compensate, or otherwise mitigate any potential adverse impacts on state or federally listed or proposed or candidate threatened or endangered species....” in association with construction, visitor use, or restoration activities (GMP p. 37). These actions will be achieved primarily by restricting work temporally and spatially so as not to disturb threatened and endangered species and by designating almost one-third of the RNSP as “primitive” zones where disturbance to all species from

human activities would be limited to those "...necessary to restore and maintain ecosystem function" (GMP p. 38).

The National Park Service signed the Interagency Memorandum of Understanding implementing the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA and USDI 1994; Northwest Forest Plan ROD). National Park lands within the range of the northern spotted owl are designated as congressionally reserved. RNP is managed using an ecosystem management strategy, similar to the strategy presented in the Northwest Forest Plan ROD. Implementation of RNP operations consistent with federal and state enabling legislation (i.e., to preserve, and restore where needed, the old-growth forest ecosystem) will augment the lands designated as Riparian and Late Successional Reserves on other nearby federal lands. RNP policies and guidelines relative to watershed restoration are similar to those outlined by the Aquatic Conservation Strategy in the Northwest Forest Plan ROD.

Section 7(a)1 of the Endangered Species Act (ESA) of 1973, as amended, requires that federal agencies utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. Section 7(a)2 of the ESA requires that a federal agency, in consultation with and with the assistance of the Secretary of the Interior, ensures that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. Specific management direction for each of the listed threatened, endangered, or proposed species considered in this document is reviewed in Section V, "Status and Distribution of Listed Species".

IV. DESCRIPTION OF THE PROPOSED ACTION

The 2015 Redwood National Park Fire Management Plan is expected to be effective through 2020.

1) Wildfire Suppression

Guidelines were developed as part of the Redwood National Park 2015 Fire Management Plan to potentially reduce or eliminate impacts to threatened, endangered and candidate species as well as non listed fish and wildlife from wildfire suppression activities (Appendix 1). These wildfire suppression guidelines are only guidelines, *not proposed actions*. The unpredictability of wildfires and the subsequent potential threats to human safety and significant resources could possibly dictate wildfire suppression tactics that would possibly overrule some or all of the recommendations in the guidelines. This unpredictability prevents any meaningful analysis from being conducted. *Any wildfire suppression tactics and activities, therefore, will be analyzed under emergency consultation procedures and will not be mentioned further in this document.*

2) Prescribed Burning

Prescribed fire will be used to treat approximately 6,000 acres of grassland, oak and pine woodland, coastal shrub land, and second growth forest on Redwood National Park lands. Specific areas or "burn units" and their relative distance to anadromous salmonid habitat are listed below in Table 1. No units contain a perennial stream within the unit boundaries. Burn unit locations are shown in Appendix 2.

Table 1. Prescribed burn units and number of perennial and intermittent streams contained within each (from RNP GIS database). Prescribed burn start dates vary between units due to proximity to potentially suitable habitat of listed terrestrial species or migratory birds.

Burn Unit Name	Acres	Time of year burning proposed	Number of intermittent streams w/in 100 feet of burn unit	Number of perennial streams w/in 150 feet of burn unit	Number of perennial streams w/in 300 feet of burn unit
Airstrip, Lower ¹	110	August 1 st to first rains	1	0	1
Airstrip, Upper ¹	102	August 1 st to first rains	0	0	0
C-10 ⁴	339	September 16 th to first rains	3	0	0
Child's Hill ¹	561	August 1 st to first rains	3	0	0
Copper Creek ¹	148	August 1 st to first rains	2	0	0
Counts, Upper ¹	118	August 1 st to first rains	1	0	0
Counts, Lower ¹	220	September 16 th to first rains	1	0	1
Coyote Creek ²	1,063	September 16 th to first rains	5	0	0
Davison ¹	10	September 16 th to first rains	0	0	1
DeMartin ²	5	September 16 th to first rains	0	0	0
Dolason, Lower ²	220	September 16 th to first rains	0	0	0
Dolason, Upper ²	94	September 16 th to first rains	0	0	0
Dooleyville ²	111	September 16 th to first rains	1	0	1
Eastside ¹	107	August 1 st to first rains	0	0	0
Elk Camp, Lower ¹	244	September 16 th to first rains	1	0	0
Elk Camp, Upper ¹	37	August 1 st to first rains	0	0	0
Enderts ⁵	109	August 1 st to first rains	1	0	0
Gans, Lower ¹	7	September 16 th to first rains	0	0	0

Burn Unit Name	Acres	Time of year burning proposed	Number of intermittent streams w/in 100 feet of burn unit	Number of perennial streams w/in 150 feet of burn unit	Number of perennial streams w/in 300 feet of burn unit
Gans, Upper ¹	17	September 16 th to first rains	0	0	0
Holter Ridge Beargrass ⁴	5	September 16 th to first rains	0	0	0
Lagoon Creek ⁵	68	September 16 th to first rains	0	1*	0
Little Bald Hills ³	1,470 ^a	August 1 st to first rains	6	0	0
Lyons, Lower ²	143	August 1 st to first rains	2	0	0
Lyons, Upper ²	208	August 1 st to first rains	0	0	0
Mainstem ¹	166	August 1 st or September 15 th to first rains	2	0	1
Major Creek ⁵	7	August 1 st to first rains	0	1*	1*
Maneze ²	226	August 1 st to first rains	0	0	0
Mid Basin ²	129	August 1 st to first rains	3	0	0
School House ¹	300	August 1 st to first rains	0	0	0
South Boundary ¹	86	September 16 th to first rains	1	0	0
Upper K&K ⁴	40	September 16 th to first rains	0	0	0
Wildcat ⁴	300	September 16 th to first rains	6	1	0
Williams Ridge ¹	118	August 1 st to first rains	0	0	0
Wooden Gate ¹	243	August 1 st to first rains	0	0	0

Vegetation type within unit: ¹grassland, ²grassland and oak woodland, ³Jeffrey pine woodland, ⁴second growth conifer, ⁵coastal grass and scrub.

*Non anadromous watershed.

^aOnly 50 acres within the larger prescribed burn planning unit will be burned per year.

Preparation methods will include cutting grass with line trimmers and mowers along fire lines, fire line construction with chainsaws and hand tools, installation of fire hoses and setting up and filling portable water tanks at strategic locations. Fire line construction will vary according to fuel type and time of year to ensure firefighter safety and allow for control of the prescribed fire. Burns completed late in the year that are dependent upon precipitation will utilize "wet" lines of either naturally occurring forest edge fuel moisture changes or through the direct application of water to vegetation prior to ignition. Where fire lines are constructed they will be dug to mineral soil to a width of no more than four feet. These will be rehabilitated after the prescribed burn by replacing the topsoil. Any fire lines which cross riparian areas will have water bars installed within 300 feet of any intermittent or perennial stream using spacing standards described in Weaver and Hagans (1994) (Table 2). No shading riparian vegetation will be removed during fire line construction, only understory shrubs and trees and low hanging branches will be removed. Existing canopy cover will be maintained along all riparian areas within 300 feet of any intermittent or perennial stream. In grasslands additional mowing of fuels adjacent to the fire line may occur, while in oak woodlands or areas bordered by dense, young conifers, adjacent ladder fuels will be cleared (i.e. brush cut back, lower limbs removed, small diameter seedlings/pole sized trees cut). In second growth units, small pole sized trees within four feet of fire lines may be cut and limbs of larger trees removed up to six feet above ground. No conifers greater than 18 inches DBH will be cut in any unit. In units with established roads, feller bunchers or a variation on such heavy equipment may be used to fell trees along road sides instead of hand crews with chainsaws. Debris will be scattered within the burn unit when feasible or hand piled and burned during the winter wet season in areas of heavier accumulation. No piles will be burned within the riparian area (i.e. within 300 feet) of any intermittent or perennial stream.

Table 2. Maximum distance between waterbreaks on roads and trails (feet; reproduced from Weaver and Hagans 1994)				
Erosion Hazard Rating (for surface erosion)	Road or Trail Gradient (%)			
	10%, or less	11-25%	26-50%	over 50%
Extremely high	100'	75'	50'	50'
High	150'	100'	75'	50'
Moderate	200'	150'	100'	75'
Low	300'	200'	150'	100'

Treatment prescriptions will vary among unit prescribed fire plans in order to meet specific unit objectives. Prescriptions will include flame lengths between 1 and 27 feet, and rates of spread between 3 and 60 chains per hour. Ignition will be accomplished using drip torches, fusees, and aerial ignition. The personnel committed to each burn may include up to 15 to 20 overhead positions, two handcrews, four engines, one helicopter, one water tender, portable tanks and pumps, hose and related equipment. No water will be drafted from anadromous fish bearing streams.

All structures (historic or otherwise) within the burn units will be protected using standard methods including construction of fire lines, fuel reduction and pretreatment with water and/or foam. No foam applications will be made within 300 feet of any intermittent or perennial streams.

Post burn vegetation monitoring will be accomplished in order to ensure burn objectives are achieved. Fire effects plots have been installed in accordance with the procedures outlined in the "NPS Fire Monitoring Handbook" on a random basis in many of the units.

RNP has in the past and will make every effort to maintain control of all prescribed fires within the parks using the techniques just described. There is, however, the possibility that a prescribed fire could escape control lines. Emergency consultation procedures will be used to address any fire suppression operations which arise from an escaped prescribed fire because of the unpredictable nature of when and where in RNP these activities might occur. The wildfire suppression guidelines described in Appendix 1 will be utilized in the event of an escaped prescribed fire. Therefore, there will be no further discussion of these actions within this document.

3) Shaded Fuel Breaks

Five shaded fuel breaks will be created or maintained during the life of the 2010 Fire Management Plan: 1) along Holter Ridge Road (aka Lost Man Creek Trail)/B Line Road from the Bald Hills Road north to US Highway 101, 2) along the Bald Hills Road from the Holter Ridge Road junction to Elk Camp Prairie, 3) the Wolf Creek Outdoor School Access Road and housing complex/fire cache, 4) around the Hiouchi park housing and fire cache complex, and 5) around the Howland Hills Outdoor School access road and complex(Appendix 2). The reason for the thinning is to provide more secure and defensible park boundaries, defensible spaces around park developments and escape routes in the event of a wildfire. Mechanical thinning will involve cutting trees with chainsaws less than 18 inches DBH as well as brush and tree limbs that could provide ladder fuels into the forest canopy along a 100 foot wide strip along either side of roads or around building complexes. Canopy cover will be maintained above 60% where it exists. Cut trees and limbs will be piled away from live trees and large logs and snags (i.e. logs >36 inches diameter on the wide end and longer than 10 feet and snags >24 inches DBH) within the units or on the roads and either burned during the wet season outside of the burn timing restrictions or chipped with a mechanical chipper outside of the noise restrictions described below. Thinning may be done with chainsaws or feller bunchers or some mechanical variation. All five of the fuel breaks are located along ridge tops well away from any stream course or are at least 300 feet from the nearest perennial stream.

4) Historic Structure Annual Hazard Fuel Reduction

Seven historic structures, Elk Camp Barn, Dolason Barn, Lyons Ranch Barn and Bunkhouse, Dooleyville Line Shack, Long Ridge Sheepshead, Coyote Creek Barn, and Coyote Creek Cabin have hazardous fuel accumulations (overgrown grass and brush within 40 feet of structures) cleared annually in order to provide some wildfire protection for the structures (Appendix 2). All structures are at least 300 feet from any intermittent or perennial stream.

5) Pond Maintenance

Four existing, human-made ponds (formerly used as water sources for livestock or logging operations) will have low growing brush and sapling trees cleared in and around them with line trimmers and chainsaws to improve access and maintain them as firefighting water sources for either prescribed fires, wildfires or both. The four ponds (M-Line, Elk Camp Upper, Elk Camp Lower, and Coyote) (Appendix 2) are all located on the upper thirds of watersheds and are fed by small springs. They are all located well upslope of anadromous reaches.

V. STATUS AND DISTRIBUTION OF LISTED SPECIES AND ENVIRONMENTAL BASELINE

1. California Coastal Chinook Salmon (*Oncorhynchus tshawytscha*), Threatened

A. Species Account

Chinook salmon populations have declined along the Pacific coast to the degree that certain evolutionarily significant units (ESUs) were listed as threatened by NOAA Fisheries under the Endangered Species Act (USDC 1999a). Based on the best biological and commercial information available NOAA Fisheries identified 19 ESUs from populations in Washington, Idaho, Oregon, and California. Genetic data were the primary evidence considered for the reproductive isolation criterion, supplemented by inferences about barriers to migration, human-induced changes resulting from artificial propagation, and harvest. Chinook salmon historically ranged as far south as the Ventura River, California, and north as far as the Russian Far East (USDC 1999a). The California Coastal ESU (Redwood Creek and south) was listed as threatened in 1999 (USDC 1999a).

Chinook typically return from the ocean to rivers, larger streams, and larger tributaries to spawn between November and early January after three to four years in the ocean, although two year old male spawners are commonly observed. Winter-run chinook constitute the main chinook runs in RNSP streams. These fish begin their upstream migration around November, if access through the Redwood Creek estuary is possible, and have spawned and died by the end of January. Adult spring-run chinook were observed in only one season since 1981, when the park began Summer steelhead surveys, but are not typically considered to use the Redwood Creek watershed. Chinook salmon spawning in the RNSP tributaries may be impeded by stream barriers, but they may be able to surmount some barriers that may impede the smaller coho salmon. Copper Creek is a steep, minor tributary to Redwood Creek and no chinook have been detected within Copper Creek during presence/absence surveys conducted at the mouth of the creek (RNSP unpub. data).

Juvenile chinook salmon in the Redwood Creek and Prairie Creek watersheds do not spend time rearing in upstream areas (Anderson and Brown 1982), but instead, utilize the Redwood Creek estuary. In spring, chinook salmon fry migrate downstream to rear in the estuary before entering the ocean in the fall. Thus, the Redwood Creek estuary is important as the sole rearing habitat for this ESU in the park. Research shows that if given the opportunity the juveniles will spend an extended period (to late summer) in the estuary before entering the ocean. Reimers (1973) documented the role estuaries play in fall chinook salmon production. From scale analysis of spawning fall chinook from the Sixes River, Oregon, he determined that the majority of returning adults spent June, July, and August as juveniles within the estuary before completing their seaward migration. His investigations determined that juvenile chinook

spending less than three months in the estuary seldom returned to spawn in the natal stream. He concluded that these fish did not survive as well in the ocean as the fish that had spent three months in the estuary. Apparently a survival advantage was conferred upon the fish that remained in the estuary and grew to a larger size before entering the ocean.

B. Habitat Status

Chinook salmon rearing habitat was degraded when flood control levees that bisect the Redwood Creek estuary were constructed in 1968. The levees altered the physical and biological functions of the estuary and adjacent wetlands and confined the stream channel to a width of 300 ft. The flood control project reduced the amount of riparian vegetation and tree cover, reduced adjacent wetlands, altered valley drainage patterns, decreased the amount of instream woody debris, and caused decreased pool depths along lower Redwood Creek. The levees bypassed and isolated the last downstream meander of Redwood Creek, reduced circulation into the north and south sloughs, and contributed to 50% of the lower estuary between zero and four feet Mean Sea Level filling with sediment or becoming isolated from the embayment (Ricks 1983). Adjacent land uses, e.g., cattle grazing on the flood plain and uncontrolled breaching of the sand berm (which forms a barrier to the ocean across the mouth), also have contributed to habitat degradation of the estuary.

Critical habitat for California Coastal ESU chinook salmon was re-designated effective January 2, 2006. Potentially suitable habitat for this ESU in RNSP occurs in the Redwood Creek basin and includes all stream and estuarine reaches accessible to the species. Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of the species.

Chinook Critical Habitat

Critical habitat is defined in Section 3(5)A of the Endangered Species Act as "...the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection". In designating critical habitat NOAA Fisheries considers habitat elements and conditions required for all life stages of the species. In addition, NOAA Fisheries also focuses on the known physical and biological features (primary constituent elements) within the designated area that are essential to the conservation of the species. These essential features may include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation.

In California Coastal, NOAA Fisheries has designated critical habitat for this ESU to include all naturally spawned populations of chinook salmon from rivers and streams south of the Klamath River to the Russian River, California, as well as seven artificial propagation programs: the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run chinook hatchery programs.

No chinook have been detected in Copper Creek and so is not considered critical habitat, however, Redwood Creek, the stream that Copper Creek is a tributary of, is occupied by chinook salmon and it and its associated riparian habitat are critical habitat.

2. Northern California Steelhead (*Oncorhynchus mykiss*), Threatened

A. Species Account

Steelhead trout were distributed historically throughout the North Pacific Ocean from the Kamchatka Peninsula in Asia to the northern Baja peninsula. Presently, the distribution extends from the Kamchatka Peninsula, east and south along the Pacific Coast of North America, to at least Malibu Creek in southern California. Steelhead likely inhabited most coastal streams in Washington, Oregon and California as well as many inland streams in these states and Idaho.

During this century, over 23 naturally reproducing stocks of steelhead are believed to have been extirpated, and many more are thought to be in decline in numerous coastal and inland streams in Washington, Oregon, California, and Idaho. Forty-three stocks have been identified as being at moderate or high risk of extinction. For these reasons, steelhead were listed as endangered in two environmentally significant units (DPSs) and threatened in four DPSs. The Northern California DPSs, from Redwood Creek south, falls within the boundaries of RNSP; it was listed as threatened on June 7, 2000.

Steelhead trout are found in most small order, high gradient tributaries to Redwood Creek. They are able to leap above barriers that might impede coho salmon (D. Anderson personal communication). Whether logjams are barriers to movement depends upon stream dynamics such as the size of the logjam and the stream discharge as well as the timing and duration of the steelhead migration. These events change from year to year.

Steelhead spawners are the last of the anadromous salmonid species to return to freshwater in the annual cycle, generally between January and April. Juveniles rear in the streams for one to four years before their downstream migration to the ocean. The majority of juvenile steelhead in Redwood Creek spend their second year of life in the estuary and lower part of Redwood Creek (Anderson 1988). They reside in marine waters typically for two or three years prior to returning to the natal stream to spawn. Unlike other Pacific salmon, steelhead trout are capable of spawning more than once before they die.

Summer steelhead surveys began in the park in 1981 and survey data have indicated a continuous decline since that time. Forty-four is the highest total number of adult fish observed during summer surveys of portions of the mainstem of Redwood Creek. No adult fish were seen in 1989 or 2001. The number of adult steelhead counted in 2005 was 22, in 2004 eight adults were counted. No other park streams in the Redwood Creek basin have been surveyed for summer steelhead; the smaller streams do not have pools large enough to support fish during the warm summer months.

Winter-run steelhead numbers are higher than summer steelhead numbers. Juvenile winter-run steelhead are the most common and widely distributed fish in the Redwood Creek basin. During sampling efforts in the summers of 1980 and 1981, steelhead trout occurred in 57 of the 111 tributaries surveyed (Anderson 1988, Brown 1988). In recent years winter stream surveys have been conducted along the mainstem of Redwood Creek (flows permitting), Lost Man Creek, Little Lost Man Creek, Prairie Creek, Mill Creek, and Bridge Creek (Holden 2002). Steelhead have been detected in Copper Creek near the mouth but are unlikely to occur much farther up the creek due to the steepness of the watershed (Anderson 1988, Anderson pers. comm.).

B. Habitat Status

Steelhead habitat requirements change as they go through different life phases. Adult steelhead need to have access to their natal streams, therefore, it is important that streams are free of barriers to migration, as the majority of spawning occurs in the upper reaches of tributaries. Adults also need access to spawning gravel in areas free of heavy sedimentation with adequate flow and cool, clear water. Steelhead utilize gravel that is 0.5-6 inches in diameter, dominated by 2 to 3 inch gravel. Escape cover for spawning adults also is important.

Steelhead eggs and pre-emergent fry require cool water with adequate dissolved oxygen. Fine sediment smothers developing eggs, so the area must be free of silt and the water clear. During their first summer, juvenile steelhead are typically found in relatively shallow areas with cobble and boulder bottoms. They reside at the downstream end of shallow places or in riffles less than two feet deep in areas with woody debris accumulation (logs or tree roots). Cover structures such as boulder clusters and root wads provide both summer and winter rearing habitat. Surface turbulence (or white water) provides another source of cover during the summer months. As juvenile steelhead grow, pools become an important habitat component. The best pools for habitat are those with abundant escape cover in the form of large woody debris, undercut banks, root masses, and large boulders.

Many of the small order, high gradient tributaries to Redwood Creek provide suitable habitat for steelhead in RNSP, including the very lowest reach of Copper Creek. Copper Creek's lowest reach has good riparian cover which keeps the water temperature low, and a small amount of riffles with a variety of gravel sizes, a few small pools for rearing, and instream cover provided by boulders and bedrock that provides protection for both adult and juvenile fish. There is no LWD (pers. obs.) because the whole watershed was clearcut in the early 1970's. Critical habitat for Northern California DPS steelhead trout was designated effective January 2, 2006. Potentially suitable habitat for this DPS in RNSP occurs in the Redwood Creek basin and includes all stream and estuarine reaches accessible to the species. Accessible reaches are those within the historical range of the DPS that can still be occupied by any life stage of the species.

Steelhead Critical Habitat

Critical habitat is defined in Section 3(5)A of the Endangered Species Act as "...the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection". In designating critical habitat NOAA Fisheries considers habitat elements and conditions required for all life stages of the species. In addition, NOAA Fisheries also focuses on the known physical and biological features (primary constituent elements) within the designated area that are essential to the conservation of the species. These essential features may include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation. NOAA Fisheries designated critical habitat for this DPS between Redwood Creek, California and Russian River, California.

3. Southern Oregon/Northern California Salmon (*Oncorhynchus kisutch*), Threatened

A. Species Account

Coho or “silver” salmon are found in streams and rivers throughout much of the Pacific Rim, from central California to Korea and northern Japan. Coho are anadromous and have a life history similar to chinook. However, the time they spend in fresh and salt water is relatively fixed, compared to the more variable life history of chinook. North of central British Columbia, coho tend to spend two years in freshwater, while south of this point they spend only one year in the freshwater. Unlike chinook, where most production comes from mainstem spawning areas, coho tend to use smaller streams and tributaries. North American coho spawn in tributaries from the San Lorenzo River in Monterey Bay, California to Point Hope, Alaska, and throughout the Aleutian Islands. They are most abundant in coastal areas from central Oregon to southeast Alaska.

Coho salmon have shown substantial decreases throughout their range (Konkel and McIntyre 1987). In the U.S. Pacific Northwest, they are now extinct in the eastern half of their former range, and badly depleted over most of the western half (Frissell 1993). At least 33 populations have been identified by agencies and conservation groups for being at moderate or high risk of extinction. Overall a geographic trend for west coast coho salmon stocks has developed with the southernmost and easternmost stocks in the worst condition. In California, including hatchery stocks, current abundance could be less than 6% of estimates for the period 1940 to 1949. Populations now are at least 70% lower than during the 1960s (CDFG 1994). The Southern Oregon/Northern California Coasts ESU for coho salmon, where RNSP is located, were designated as threatened in 1997 (USDI 1997).

The anadromous fish populations of Redwood Creek have experienced a substantial reduction during the last 30 years, in part due to severe flood events that moved large amounts of sediment from highly eroded hill slopes to the stream channels of the Redwood Creek basin. Current fish runs are far below those that occurred 70-80 years ago. News accounts and recollections of longtime residents of the Redwood Creek watershed suggest that both the size and numbers of salmonids have declined in recent decades (Van Kirk 1994). The total population in the Redwood Creek system may have numbered more than 2,000 adult coho; most occurred in the Prairie Creek drainage and probably originated from the Prairie Creek Hatchery (D. Anderson field notes). Since the closure of the hatchery in 1992 the number of coho are probably much lower.

After hatching juvenile coho salmon generally spend one full year rearing in freshwater before entering the ocean. However, Bell (2001) determined a two-year freshwater life history component, 28%, in Prairie Creek smolts. Downstream migration of coho to the ocean from upstream Redwood Creek rearing areas occurs in early spring (March-April). Survey data from RNSP indicate that these young salmon move directly into the ocean, spending a minimal amount of time in the Redwood Creek estuary (Anderson 1995). Migration through the Redwood Creek estuary is dependent upon the mouth being open to the ocean. Adult coho typically run upstream to spawn from late October to early March depending on access through the estuary (Anderson 1995). The conditions at the mouth depend on a combination of wave action on the sand berm, the volume of water in the estuary, and the flow of water in the stream.

Coho salmon distribution in the Redwood Creek basin is limited to the mainstem and the larger low gradient tributaries. The park conducted general stream surveys of the basin in 1980 and 1981 to describe and characterize the salmonid rearing habitat and distribution of juvenile salmonids (Anderson 1988, Brown 1988). Migrational barriers were identified during those electrosurveys; no coho were found

above the barriers. However, subsequent surveys in the 1990s have detected coho in streams that did not have coho in 1980-81.

B. Habitat Status

Based on data collected by RNSP fishery biologists, it was estimated that coho can be found occupying 26 miles of stream within the Lower Redwood Creek Basin. Coho have not been found in Copper Creek but are in Redwood Creek, at least transitionally, where Copper Creek empties into Redwood Creek (RNSP unpub. data).

Critical habitat is defined in Section 3(5)A of the Endangered Species Act as "...the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection". In designating critical habitat NOAA Fisheries considers habitat elements and conditions required for all life stages of the species. In addition, NOAA Fisheries also focuses on the known physical and biological features (primary constituent elements) within the designated area that are essential to the conservation of the species. These essential features may include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation. Structurally complex streams containing stones, logs, brush, and aquatic macrophytes support larger numbers of rearing coho juveniles (Scrivener and Andersen 1982) than do streams that lack these structural features.

In southern Oregon and northern California, NOAA Fisheries has designated critical habitat for this ESU between Cape Blanco, Oregon and Punta Gorda, California. The critical habitat unit is all stream and estuarine reaches accessible to the species and includes water, substrate, and the adjacent riparian zone. Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of coho. The adjacent riparian zone is the area that provides shade, sediment transport, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter. Habitat quality in this zone is related to the quality of riparian areas, upland areas, and inaccessible or headwater or intermittent streams that provide key habitat elements, such as large woody debris and gravel, that are crucial for coho in downstream reaches (USDC 1999b). Thus, the width of the riparian zone included as critical habitat is variable depending upon consideration of these factors. Based on this definition, Copper Creek is not critical habitat but Redwood Creek is.

4. Environmental Baseline

a. *Redwood Creek Watershed Baseline*

Detailed watershed baseline condition descriptions for Redwood Creek can be found in the recently completed Annual Routine and non-routine road maintenance program in Redwood National and State Parks biological assessment (RNSP 2002a), the Redwood Creek Watershed Analysis (RNSP 2002b), and the Total Maximum Daily Load for Sediment: Redwood Creek, California (EPA 1998). All of these documents are on file at RNSP and the NOAA Fisheries office in Arcata, California.

The upper third of the Copper Creek watershed is composed of grassland and oak woodland while the lower two thirds is composed of approximately 35 year old second growth conifer forest. The entire conifer forest portion of the watershed was clearcut in the early to mid 1970's before being acquired by the National Park Service. It was crisscrossed by logging roads used to haul the timber downhill to the

K&K main haul road. All of the roads within the watershed were removed in the late 1970's and early 1980's after the land was incorporated into Redwood National Park. Approximately the lower third of Copper Creek is perennial with direct connection to Redwood Creek being disrupted in the late fall dry season.

VI. IMPACTS TO THREATENED AND ENDANGERED SPECIES

A. Direct Effects

California Coastal (CC) Chinook Salmon, Southern Oregon/Northern California Coasts (SONCC) Coho Salmon, and Northern California (NC) Steelhead Trout and Critical Habitat

A. 2015 Redwood National Park Fire Management Plan

1) Prescribed Burning in Prairies (Grasslands), Oak Woodlands, Pine Woodlands, Coastal Scrub and Second Growth Coniferous Forest

Burning the following prescribed burn units will have no effect on listed salmonids because they are not located in anadromous watersheds: DeMartin, Enderts, Lagoon Creek and Major Creek (Table 1).

Burning the following prescribed burn units will have no effect on listed salmonids because no perennial streams are within 300 feet of the burn unit and no intermittent streams are within 100 feet of the burn unit: Airstrip Upper, Dolason Lower, Dolason Upper, Eastside, Elk Camp, Gans Lower, Gans Upper, Holter Ridge Beargrass, Lyons Upper, Maneze, School House, Upper K&K, Williams Ridge, Wooden Gate (Table 1). These units are all located at or near ridgetops. Intervening unburned vegetation and downed woody material will prevent any ash from being transported into any stream course.

Potential negligible effects could result if intermittent streams within 100 feet of burn units or sheet flow into perennial stream within 300 feet of burn units carry ash sediment downstream into occupied fish bearing streams from the following burn units: Airstrip Lower, C-10, Child's Hill, Copper Creek, Counts Upper, Counts Lower, Coyote Creek, Davison, Dooleyville, Elk Camp Lower, Little Bald Hills, Lower Lyons, Mainstem, Mid Basin, and South Boundary (Table 1). Even this scenario is unlikely, however, because only very small amounts of biomass will be burned in these burn units (i.e. only the top stalks of grass will be burned leaving leaf bases and root stalks intact). Vegetative recovery within these vegetation types of burn units is rapid and occurs within one season (Leonel Arguello, pers. comm.). In addition, past informal monitoring efforts of intermittent streams in or adjacent to these proposed burn units have indicated none to negligible amounts of ash transport or sedimentation after prescribed burning (Vicki Ozaki, pers. comm.; Barry Hill, letters on file). Measurable amounts of ash sediment, therefore, is not expected to originate from most of the prescribed prairie, oak woodland, pine woodland, coastal scrub and second growth coniferous forest burn units. It should be noted that the Copper Creek prescribed burn unit is within the same watershed as the Wildcat burn unit but is located at the top of the watershed and is of a different vegetation type (grass and oak woodland) than the lower down located Wildcat unit (second growth conifer). The Copper Creek unit will be affected differently by prescribed burning due to the much lower biomass (i.e. grass) that will be consumed by fire and its farther distance from the perennial stream flow areas as compared to the Wildcat unit.

Another potential sediment source caused by proposed activities is hand line construction whereby bare soil is exposed. Hand lines, however, will not cause sedimentation because they will be rehabilitated immediately after prescribed burning. Most of the fire lines will be mowed grass, wet lines, or utilize

forest edges which do not expose any bare soil.

No contamination from retardant use should occur because only buildings will be treated, all of which are located more than 300 feet from any intermittent or perennial stream.

The only time and place where a measureable amount of ash sediment may wash into fish bearing streams would be during initial rains occurring immediately after prescribed burns in units within 150 feet of perennial streams.

The 300 acre Wildcat unit is entirely composed of second growth coniferous forest. The burn prescription is for a "cool" under burn that will only consume small diameter woody ground fuels, small pole sized trees, herbaceous vegetation, and duff. The forest canopy should not change significantly from its existing level of almost 100% (see Appendix 3 for results of past prescribed burning within another RNP second growth conifer forest unit). Copper Creek runs through the middle of the unit but is intermittent in the 300 acre area of the unit. It is expected that the creek will be dry in the reach within the unit during the burn season. Riparian shading will not change post burn, as the forest canopy will not alter significantly. The intact forest canopy will also greatly lessen the impact force of falling rain which should decrease the amount of mobilized ash sediment. The majority of the ash sediment that is transported should be prevented from entering the stream by the remaining larger woody debris that will not be consumed by the fire. In addition, the fire is expected to be spotty (R. Young pers. comm.), with many unburned areas remaining, which should act as ash sediment traps. In particular, it is likely that the damper riparian areas near the perennial sections of the stream will not burn at all due to high fuel moisture content (R. Young pers. comm.). These unburned riparian areas will also act as ash sediment traps. Some ash sediment, however, may reach the stream during very high flow events during the first rains of the rainy season in December and January. This small amount of ash sediment should be further captured by stream course woody debris in the lower, unburned, two-thirds of the watershed, before reaching the very lowest reaches where anadromous fish are present. The listed salmonid life stages present in Copper Creek at that time of year will be rearing juvenile steelhead trout and in Redwood Creek there would be adult migrating chinook and coho salmon and rearing juvenile coho and steelhead trout. The effects to all listed fish present, regardless of life stage, will be negligible.

3) Shaded Fuel Breaks

None of the five shaded fuel breaks are within 300 feet of any perennial stream and thus the thinning prescription for these fuel breaks will have no effect on listed salmonids or their habitat.

4) Historic Structure Annual Hazard Fuel Reduction

None of the seven historic structures is within 300 feet of any perennial stream and thus the grass mowing around each building will have no effect on listed salmonids.

5) Pond Maintenance

The grass mowing and brush clearing around the four water source ponds will have no effect on listed salmonids because the ponds are located near ridge tops, well up slope from any anadromous reaches of any streams.

B. Indirect Effects

No indirect effects are expected from any component of the proposed action.

C. Cumulative Effects

Cumulative effects are those state and private actions that may occur in the future that have the potential to impact listed species in the park. Much private timber company land occurs immediately adjacent to park boundaries, some of it scheduled for pre-commercial thinning and/or post - timber harvest prescribed burning in preparation for reforestation. Thinning and prescribed burning has occurred extensively in harvested stands adjacent to the park (Greg Bundros pers. comm.). Prescribed burning associated with timber harvest plans adjacent to RNSP is not likely to add to any measurable impacts identified in the effects analyses for this proposed action. Thinning that will occur throughout the surrounding private timber lands will most likely be using prescriptions which remove much more basal area and open up the canopy more than those being proposed in this plan. The thinning will most likely cause some temporary habitat degradation to some listed salmonid habitat. The use of riparian management zones as stipulated in the California Forest Practice Rules and Habitat Conservation Plans should provide some significant protection of streamside areas.

VII. DETERMINATION

Based on the nature and timing of the proposed actions, it is determined that the Redwood National Park 2015 Fire Management Plan may affect but is not likely to adversely affect California coastal chinook salmon, northern California steelhead trout or southern Oregon/northern California coastal coho salmon and their critical habitat.

VIII. MANAGEMENT RECOMMENDATIONS

There are no management recommendations beyond the conservation measures already built into the proposed action.

VIX. PREPARED BY

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LITERATURE CITED

- Anderson, D.G. 1988. Juvenile salmon habitat of the Redwood Creek basin in Humboldt County, California. Master's Thesis. Humboldt State University, Arcata, CA. 99 pp.
- Anderson, D.G. 1995. Biological supplement to Redwood National and State Parks US Army Corps of Engineers application: coho salmon utilization of Redwood Creek estuary. Unpub. Rep. on file at Redwood National and State Parks, Orick, CA. 13 pp.
- Anderson, D.G. 1998. Redwood Creek estuary breaching and channel manipulation. Request for formal consultation with National Marine Fisheries Service. Unpub. Rep. on file at Redwood National and State Parks. Orick, CA. 188 pp.
- Anderson, D.G. and R.A. Brown. 1982. Anadromous salmonid nursery habitat in Redwood Creek watershed. *In*: Proceedings of the first biennial conference of research in California National Parks. University of California, Davis.
- Brown, R.A. 1988. Physical rearing habitat for anadromous salmonids in the Redwood Creek basin, Humboldt County, California. Master's Thesis. Humboldt State University, Arcata, CA. 132 pp.
- CDFG California Department of Fish and Game. 1994. Petition to the Board of Forestry to list coho salmon as a sensitive species. Calif. Dept. Fish and Game Rep. 35 pp plus appendices.
- CDPR. 1996. California Department of Parks and Recreation – Trails Handbook. Unpub. handbook on file at Redwood National and State Parks, Orick, CA. 312pp.
- Childers, E.L. 1999. Monitoring the northern spotted owl in Redwood National and State Parks 1993 to 1999. Unpubl. report on file at Redwood National and State Parks, Orick, CA. 86pp.
- Environmental Protection Agency (EPA). 1998. Total Maximum Daily Load for Sediment. Redwood Creek, California. Region 9. 71.
- Frissell, C.A. 1993. Topology of extinction and decline of native fishes in the Pacific Northwest and California. *Conserv. Biol.* 7:342-354.
- Holden III, B., T. Spreiter, M. Sanders, N. Youngblood, R. Klein, G. Craven. 2003. A Biological Assessment of Impacts to Aquatic Threatened Species from the Watershed Restoration Program in the Northern Portion of Lost Man Creek Watershed, Redwood National and State Parks. Unpublished report on file at Redwood National and State Parks, Orick, CA. 35 pp.
- Konkel, G.W. and J.D. McIntyre. 1987. Trends in spawning populations of Pacific anadromous salmonids. USDI Fish and Wildlife Service Wildl. Tech. Rep. 9, Washington DC. 25 pp.
- Reimers, P.E. 1973. The length of residency of juvenile fall chinook salmon in Sixes River, Oregon. Res. Rep. of Fish Comm. of Oregon 4(2).
- RNSP. 2002a. A Biological Assessment of Impacts to Aquatic Threatened Species for the Annual Routine and Non-Routine Road Maintenance Program in Redwood National and State Parks (RNSP). June.
- RNSP. 2002b. Redwood Creek Watershed Analysis. January.
- Sakai, H. 2003. A conservation strategy for managing threatened and endangered species in Redwood National and State Parks. Unpublished report on file at South Operations Center – Redwood National and State Parks, Orick, CA. 116 pp.

- Scrivener, J. C. and B. C. Andersen. 1982. Logging impacts and some mechanisms which determine the size of spring and summer populations of coho salmon fry in Carnation Creek. *In*: Proceedings of the Carnation Creek Workshop: a ten year review. G.F. Hartman, ed. Pacific Biological Station, Nanaimo, BC, Canada.
- Smith River National Recreational Area. 1995. Smith River Watershed Analysis. October.
- Spence, B.C., G.A Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR.
- USDC U.S. Department of Commerce. 1999a. Endangered and threatened species; threatened status for two chinook salmon evolutionarily significant units (ESUs) in California. Fed. Reg. 64(179):50394-50415.
- USDC U.S. Department of Commerce. 1999b. Designated critical habitat; central California coast and southern Oregon/northern California coasts coho salmon; final rule and correction. Fed. Reg. 64(86):24049-24062.
- USDC U.S. Department of Commerce. 2000. Designated critical habitat: critical habitat for 19 evolutionarily significant units of salmon and steelhead in Washington, Oregon, Idaho, and California; final rule. Fed. Reg. 65(32):7764-7787.
- USDI U.S. Department of the Interior. 1997. Endangered and threatened species; threatened status for the southern Oregon/northern California coast evolutionarily significant unit (ESU) coho salmon; final rule. Fed. Reg. 62(117):33038-33039.
- USDI U.S. Department of the Interior and [CDPR] California Department of Parks and Recreation. 1999. Redwood National and State Parks, Humboldt and Del Norte Counties; final general management plan/ general plan; environmental impact statement/ environmental impact report. Vol. 1. Crescent City, CA: USDI National Park Service and California Department of Parks and Recreation.
- Van Kirk, S. 1994. Historical information on Redwood Creek. Unpub. Rep. on file at Redwood National and State Parks, Arcata, CA
- Ward, M.B. 1988. Adult summer steelhead trout utilization of summer holding pools, Middle Fork Eel River, California. In Western Proceedings: 68th Annual Conference of the Western Association of Fish and Wildlife Agencies. Albuquerque, New Mexico.
- Weaver, W. E., D. K. Hagans. 1994. Handbook for Forest and Ranch Roads: A Guide for planning, designing, constructing, reconstructing, maintaining and closing wildland roads. Prepared for the Mendocino County Resource Conservation District; in cooperation with the California Department of Forestry and Fire Protection and the USDA Soil Conservation Service. Prepared by Pacific Watershed Associates. June 1994.

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Appendix 1

Guidelines to Reduce or Eliminate Impacts to Threatened and Endangered Species and Non Listed Fish and Wildlife Species During Wildfire or Escaped Prescribed Fire Suppression Efforts

***PLEASE NOTE!**

Never allow these fire suppression guidelines to obstruct any actions when human lives are at stake. Never utilize these guidelines if by their use human safety could be compromised. In addition, the potential risk to property or significant resources may also preclude the implementation of any or all of these fire suppression guidelines.

Emergency Consultation with USFWS and NOAA Fisheries - The RNSP Fish and Wildlife Branch will initiate emergency consultation with both regulatory agencies within at least 48 hours, preferably within 24 hours, of initial attack on any wildfire or escaped prescribed fire. The assigned RNSP biologist(s) will work with the incident command team both during and after the incident on gathering pertinent information necessary for the consultation.

I. Terrestrial Species Protection Measures

1) General Guidelines -

- A wildlife biologist or fish and wildlife biologist (preferably one with local knowledge) should serve as a resource advisor with the incident command team (ICT). The biologist(s) will coordinate with the ICT about listed terrestrial species and their critical habitat and incorporate recommendations within the Incident Action Plan to minimize adverse effects.
- If a wildlife biologist or fish and wildlife biologist is not available, assure that someone with local wildlife knowledge provides the ICT with information about the location of listed species habitats, nest or den sites, critical habitat, and recommendations to minimize adverse effects summarized below.

2) Aircraft Flight Guidelines -

***PLEASE NOTE!**

These guidelines are for aircraft flying over RNSP lands away from any active wildfire location and are not intended to influence approach or exit flight lines during aerial water/retardant drops or low elevation reconnaissance of fire activity. At no time should the helicopter or airtanker pilot-in-command

fly in such a way as to endanger the aircraft, other aircraft, or structures, or compromise ground personnel safety in order to implement these guidelines.

- Please refer to further guidelines concerning aerial retardant drops near lakes, streams, rivers and ponds in the Anadromous and Other Aquatic Species Protection Measures section below.

- When flying over forested regions of RNSP between January 1st and September 15th, restrict flight elevations to at least 500 feet, preferably 1000 feet, above the canopy of suitable marbled murrelet and spotted owl habitat.
- When flying over known active spotted owl nests between February 1st and July 9th, restrict flight elevations to at least 1000 feet above the canopy within 0.25 miles of the nest site. Consult with the assigned ICT biologist for information on known active owl nest locations.
- When flying over known active bald nests between January 1st and August 31st, restrict flight elevations to at least 500 feet above the canopy within 0.5 miles of the nest site. Consult with the assigned ICT biologist for information on known active eagle nest locations.
- When flying over the Steller's sea lion colony during any time of the year, restrict flight elevations to at least 1000 feet above sea level with 0.25 miles of the colony.
- When flying over ocean beaches and offshore rocks between March 1st and September 30th, restrict flight elevations to at least 500 feet, preferably 1000 feet, above sea level. If the aircraft appears to cause seabirds or marine mammals to flush, gain elevation by at least 500 feet during future passes.
- When flying within 1000 feet of known active peregrine falcon eyries, restrict flight elevations to at least 500 feet. Consult with the assigned ICT biologist for information on known active peregrine falcon eyrie locations.

3) Direct Attack, Fire Line Construction and Mop Up Guidelines –

- When fire is found in the canopy of single or multiple isolated large (>36 inch DBH) old growth trees, it is always preferable to extinguish the fire with a "bucket drop" from a helicopter and to avoid, if at all possible, felling the tree or letting it continue to burn.
- Where possible, expedient and fire fighter safety will not be compromised or fire suppression activities significantly hindered, avoid felling trees larger than 18 inches DBH when constructing fire lines, particularly trees with broken or deformed tops.
- Where possible, expedient and fire fighter safety will not be compromised or fire suppression activities significantly hindered, avoid felling snags greater than 24 inches DBH.

- Avoid placing fire camps 0.25 miles and heliports within 0.5 miles of suitable spotted owl and marbled murrelet habitat between February 1st and September 15th. This period would extend to January 1st near known bald eagle nest sites. Where possible, expedient and where fire fighter safety will not be compromised or fire fighting suppression activities significantly hindered, avoid placing spike camps and staging areas within 0.25 miles of suitable spotted owl and marbled murrelet habitat between February 1st and September 15th. This period would extend to January 1st near known bald eagle nest sites. Consult with the assigned ICT biologist for information on known active eagle nest locations.
- Inform all fire fighting field staff to always pack out all food waste and to never feed any wildlife.

II. Anadromous Fish and Other Aquatic Species Protection Measures

1) General Guidelines -

- A fishery biologist or fish and wildlife biologist (preferably one with local knowledge) should serve as a resource advisor with the incident command team (ICT). The biologist(s) should coordinate with the ICT about listed salmon and trout and their critical habitat and incorporate recommendations within the Incident Action Plan to minimize adverse effects.
- If a fishery biologist or fish and wildlife biologist is not available, assure that someone with local fisheries knowledge provides the ICT with information about the location of listed salmon and trout, their critical habitat, and recommendations to minimize adverse effects listed below.
- Use untreated water to suppress wildland fire within or near riparian habitat where feasible. If fire retardant or foam is used, follow the Guidelines for Aerial Delivery of Retardant or Foam Near Lakes, Rivers, Streams and Ponds detailed below.
- Avoid or minimize disturbance of ground cover and vegetation that exposes mineral soil within riparian areas, including:
 - fire line construction by dozers;
 - grading activities;
 - road reconstruction;
 - stream crossings;
 - ignition of backfires; and
 - staging areas, helibases, base camps, drop-off points, etc.
- Use water sources designated by a biologist for dipping and drafting. If not available, minimize using water sources where there is a risk of entraining listed salmon or trout or reducing in-stream flows, both on and off site. Use Water Drafting Guidelines detailed below.
- Avoid and minimize dam construction to pond water for drafting in streams where listed salmonids or their critical habitat are known or believed to be present.

- Avoid and minimize road and stream crossing construction where possible. If road construction is unavoidable, do so in a manner that prevents or minimizes erosion, sediment delivery to stream channels, and modification of the natural drainage patterns. Minimize the number of crossings, amount of fill, diversion potential, and maintain approaches that are perpendicular to the stream channel.

2) Guidelines for Drafting Water from Streams Containing Federally Listed Salmon and Trout

- Drafting will be restricted to one hour after sunrise to one hour before sunset to avoid attracting fish to the draft hose.
- Pumping rate will not exceed 350 gallons per minute.
- Pumping rate will not exceed 10% of estimated stream flow.
- Use streams and pools where water is deep and flowing, as opposed to streams with low flow and small isolated pools.
- Pumping will be terminated when the tank is full. The effect of single pumping operations, or multiple pumping operations at the same location, should not result in obvious draw-down of either upstream or downstream pools.
- Each pumping operation will use a fish screen (design standards described below). The screen should be oriented parallel to flow for best screening performance. The screen will be designed and used so that it can be submerged with at least one-screen-height-clearance above and below the screen.
- Pump operators will maintain a logbook containing the following information: operator's name, date, time, pump rate, filling time, screen cleaned (yes or no), screen condition, comments. These guidelines should be included as instructions in the logbook and made easily available to every operator.

Fish Screen Construction Criteria

- Surface Area – The total, unobstructed surface area of the screen will be at least 2.5 square feet, based on the upper limit of pumping of 350 gallons per minute. Larger surface areas are recommended where debris buildup is anticipated and where stream depth is adequate to keep the screen submerged at approximately mid-depth.

- **Screen Mesh** – Screen mesh must be in good repair and present a sealed, positive barrier that effectively prevents the entry of immature (20-30mm) salmon or trout fry. The screen mesh will be: round openings a maximum 3/32 inch diameter, square openings a maximum 3/32 diagonal, slotted openings a maximum 1/16 inch width.
- **Screen Design** – Water drafting screens may be off the shelf products, but they can be custom made devices appropriate to the scale and duration of the operation. To keep the screen supported and correctly positioned in the water column, adjustable support legs are advised. Screen geometry can be configured either as rectangular or cylindrical. The intake structure must be designed to promote uniform velocity distribution at all external mesh surfaces. This can be accomplished with a simple internal baffle device that distributes the flow evenly across the entire surface of the screen. In order to accomplish this, the designer needs to understand the hydraulic characteristics of these devices. There is a tendency for most of the intake water to enter the screen near the hose end, so a typical internal baffle would consist of a pipe (or manifold set of pipes) which have variable porosity holes at predetermined spacing. It is recommended to start near the hose end with approximately 5-10% average open area and gradually increase the porosity toward the length of the screen. At a point where screen length exceeds three times the diameter of the suction hose, the baffling effect tends to diminish rapidly. At this point the baffle porosity may approach 100%. A successful baffle system will functionally distribute flow areas to all areas of the screen. A poorly designed screen may result in high velocity “hot spots” which could lead to fish impingement on the screen face. Hydraulic testing of prototype screen designs is recommended where the screen use is on going and extensive.
- **Screen Structure** – The screen frame must be strong enough to withstand the hydraulic forces it will experience. However, structural frames, braces, and other elements that block the flow, change flow direction, or otherwise decrease the screen surface area should be minimized.
- **Screen Cleaning** – The screen must be cleaned as often as necessary to prevent approach velocity from exceeding 0.33 feet per second. Operators should withdraw the screen and clean it after each use or as necessary to keep screen face free of debris. Pumping should stop for screen cleaning when approximately 15% or more of the screen area is occluded by debris. A suitable brush shall be on board the truck for this cleaning operation.

3) Guidelines for Aerial Delivery of Retardant or Foam Near Lakes, Rivers, Streams and Ponds -

***PLEASE NOTE!**

At no time should the helicopter or airtanker pilot-in-command fly in such a way as to endanger the aircraft, other aircraft, or structures, or compromise ground personnel safety in order to implement these guidelines. Deviations from these guidelines are acceptable when life or property is threatened and the use of retardant or foam can be reasonably expected to alleviate the threat.

- Avoid aerial application of retardant or foam within 300 feet of waterways. To meet the 300-foot buffer zone guideline, implement the following:

- Airtankers: When approaching a waterway visible to the pilot, the pilot should terminate the application of retardant approximately 300 feet before reaching the waterway. When flying over a waterway, pilots should wait one second after crossing the far bank or shore of a waterway before applying retardant. Pilots should make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant within the 300-foot buffer zone.
- Helicopters: When approaching a waterway visible to the pilot, the pilot should terminate the application of retardant or foams 300 feet before reaching the waterway. When flying over a waterway, pilots should wait five seconds after crossing the far bank or shore before applying the retardant or foam. Pilots should make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant or foam within the 300-foot buffer zone.
- When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns, or lack of ground personnel, it is acceptable to anchor the foam or retardant application to the waterway. When anchoring a retardant or foam line to a waterway, use the most accurate method of delivery in order to minimize placement of retardant or foam in the waterway (e.g., a helicopter rather than a heavy airtanker).
- When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines.

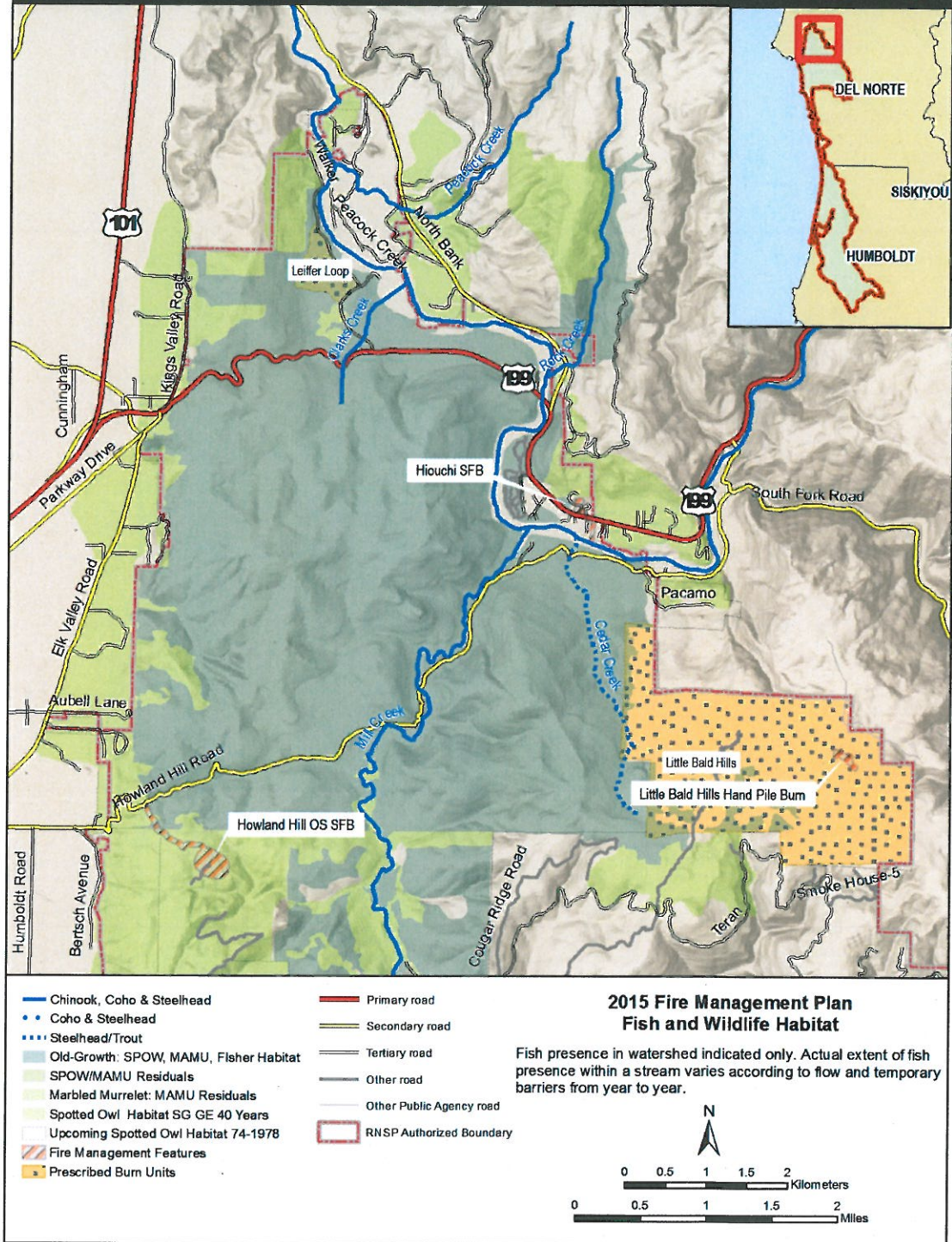
4) Guidelines for Wildland Fire Rehabilitation Actions -

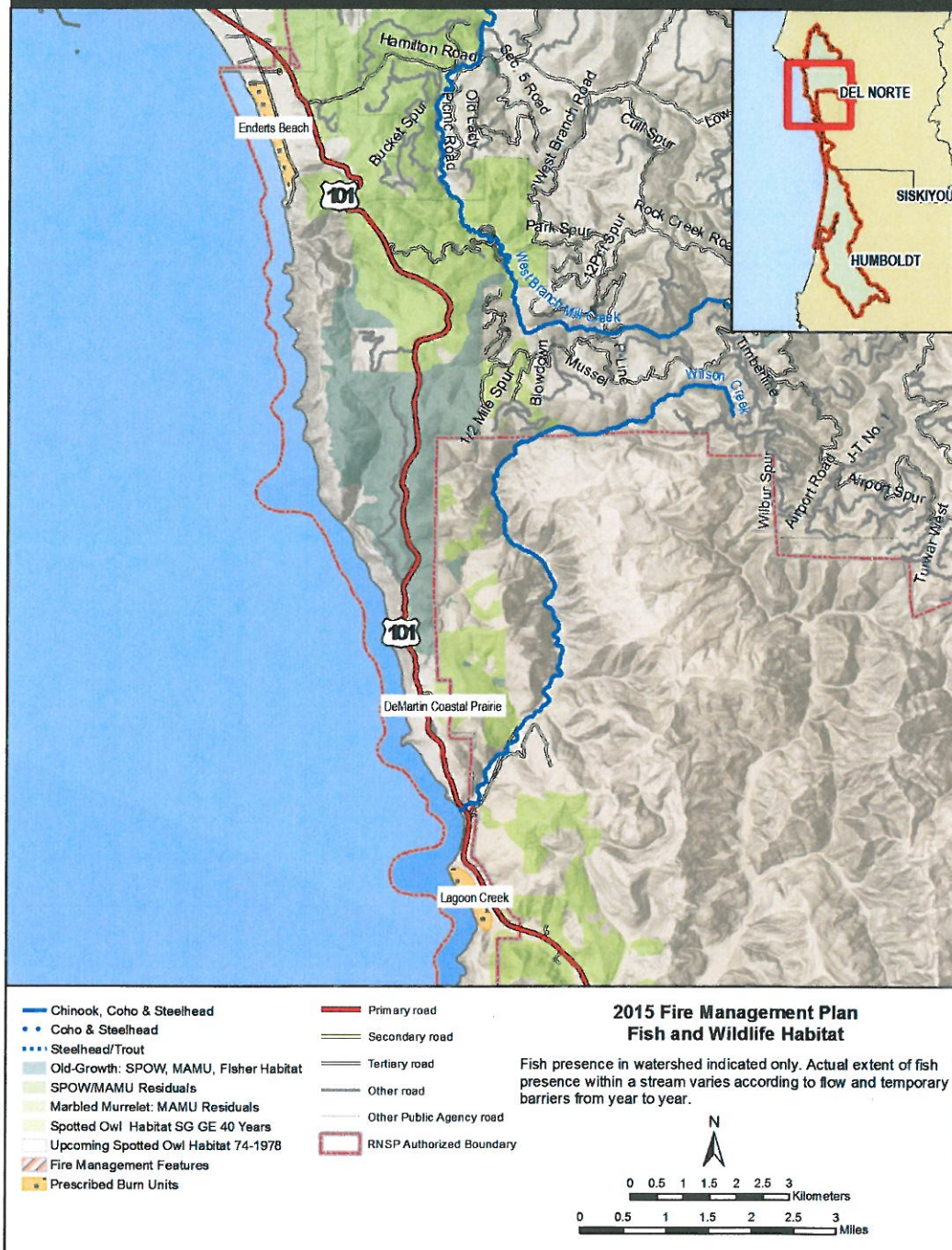
This section provides recommendations for avoiding and minimizing adverse effects on listed salmon and trout and their critical habitat from wildland fire rehabilitation activities. There are two types of emergency rehabilitation associated with wildland fires: fire suppression rehabilitation and burned area emergency rehabilitation (BAER). Fire suppression rehabilitation is any action that minimizes the effects of wildland fire suppression activities. BAER activities are implemented to reduce the effects of the wildland fire prior to the onset of winter precipitation.

- Remove woody debris or slash from stream channels only if it may cause an imminent threat of damage to life or property (e.g., above a culvert inlet that could potentially plug).
- Implement erosion control measures to restore natural drainage patterns and minimize the amount of exposed mineral soil, thereby reducing sediment delivery to stream channels.
- Decommission roads and stream crossings constructed for fire suppression actions.
- Decommission dams at drafting sites developed for the Actions.
- Include a fisheries biologist with local knowledge on the wildland fire suppression rehabilitation and BAER teams for identifying activities that benefit listed salmonids and their critical habitat.

Appendix 2

Maps





Document Path: N:\GIS_Maps\user_maps\466_SOC_FMP_TnEHab\Draft_BioMap_8x11_Portrait_2.mxd Data 12/3/2015 Using ArcGIS Server



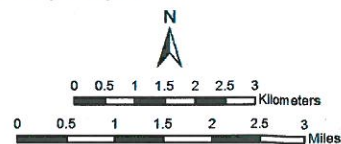


- Chinook, Coho & Steelhead
- Coho & Steelhead
- Steelhead/Trout
- Old-Growth: SPOW, MAMU, Fisher Habitat
- SPOW/MAMU Residuals
- Marbled Murrelet: MAMU Residuals
- Spotted Owl Habitat SG GE 40 Years
- Upcoming Spotted Owl Habitat 74-1978
- Fire Management Features
- Prescribed Burn Units

- Primary road
- Secondary road
- Tertiary road
- Other road
- Other Public Agency road
- RNSP Authorized Boundary

2015 Fire Management Plan Fish and Wildlife Habitat

Fish presence in watershed indicated only. Actual extent of fish presence within a stream varies according to flow and temporary barriers from year to year.



Appendix 3

Large Tree Mortality Post Prescribed Fire Monitoring Results From DA Second Growth Unit

Note, the 30 acres DA Second Growth Prescribed Burn Unit was burned in the fall of 2007 using the same prescription that will be used on all second growth burn units under the 2010 Fire Management Plan.

Hi Keith,

Here is a summary of results from Jason's DA second growth plots. 21 plots were measured preburn (summer 2006) and one year postburn (summer 2008). For overstory trees > 20 cm (7.9") DBH, there was a 3.7% reduction in density, and a 2.1% reduction in basal area. The results are as follows:

Overstory (> 20 cm DBH) tree density (trees/ha)

Preburn: 577.4

1 year postburn: 556

Overstory (> 20 cm DBH) basal area (m²/ha)

Preburn: 67.9

1 year postburn: 66.5

Let me know if you need any additional information.

-Jen



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1655 Heindon Road
Arcata, California 95521-4573

JAN 12 2016

Refer to NMFS No: WCR-2015-3781

Mr. Stephen Prokop
Superintendent, Redwood National Park
Redwood National and State Parks
1111 Second Street
Crescent City, California 95531

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens
Fishery Conservation and Management Act Essential Fish Habitat Response for the 2015
Redwood National Park Fire Management Plan

Dear Mr. Prokop:

On December 21, 2015 NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that Redwood National Park's (RNP) 2015 Fire Management Plan (FMP) is not likely to adversely affect (NLAA) the following threatened species and their critical habitats designated under the Endangered Species Act (ESA): (1) Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) Evolutionarily Significant Unit (ESU) (70 FR 37160, June 28, 2005), (2) California Coastal (CC) Chinook salmon (*O. tshawytscha*) ESU (70 FR 37160, June 28, 2005), (3) Northern California (NC) steelhead (*O. mykiss*) Distinct Population Segment (DPS) (71 FR 834, January 5, 2006), (4) SONCC coho salmon ESU critical habitat (64 FR 24049, May 5, 1999), (5) CC Chinook salmon ESU critical habitat (70 FR 52488, September 2, 2005), and (6) NC steelhead DPS critical habitat (70 FR 52488, September 2, 2005). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence. Your request concerns the effects of the Fire Management Plan on threatened salmonid species and their habitats within RNP lands.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. In this case, NMFS concluded the action would adversely affect EFH. Thus, consultation under the MSA is included near the end of this document.



This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System (https://pcts.nmfs.noaa.gov/pcts-web/dispatcher/trackable/WCR-2015-3781?overrideUserGroup=PUBLIC&referer=%2fpcts-web%2fpublicAdvancedQuery.pcts%3fsearchAction%3dSESSION_SEARCH). A complete record of this consultation is on file at the Arcata, California NMFS office.

Proposed Action

The 2015 Redwood National Park Fire Management Plan is expected to be effective through 2020. This plan includes guidelines for wildfire suppression, which may be used in the event of a wildfire, but any actions related to fire suppression will be analyzed through emergency consultation after the fire suppression event. Planned prescribed burning may treat approximately 6,000 acres of grassland, oak, and pine woodland, coastal shrub land and second growth forest on Redwood National Park lands. In addition, RNP is planning to create or maintain five shaded fuel breaks to provide more secure and defensible park boundaries, defensible spaces around park developments and escape routes in the event of a wildfire. Planned annual fuel reduction around seven historic structures and pond maintenance in and around four existing, human made ponds is also described in the Plan.

Prescribed Burning

Prescribed burning is proposed for 34 units, of which four are located in non-anadromous watersheds, 14 units are located within an anadromous watershed (but are not within 300 feet of perennial streams nor within 100 feet of intermittent streams), 15 units are within 100 feet of intermittent streams or hydrologically connected to perennial streams within 300 feet, and one unit is within 150 feet of a perennial stream. No units contain a perennial stream within the unit boundaries.

Preparation methods will include cutting grass with line trimmers and mowers along fire lines, fire line construction with chainsaws and hand tools, installation of fire hoses and establishing portable water tanks at strategic locations. Fire line construction will vary according to fuel type and time of year to ensure firefighter safety and allow for control of the prescribed fire. Burns completed late in the year that are dependent upon precipitation will utilize "wet" lines of either naturally occurring forest edge fuel moisture changes or through the direct application of water to vegetation prior to ignition. Where fire lines are constructed, they will be dug to mineral soil to a width of no more than four feet. These will be rehabilitated after the prescribed burn by replacing the topsoil or duff. Any fire lines which cross riparian areas will have water bars installed within 300 feet of any intermittent or perennial stream. No riparian vegetation which provides shade to watercourses will be removed during fire line construction, only understory shrubs and trees and low hanging branches will be removed to prevent fire from moving into the canopy of trees. Existing canopy cover will be maintained along all riparian areas within 300 feet of any intermittent or perennial stream. In grasslands additional mowing of fuels adjacent to the fire line may occur, while in oak woodlands or areas bordered by dense, young conifers, adjacent ladder fuels will be cleared (i.e. brush cut back, lower limbs removed, small diameter seedlings/pole sized trees cut). In second growth units, small pole sized trees within four feet of

fire lines may be cut and limbs of larger trees removed up to six feet above ground. No conifers greater than 18 inches DBH will be cut in any unit. In units with established roads, feller bunchers or a variation on such heavy equipment may be used to fell trees along road sides instead of hand crews with chainsaws. Debris will be scattered within the burn unit when feasible or hand piled and burned during the winter wet season in areas of heavier accumulation. No piles will be burned within the riparian area (i.e. within 300 feet) of any intermittent or perennial stream.

Treatment prescriptions will vary among units in order to meet specific unit objectives. Prescriptions will include flame lengths between 1 and 27 feet, and rates of spread between 3 and 60 chains per hour. Ignition will be accomplished using drip torches, fusees, and aerial ignition. The personnel committed to each burn may include up to 15 to 20 overhead positions, two handcrews, four engines, one helicopter, one water tender, portable tanks and pumps, as well as hose and related equipment. No water will be drafted from anadromous fish bearing streams.

All structures (historic or otherwise) within the burn units will be protected using standard methods including construction of fire lines, fuel reduction, and pretreatment with water and/or foam. No foam applications will be made within 300 feet of any intermittent or perennial streams.

Shaded Fuel Breaks

Mechanical thinning will involve cutting trees less than 18 inches DBH with chainsaws, as well as brush and tree limbs that could provide ladder fuels into the forest canopy along a 100 foot wide strip along either side of roads or around building complexes. Canopy cover will be maintained above 60% where it exists. Cut trees and limbs will be piled away from live trees and large logs and snags (i.e. logs >36 inches diameter on the wide end and longer than 10 feet and snags > 24 inches DBH) within the units or on the roads and either burned during the wet season (outside of the burn timing restrictions) or chipped with a mechanical chipper outside of the noise restrictions. Thinning may be done with chainsaws or feller bunchers or some mechanical variation. All five fuel breaks are located along ridge tops well away from any stream course or are at least 300 feet from the nearest perennial stream.

Historic Structure Annual Hazard Fuel Reduction

Seven historic structures have hazardous fuel accumulations (overgrown grass and brush within 40 feet of structures) that will be cleared annually in order to provide some wildfire protection for the structures (See Appendix 2 in the BA for further description; RNP 2015). All structures are at least 300 feet from any intermittent or perennial stream.

Pond Maintenance

Four existing, human-made ponds (formerly used as water sources for livestock or logging operations) will have low growing brush and sapling trees cleared in and around them with line trimmers and chainsaws to improve access and maintain them as firefighting water sources for prescribed fires, wildfires, or both. The four ponds (further described in Appendix 2 of the BA; RNP 2015) are all located on the upper portions of watersheds and are fed by small springs. The ponds are all located well upslope of anadromous reaches.

Action Area

Wildfire suppression, prescribed burning, shaded fuel break creation and maintenance, historic structure annual hazard fuel reduction, and pond maintenance will occur in various areas throughout Redwood National Parks. The prescribed burns are proposed in areas varying from 5 to 1,470 acres in size, although the entire acreage of each area won't necessarily all be burned at once or even in the same year in many cases.

Action Agency's Effects Determination

Table 1. Status of ESA listed species and designated critical habitat in the action area.

ESA-Listed Species	Status	Critical Habitat	Is Action Likely to Adversely Affect Species or Critical Habitat?*
Southern Oregon/Northern California Coast (SONCC) coho salmon ESU (<i>Oncorhynchus kisutch</i>)	<u>Threatened</u> ; 70 FR 37160, June 28, 2005	<u>64 FR 24049, May 5, 1999</u>	No
California Coastal (CC) Chinook Salmon ESU (<i>O. tshawytscha</i>)	<u>Threatened</u> ; 64 FR 50394, September 16, 1999	<u>70 FR 52488, September 2, 2005</u>	No
Northern California (NC) steelhead DPS (<i>O. mykiss</i>)	<u>Threatened</u> ; 71 FR 834, January 5, 2006	<u>70 FR 52488, September 2, 2005</u>	No

Based on the nature and timing of the actions proposed in the 2015 Fire Management Plan, Redwood National Park determined that the actions proposed in the plan may affect but are not likely to adversely affect federally threatened Southern Oregon/ Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), California Coast (CC) Chinook salmon (*O. tshawytscha*), Northern California (NC) steelhead (*O. mykiss*), and their designated critical habitats. The RNP has determined that there are no effects expected to the Southern Resident killer whale (*Orcinus orca*) and the Southern Distinct Population Segment (DPS) of the Northern American green sturgeon (*Acipenser medirostris*).

RNP determined that potential negligible effects could occur in 15 of the proposed burn units; in cases where intermittent streams are within 100 feet of burn units or are hydrologically connected to a perennial stream within 300 feet of the burn units. In these cases, ash sediment has the potential to be carried downstream into occupied fish bearing streams. This scenario is unlikely, however, because only very small amounts of biomass will be burned in these burn units and the vegetation recovery is very rapid for the vegetation types proposed to be burned (Leonel Arguello, pers. comm.). In addition, past informal monitoring efforts of intermittent streams in or adjacent to these proposed burn units have indicated none to negligible amounts of ash transport or sedimentation after prescribed burning (Vicki Ozaki, pers. comm.; Barry Hill, letters on file). Measurable amounts of ash sediment, therefore, are not expected to originate from most of the prescribed prairie, oak woodland, pine woodland, coastal scrub and second growth coniferous forest burn units. It should be noted that the Copper Creek prescribed burn unit is within the same watershed as the Wildcat burn unit but is located at the top of the watershed and is of a different vegetation type (grass and oak woodland) than the lower elevation located Wildcat unit (second growth conifer). The Copper Creek unit will be affected differently by prescribed burning due to the much lower biomass (i.e. grass) that will be consumed by fire and its farther distance from the perennial stream flow areas as compared to the Wildcat unit. The only time and place where a measurable amount of ash sediment may wash into fish bearing streams would be during initial rains occurring immediately after prescribed burns in units within 150 feet of perennial streams.

Another potential sediment source caused by proposed activities is fire hand line construction whereby bare soil is exposed. Fire hand lines, however, will not cause sedimentation because they will be rehabilitated immediately after prescribed burning. Most of the fire lines will be mowed grass, wet lines, or utilize forest edges which do not expose any bare soil. No contamination from retardant use should occur because only buildings will be treated, all of which are located more than 300 feet from any intermittent or perennial stream.

The 300 acre Wildcat unit is entirely composed of second growth coniferous forest. The burn prescription is for a "cool" under burn that will only consume small diameter woody ground fuels, small pole sized trees, herbaceous vegetation, and duff. The forest canopy should not change significantly from its existing level of almost 100% (see Appendix 3 in the BA for results of past prescribed burning within another RNP second growth conifer forest unit; RNP 2015). Copper Creek runs through the middle of the Wildcat unit but is intermittent in the 300 acre area of the unit. It is expected that the reach of Copper Creek within the burn unit will be dry during the burn season. Riparian shading will not change post burn, as the forest canopy will not change significantly. The intact forest canopy will also greatly lessen the impact force of falling rain which should decrease the amount of mobilized ash sediment. The majority of the ash sediment that is transported should be prevented from entering the stream by the remaining larger woody debris that will not be consumed by the fire. In addition, the fire is expected to be spotty (R. Young, pers. comm.), with many unburned areas remaining, which should act as ash sediment traps. In particular, it is likely that the damper riparian areas near the perennial sections of the stream will not burn at all due to high fuel moisture content (R. Young, pers. comm.). These unburned riparian areas will also act as ash sediment traps. Some ash sediment, however, may reach the stream during very high flow events during the first rains of the rainy season in

December and January. This small amount of ash sediment should be further captured by stream course woody debris in the lower, unburned, two-thirds of the watershed, before reaching the very lowest reaches where anadromous fish are present. The listed salmonid life stages present in Copper Creek at that time of year will be rearing juvenile steelhead, rearing juvenile coho salmon, and steelhead trout. The effects to all listed fish present, regardless of life stage, will be negligible.

Consultation History

A field visit was conducted by RNP and NMFS staff on November 13, 2015, to view previous second growth prescribed burn units and to evaluate performance and effectiveness of past actions. The site visit also included a review of the proposed Wildcat second growth prescribed burn unit.

RNP includes wildfire suppression guidelines within the Biological Assessment (BA) for the Fire Management Plan (Appendix 1, RNP 2015). These guidelines are not a proposed action, and any incidental take resulting from wildfire suppression actions will be analyzed through an emergency Section 7 consultation and will not be considered further in this consultation.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, “effects of the action” means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

The effects of the proposed action are expected to include: temporary increases in suspended sediments and turbidity in receiving waters following burn treatments; and small potential of delivery of ash or nutrients into waterways.

Turbidity and Sedimentation

Ground disturbance resulting from fire line creation creates the potential for the delivery of fine sediment to stream courses-particularly where fire lines pass through riparian areas and are hydrologically connected to streams. The areas identified by RNP for prescribed burning will require fire line construction, but those fire lines crossing riparian areas and/or within 300 feet of any intermittent or perennial stream will have water bars installed using spacing standards described in Weaver and Hagans (1994). Water bars will significantly decrease any hydrological connectivity that may exist and reduce the potential for sediment delivery to streams to a negligible level. The rehabilitation of all riparian fire lines will also encourage the rapid re-

growth of vegetation on bare soil. Furthermore, NMFS expects that the unburned large woody debris, the undisturbed riparian vegetation, and the forest litter that will remain between the fire lines and streams will filter out most fine sediment before it reaches the surface water of any creeks.

Studies on adult and juvenile salmon have shown that salmon, when exposed to short-term pulses of suspended sediment, disperse from or avoided the area (Bisson and Bilby 1982, Whitman et al. 1982, Berg and Northcote 1985). In the unlikely case that suspended sediment, ash, or nutrients resulting from RNPs prescribed burns do enter the stream and are carried downstream to areas where listed species are present, the listed species exposed to temporary increases in turbidity will likely flee into suitable habitat elsewhere and be able to return after turbidity subsides to background levels. Therefore, NMFS believes that the potential effects of sediment on listed species will be insignificant.

Ash and Nutrients

Surface run-off of ash from prescribed fires and burn piles could increase nutrient levels and result in hypoxic conditions if allowed to enter streams. RNP proposes to keep all burn piles at least 300 feet from any intermittent or perennial streams, which will leave soils nearest to the streams intact and will reduce the erosion potential. Prescribed fire in the units that come within 300 feet of streams may burn in some riparian areas of intermittent streams. However, undisturbed ground and vegetation will remain between the burned area and the perennial streams and should filter out most ash before it can be delivered to streams. Similarly, ash laden water running down constructed fire lines will be prevented from reaching streams by water bars that will be constructed on all fire lines passing within 300 feet of any streams and will act to direct overland flow away from the exposed soil on fire lines and reduce erosion. Therefore, NMFS believes the total amount of nutrients delivered to the stream courses will remain small and insufficient in quantity to be measurable or detectable in receiving waters downstream of the project. Therefore, NMFS believes the effects of ash and increased nutrient levels on listed species to be discountable.

Aggregate Effects

The proposed actions are expected to have either insignificant or discountable effects due to their distance from water courses and from the minimization measures developed to avoid or reduce effects of the project on listed species. The units that are planned to have prescribed burn treatments are dispersed throughout the Park so that resulting effects remain spatially discrete. Prescribed burn treatment actions will be dispersed throughout the 5-year permit to avoid having all of the effects concentrated into one season. Therefore, NMFS does not anticipate additive or aggregate effects to result from this project.

Conclusion

Based on this analysis, NMFS concurs with Redwood National Park that the proposed action is not likely to adversely affect threatened SONCC coho salmon, CC Chinook salmon, NC steelhead or their designated critical habitats.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by Redwood National Park or by NMFS, where discretionary Federal involvement or control over the action has been retained or

is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

Under the MSA, this consultation is intended to promote the protection, conservation and enhancement of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10), and "adverse effect" means any impact which reduces either the quality or quantity of EFH (50 CFR 600.910(a)). Adverse effects may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

NMFS determined the proposed action may adversely affect EFH for species managed by the Pacific Coast Salmon Fishery Management Plan as follows

1. Temporally short-lasting, and spatially small increases in suspended sediment during and directly following the first few rains following prescribed burning for those units located within 150 feet of intermittent and perennial streams. EFH may also be adversely affected temporarily by habitat degradation resulting from increased sedimentation.

NMFS has no conservation recommendations to recommend for EFH, as the minimization measures already proposed in the proposed action are sufficient to avoid and minimize the anticipated effects resulting from the project. The RNP must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(1)). This concludes the MSA portion of this consultation.

Please contact Ms. Liz Perkins at (707) 825-1623, or via email at liz.perkins@noaa.gov, if you have any questions regarding this consultation.

Sincerely,



William W. Stelle, Jr.
Regional Administrator

RECEIVED JAN 15 2016

cc: Keith Bensen, RNP, Orick, CA
David Roemer, RNP, Orick, CA
AR #: 151422WCR2015AR00291

bcc: CHRON File (pdf)
Division- File copy

Literature Cited

- Anderson, D.G. 1988. Juvenile salmon habitat of the Redwood Creek basin in Humboldt County, California. Master's Thesis. Humboldt State University, Arcata, CA. 99 pp.
- Berg, L. and T.G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Onchorhynchus kisutch*) following a short-term pulses of suspended sediment. Can. J. Fish. Aqua. Sc. 42:1410-1417.
- Bisson, P. A., and R. E. Bilby. 1982. Avoidance of Suspended Sediment by Juvenile Coho Salmon. North American Journal of Fisheries Management 4: 371-374.
- Redwood National Park (RNP). 2015. A Biological Assessment of Impacts to Threatened Anadromous Salmonids from the 2015 Redwood National Park Fire Management Plan. December 2015. Orick, California.
- Weaver, W. E., D. K. Hagans. 1994. Handbook for Forest and Ranch Roads: A Guide for planning, designing, constructing, reconstructing, maintaining and closing wildland roads. Prepared for the Mendocino County Resource Conservation District; in cooperation with the California Department of Forestry and Fire Protection and the USDA Soil Conservation Service. Prepared by Pacific Watershed Associates. June 1994.
- Whitman, R. P., T. P. Quinn, and E. L. Brannon. 1982. Influence of Suspended Volcanic Ash on Homing Behavior of Adult Chinook Salmon. Transactions of the American Fisheries Society 111: 63-69.

PERSONAL COMMUNICATIONS

Anderson, David. Fishery Biologist. Redwood National and State Parks, Orick, CA
Arguello, Leonel. Supervisory Botanist, Redwood National Park, Orick, CA
Bundros, Greg. Geologist, Redwood National Park, Orick, CA
Ozaki, Vicki. Geologist. Redwood National and State Parks. Orick, CA.
Young, Rick. Fire Management Officer. Orick, CA