UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
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Refer to NMFS Consultation No.:
WCRO-2019-00032

January 23, 2020

Mark G. Eberlein
Regional Environmental Office
FEMA Region X
130 228th Street SW
Bothell, Washington 98201

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Federal Emergency Management Agency funding for Josephine County Fuels Reduction Project

Dear Mr. Eberlein:

Thank you for your letter of February 11, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for Josephine County (County) Fuels Reduction Project funded by the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP). The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA)(16 U.S.C. 1855(b)) for this action.

In this biological opinion (opinion), NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Southern Oregon/Northern California Coast (SONCC) coho salmon or result in the destruction or adverse modification of their designated critical habitat.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion for programs that do not require further FEMA decisions. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The incidental take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the Federal action agency must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on EFH pursuant to section 305(b) of the MSA, and includes one conservation recommendation to avoid, minimize, or otherwise offset potential adverse effects on EFH. This conservation recommendation is a subset of the ESA take statement's terms and conditions. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, FEMA must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Please contact Jim Muck at 541-957-3394 or Jim.B.Muck@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Kim W. Kratz, Ph.D.
Assistant Regional Administrator
Oregon Washington Coastal Office

cc. William Kerschke, FEMA

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Fish and Wildlife Coordination Act Recommendations for the

Josephine County Fuels Reduction Project

NMFS Consultation Number: WCRO-2019-00032

Action Agency: Federal Emergency Management Agency

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Southern Oregon/Northern California Coasts coho salmon (*Oncorhynchus kisutch*))	Threatened	Yes	No	Yes	No

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By:

Kim W. Kratz, Ph.D
Assistant Regional Administrator
Oregon Washington Coastal Office

Date: January 23, 2020

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1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), and implementing regulations at 50 CFR 402.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at the NMFS Roseburg office.

1.2 Consultation History

The Federal Emergency Management Agency (FEMA) sent a draft Biological Assessment (BA) for the Josephine County (County) Fuels Reduction Project to NMFS for review in October 2018. The BA evaluated potential effects of the proposed action to the Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), critical habitat for the species, and EFH for Chinook and coho salmon. The NMFS identified that the proposed action will constitute an adverse effect to SONCC coho salmon and will require formal consultation. The NMFS also provided conservation measures needed to minimize take associated with the project. These conservation measures were sent to FEMA with an email from Jim Muck (NMFS) to Bill Kerchke (FEMA) dated December 6, 2018. FEMA discussed these conservation measures with the County, and then adopted them into their proposed action with an email from Bill Kerchke to Jim Muck on December 20, 2018.

The County has applied to the Department of Homeland Security's FEMA through the Oregon Office of Emergency Management for a grant under FEMA's Hazard Mitigation Grant Program (HMGP). The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The purpose of the project is to reduce the likelihood of fire damage to rural residential development adjoining County-owned forest lands. The project proposes to reduce fire hazard fuels, including understory shrubs and ladder fuels, at seven County-owned forest sites. Each of the sites is adjacent to private rural residential development. The proposed fuels treatment project is intended to augment other defensible space work that has been previously completed by individual landowners, Firewise communities, and Josephine County.

FEMA requested formal consultation on the effects of the action on SONCC coho salmon and their critical habitat with a letter to Kim Kratz (NMFS) dated February 5, 2019. FEMA also requested consultation on the effects of the action on EFH for Chinook and coho salmon. NMFS initiated consultation upon receiving the letter on February 11, 2019.

1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02*).* Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The proposed action is to reduce hazardous fuels by removing understory and dense forest vegetation on seven treatment areas on County lands that adjoin private rural residential development. Lands are identified in Table 1 below.

Table 1. Summary of treatment area and anticipated duration of work.

Site Name	**Expected work duration**	**Acres Treated**
Bear Gulch	1-4 weeks	30
Jumpoff Joe	1-4 weeks	39.5
Winona	1-4 weeks	37
Stringer Gap	1-4 months	98.8
Hayes Hill	1-4 weeks	19.2
Little T	1-4 months	90.7
Little Elder	1-4 weeks	17.5
		332.7 Total Acres

The proposed action includes the following elements (Table 2):

A. Removal of Understory and Dense Forest Vegetation (Uplands outside of Riparian areas (RR))

- Prior to any vegetation removal, a forester will identify trees to be retained. All trees equal to or greater than 12" diameter at breast height (DBH) will be retained. In addition, where canopy cover is less than 40%, conifers less than 12" DBH will also be identified for retention as needed such to maintain a minimum 40% conifer canopy cover. Finally, where trees less than 12" DBH cannot be reasonably removed without significant damage to adjacent trees identified for retention, those trees will also be retained.
- Removal will typically be conducted using handheld chainsaws. Where slopes are less than 35% and understory vegetation is exceptionally dense such that handheld removal is not practical, a bulldozer may be used in limited areas to mechanically remove vegetation (this would only be proposed within the Stringer Gap parcel in dense stands of manzanita).

B. Removal of Vegetation within RR

- *Perennial Streams:* Maintain a 120-foot management zone within the RR for perennial streams • Inner buffer (0-60 feet): Maintain a 60 feet inner buffer with no fuels reduction • Outer Buffer (60-120 feet): Maintain a 50% canopy cover per acre and a minimum of 60 trees per acre (TPA) within the management zone of the RR. Do not cut trees greater than or equal to 12" DBH.

- *Intermittent Streams:* Maintain a 50-foot management zone within RR for intermittent streams • Retain 60 TPA and 50% canopy cover in the management zone of the RR. • Do not cut trees greater than or equal to 12" DBH.

Table 2. Thinning limitations for the various areas for the Josephine County Fuels Reduction Project.

Area	Zone	Thinning Requirements	Canopy Cover
Uplands	Outside of RR listed below	<12" DBH	40%
Perennial Streams (0-120')	Inner Zone (0-60')	No Fuels Reduction or pile burning	
	Outer Zone (60-120')	<12" DBH, maintain a minimum 60 TPA.	50%,
Intermittent Streams (0-50')	Inner Zone (0-50')	<12" DBH, maintain a minimum 60 TPA. No pile burning	50%

C. Timing and Duration of Work

- Vegetation removal will take one week to four months to complete per site, depending on the size of the site (Table 1). Vegetation removal and burning activities will occur outside of the fire season (June to October) to ensure that the project does not contribute to fire risk. FEMA identified the project could be expected to begin as early as the spring of 2019, depending on the timing of available FEMA funding. The County anticipates vegetation removal activity to take up to two years across all seven sites. Burning activity will occur one year after vegetation removal at each site.

The County will stack cut vegetation by hand into small piles (no larger than 10 feet by 10 feet), except at Stringer Gap where small mechanized equipment such as a skid steer loader may also be used. Piles would be allowed to dry for one year by covering with a tarp. Dried vegetation piles will be burned approximately one year after being cut. Burning will occur during periods of high moisture outside of the fire season, as determined by the Josephine County Forestry Program Director.

Project areas were generally determined based on the presence and location of existing roads and county parcel boundaries. At Little T and Stringer Gap, the road demarcating the project boundaries is inactive and overgrown. These roads will require clearing, and potentially road maintenance. At other sites, minor road repair and maintenance may be necessary prior to, during, or after proposed operations.

Additional Best Management Practices (BMPs)

- No pile burning within the 60 feet of perennial or 50 feet of intermittent stream channels.
- Prevent mechanical fuel reduction equipment within 60 feet of perennial or 50 feet of intermittent stream channels.
- Place residual slash on severely burned areas, where there is potential for sediment delivery into water bodies, floodplains, and wetlands.
- To reduce sedimentation, rehabilitation of natural surface roads would not occur when roads are wet. Similarly, heavy equipment (other than standard pickups) would not be used on natural surface roads when roads are wet. Road rehabilitation and use would be limited to the period of May 15th through October 15th unless weather or road conditions allow.
- Protective measures including water bars would be installed in areas of rehabilitated roads as needed to reduce sediment potential and areas where a dozer is used to remove vegetation. Additionally, if mechanized equipment is used to move debris to piles, erosion control measures will be implemented as needed to limit potential erosion. Such measures would be installed prior to fall rains.
- Burning will be conducted under the direction of the Josephine County Forestry Program Director. Josephine County Forestry staff, in conjunction with the Oregon Department of Forestry (ODF), will monitor and contain any possible spread of fire. Personnel overseeing the burns will adhere to all ODF-fire suppression gear and requirements, as described in OAR 629-043-0025 of the Oregon Forest Practices Act.

D. <u>Herbicides</u>

Beginning two to three years after vegetation removal, the County will apply herbicide to understory species that begin to recolonize. The County will use Imazapyr or Glyphosate depending on the vegetation to be treated. Herbicide applications will either occur through backpack foliar application or through cut-stump and hack and squirt methods. FEMA is not funding this maintenance work.

The County will follow Environmental Protection Agency (EPA) requirements for the applicable herbicide as well as any Oregon standards. The County also stated application would be consistent with the Oregon Forest Practices Act (Oregon Administrative Rules [OAR] 629-620). Typical herbicide BMPs are:

- All herbicide applications will occur consistent with label recommendations and will be applied by trained applicators using equipment that is calibrated on an annual basis.
- Only the quantities of herbicide needed for work in a given day will be transported to the project site.
- Herbicides will not be applied when the wind speed exceeds ten miles per hour to minimize potential for drift.
- Herbicide will not be applied if rain is projected within 24 hours.

- Herbicide selection (among the two proposed) will include consideration of the quantity of herbicide to be used, selectivity for species to be treated, and potential toxicity.
- The County has indicated that application methods will be limited to backpack application or cut-stump and hack and squirt. Only the minimum area necessary for effective control will be treated. Aerial broadcast spraying will not be used.
- Under the Oregon Forest Practices Act, BMPs include measures to prevent leaks and spills (OAR 629-620).
- Oregon Forest Practices Act prohibits herbicide spray within 10 feet of fish-bearing streams (OAR 629-620). In addition, the Josephine County Forestry Program Director indicated that the project will not apply herbicides within 50 feet of small Type F streams.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Identify the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote *et al.* 2014, Mote *et al.*

2016). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Tague *et al*. 2013, Mote *et al*. 2014).

During the last century, average regional air temperatures in the Pacific Northwest increased by 1-1.4°F as an annual average, and up to 2°F in some seasons (based on average linear increase per decade) (Abatzoglou *et al.* 2014; Kunkel *et al.* 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3-10°F, with the largest increases predicted to occur in the summer (Mote *et al.* 2014).

Decreases in summer precipitation of as much as 30% by the end of the century are consistently predicted across climate models (Mote *et al.* 2014). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007, Mote *et al.* 2013). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007, Mote *et al.* 2013). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez *et al.* 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote *et al.* 2014).

Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua *et al.* 2010). Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Mantua *et al.* 2010, Isaak *et al.* 2012). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier *et al.* 2011, Tillmann and Siemann 2011, Winder and Schindler 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer *et al*. 1999, Winder and Schindler 2004, Raymondi *et al.* 2013). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Wainwright and Weitkamp 2013, Raymondi *et al.* 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode *et al.* 2013). Earlier peak stream flows will also alter migration timing for salmon smolts, and may flush some young salmon from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989, Lawson *et al.* 2004).

In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote *et al.* 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0-3.7ºC by the end of the century (IPCC 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Tillmann and Siemann 2011, Reeder *et al.* 2013).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. Acidification also impacts sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely *et al.* 2012, Sunda and Cai 2012).

Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005, Zabel *et al.* 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Tillmann and Siemann 2011, Reeder *et al.* 2013).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these evolutionarily significant units (ESUs) (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney *et al.* 2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

2.2.1 Status of Southern Oregon Northern California Coast Coho Salmon

For Pacific salmon, we commonly use the four "viable salmonid population" (VSP) criteria (McElhany *et al.* 2000) to assess the viability of the populations that, together, constitute the species. These four criteria (spatial structure, diversity, abundance, and productivity) encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends on habitat quality and spatial configuration, and the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation in single genes to complex life history traits (McElhany *et al.* 2000).

"Abundance" generally refers to the number of naturally-produced adults (*i.e*., the progeny of naturally-spawning parents) in the natural environment (*e.g*., on spawning grounds).

"Productivity," as applied to viability factors, refers to the entire life cycle (*i.e*., the number of naturally-spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany *et al*. (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance," which is the manifestation of long-term population growth rate.

For species with multiple populations, once the biological status of a species' populations has been determined, we assess the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany *et al.* 2000).

The summaries that follow describe the status of the SONCC coho salmon, and their designated critical habitats, that occur within the geographic area of this proposed action and are considered in this opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (Table 3).

Table 3. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for SONCC coho salmon considered in this opinion. Listing status: 'T' means listed as threatened; 'E' means listed as endangered; 'P' means proposed for listing or designation.

Species	Listing Status	Critical Habitat	Protective Regulations
Coho salmon *(O. kisutch)*			
Southern Oregon/Northern California Coasts	T 6/28/05; 70 FR 37160	5/5/99; 64 FR 24049	6/28/05; 70 FR 37160

A recovery plan is available for this species (NMFS 2014). In 2016, we completed a 5-year review for this ESU in which we concluded that the ESU should remain listed as threatened; in the last 5 years there has not been improvement in the status of SONCC coho salmon or a significant change in risk to persistence of the ESU (NMFS 2016b).

<u>Spatial Structure and Diversity</u>. This species includes all naturally-spawned populations of coho salmon in coastal streams from the Elk River near Cape Blanco, Oregon, through and including the Mattole River near Punta Gorda, California; progeny of three artificial propagation programs are also included in the ESU (NMFS 2016b). Williams *et al.* (2006) designated 45 populations of coho salmon in the SONCC coho salmon ESU as dependent or independent based on their

historical population size. Independent populations are populations that historically would have had a high likelihood of persisting in isolation from neighboring populations for 100 years and are rated as functionally independent or potentially independent. Dependent populations historically would not have had a high likelihood of persisting in isolation for 100 years. These populations relied upon periodic immigration from other populations to maintain their abundance. Two populations are both small enough and isolated enough that they are only intermittently present (McElhany *et al.* 2000, Williams *et al.* 2006, NMFS 2014). These populations were further grouped into seven diversity strata based on the geographical arrangement of the populations and basin-scale genetic, environmental, and ecological characteristics (Table 4).

NMFS (2014) determined the role each of the populations will serve in recovery (Table 4). Independent populations likely to respond to recovery actions and achieve a low risk of extinction most quickly are designated "Core" populations. We based this designation on current condition, geographic location in the ESU, a low risk threshold compared to the number of spawners needed for the entire stratum, and other factors. Independent populations with little to no documentation of coho salmon presence in the last century, and poor prospects for recovery were designated as non-core 2. All other independent populations are designated non-core 1. With improved data from 2006, NMFS (2014) found five of the 45 populations were ephemeral. We also established biological recovery objectives and criteria for each population role (Table 5) in our recovery plan for this species; core populations will play a major role in recovering this ESU while the other populations will contribute to maintaining and increasing connectivity and diversity (NMFS 2014).

Table 4. Independent and dependent SONCC coho salmon populations by stratum and role of each population in recovery (Williams *et al*. 2006). Ephemeral populations per NMFS (2014) not listed.

Diversity Stratum	Independent Population	Population Role
Northern Coastal Basins	Elk River	Independent - Core
	Brush Creek	Dependent
	Mussel Creek	Dependent
	Lower Rogue River	Independent - Non-Core 1
	Hunter Creek	Dependent
	Pistol River	Dependent
	Chetco River	Independent - Core
	Winchuck River	Independent - Non-Core 1
Interior Rogue River	Illinois River	Independent - Core
	Middle Rogue and Applegate rivers	Independent - Non-Core 1
	Upper Rogue River	Independent - Core
Central Coastal Basins	Smith River	Independent - Core
	Elk Creek	Dependent
	Wilson Creek	Dependent

Diversity Stratum	Independent Population	Population Role
	Lower Klamath River	Independent - Core
	Redwood Creek	Independent - Core
	Maple Creek/Big Lagoon	Independent - Non-Core 2
	Little River	Independent - Non-Core1
	Strawberry Creek	Dependent
	Norton/Widow White Creek	Dependent
	Mad River	Independent - Non-Core 1
Interior Klamath River	Middle Klamath River	Independent - Non-Core 1
	Upper Klamath River	Independent - Core
	Salmon River	Independent - Non-Core 1
	Scott River	Independent - Core
	Shasta River	Independent - Core
Interior Trinity River	Lower Trinity River	Independent - Core
	Upper Trinity River	Independent - Core
	South Fork Trinity River	Independent - Non-Core 1
Southern Coastal Basins	Humboldt Bay tributaries	Independent - Core
	Lower Eel and Van Duzen rivers	Independent - Core
	Guthrie Creek	Dependent
	Bear River	Independent - Non-Core 2
	Mattole River	Independent - Non-Core 1
Interior Eel River	South Fork Eel River	Independent - Core
	Mainstem Eel River	Independent - Core
	Middle Fork Eel River	Independent - Non-Core 2
	North Fork Eel River	Independent - Non-Core 2
	Middle Mainstem Eel River	Independent - Core
	Upper Mainstem Eel River	Independent - Non-Core 2

Table 5. Biological recovery objectives and criteria to measure whether recovery objectives are met for SONCC coho salmon (NMFS 2014).

VSP Parameter	Population Role	Biological Recovery Objective	Biological Recovery Criteria[1]
Abundance	Core	Achieve a low risk of extinction	The geometric mean of wild adults over 12 years meets or exceeds the "low risk threshold" of spawners for each core population[2]
	Non-Core 1	Achieve a moderate or low risk of extinction	The annual number of wild adults is greater than or equal to four spawners per IP-km for each non-core population[2]
Productivity	Core and Non-Core 1	Population growth rate is not negative	Slope of regression of the geometric mean of wild adults over the time series $\geq$ zero[2]
Spatial Structure	Core and Non-Core 1	Ensure populations are widely distributed	Annual within-population distribution $\geq$ 80%[4] of habitat[3,4] (outside of a temperature mask[5])
	Non-Core 2 and Dependent	Achieve inter- and intra-stratum connectivity	$\geq$ 80% of accessible habitat[3] is occupied in years[6] following spawning of cohorts that experienced high marine survival[7]
Diversity	Core and Non-Core 1	Achieve low or moderate hatchery impacts on wild fish	Proportion of hatchery-origin adults (pHOS) < 0.05
	Core and Non-Core 1	Achieve life-history diversity	Variation is present in migration timing, age structure, size, and behavior. The variation in these parameters,[8] is retained.

[1]All applicable criteria must be met for each population in order for the ESU to be viable.
[2]Assess for at least 12 years, striving for a coefficient of variation (CV) of 15% or less at the population level (Crawford and Rumsey 2011).
[3]Based on available rearing habitat within the watershed (Wainwright *et al.* 2008). For purposes of these biological recovery criteria, "available" means accessible. 70% of habitat occupied relates to a truth value of approximately 0.60, providing a "high" certainty that juveniles occupy a high proportion of the available rearing habitat (Wainwright *et al.* 2008).
[4]The average for each of the three year classes over the 12 year period used for delisting evaluation must each meet this criterion. Strive to detect a 15% change in distribution with 80% certainty (Crawford and Rumsey 2011).
[5]Williams *et al.* (2008) identified a threshold air temperature, above which juvenile coho salmon generally do not occur, and identified areas with air temperatures over this threshold. These areas are considered to be within the temperature mask.
[6]If young-of-year are sampled, sampling would occur the spring following spawning of the cohorts experiencing high marine survival. If juveniles are sampled, sampling would occur approximately 1.5 years after spawning of the cohorts experiencing high marine survival, but before juveniles outmigrate to the estuary and ocean.
[7]High marine survival is defined as 10.2% for wild fish and 8% for hatchery fish (Sharr *et al.* 2000). If marine survival is not high, then this criterion does not apply.
[8]This variation is documented in the population profiles in Volume II of the recovery plan (NMFS 2014).

<u>Abundance and Productivity</u>. Although long-term data on abundance of SONCC coho salmon are scarce, the best available data indicate that none of the seven diversity strata appear to support a single viable population, although all diversity strata are occupied (NMFS 2014). Further, 24 out of 31 independent populations are at high risk of extinction and six are at moderate risk of extinction. The extinction risk of an ESU depends upon the extinction risk of its constituent independent populations; because the population abundance of most independent

populations are below their depensation threshold, the SONCC coho salmon ESU is at high risk of extinction and is not viable (Williams *et al.* 2011). Estimates from the Rogue River with its four independent populations indicate a small but significant positive trend ($p = 0.01$) over the past 35 years and a non-significant negative trend ($p > 0.05$) over the past 12 years or four generations (NMFS 2016b). The decline in abundance from historical levels and the poor status of population viability criteria are the main factors behind the extinction risk of the ESU.

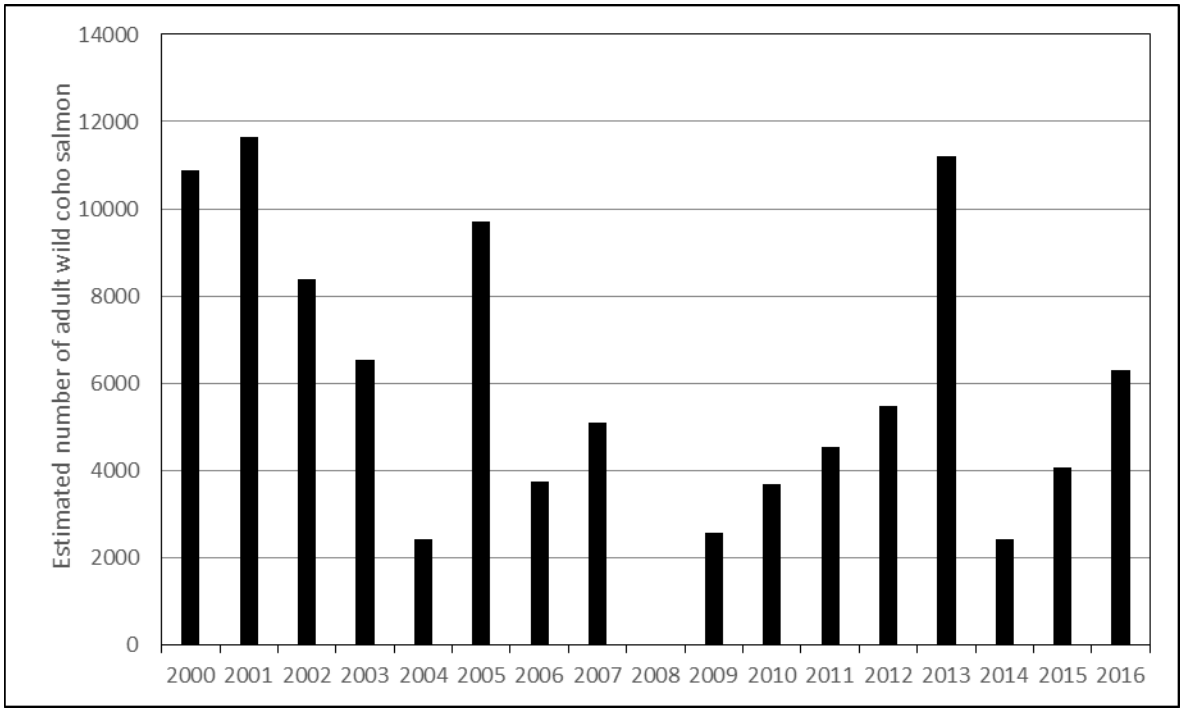

Figure 1. Estimated number of wild adult coho salmon in the Rogue River basin (Huntley Park sampling), 2000 to 2016.[1]

Limiting Factors. There is a heightened risk to SONCC coho salmon since the 2011 status review, primarily due to drought conditions, poor ocean conditions, and increased water withdrawals in many areas (NMFS 2016b). The recovery plan uses "stresses" to describe the physical, biological, or chemical conditions and associated ecological processes that may be impeding SONCC coho salmon recovery (NMFS 2014). Stresses for this species include:

- Lack of floodplain and channel structure
- Impaired water quality
- Altered hydrologic function (timing of volume of water flow)
- Impaired estuary/mainstem function
- Degraded riparian forest conditions
- Altered sediment supply

[1] 2008 data were excluded from consideration because the extremely low numbers were not consistent with that seen upstream at Gold Ray Dam, suggesting other reasons (sampling issues, data errors, etc.) for the dramatic drop in fish numbers from 2007 to 2008.

- Increased disease/predation/competition
- Barriers to migration
- Fishery-related effects
- Hatchery-related effects

2.2.2 Status of the Critical Habitats

This section examines the status of designated critical habitat affected by the proposed action by examining the condition and trends of essential physical and biological features throughout the designated areas. These features are essential to the conservation of the listed species because they support one or more of the species' life stages (*e.g.*, sites with conditions that support spawning, rearing, migration and foraging).

The physical or biological features of freshwater spawning and incubation sites, include water flow, quality and temperature conditions and suitable substrate for spawning and incubation, as well as migratory access for adults and juveniles (Table 6). These features are essential to conservation because without them the species cannot successfully spawn and produce offspring. The physical or biological features of freshwater migration corridors associated with spawning and incubation sites include water flow, quality and temperature conditions supporting larval and adult mobility, abundant prey items supporting larval feeding after yolk sac depletion, and free passage (no obstructions) for adults and juveniles. These features are essential to conservation because they allow adult fish to swim upstream to reach spawning areas and they allow larval fish to proceed downstream and reach the ocean.

Table 6. Essential features of critical habitats designated for SONCC coho salmon, and corresponding species life history events.

Essential Features		Species Life History Event
Site	Site Attribute	
Spawning and juvenile rearing areas	Access (sockeye) Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook, coho) Spawning gravel Water quality Water temp (sockeye) Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development
Adult and juvenile migration corridors	Cover/shelter Food (juvenile) Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified	Nearshore juvenile rearing Subadult rearing Adult growth and sexual maturation Adult spawning migration

Critical habitat for SONCC coho salmon was designated May 5, 1999 (64 FR 24049). Critical habitat for SONCC coho salmon includes all areas accessible to any life-stage up to long-standing, natural barriers and adjacent riparian zones. SONCC coho salmon critical habitat within this geographic area has been degraded from historical conditions by ongoing land management activities. Habitat impairments recognized as factors leading to decline of the species that were included in the original listing notice for SONCC coho salmon include:

1) Channel morphology changes
2) Substrate changes
3) Loss of in-stream roughness
4) Loss of estuarine habitat
5) Loss of wetlands
6) Loss/degradation of riparian areas
7) Declines in water quality
8) Altered stream flows
9) Fish passage impediments
10) Elimination of habitat

Numerous habitat restoration projects have been completed in many rivers and streams in the SONCC coho salmon range, but many more are needed to achieve the scale of habitat changes needed for this species to recover.

Many large and small rivers supporting significant populations of coho salmon flow through this area, including the Elk, Rogue, Chetco, Smith and Klamath. The following summary of critical habitat information in the Elk, Rogue, and Chetco rivers is also applicable to habitat characteristics and limiting factors in other basins in this area.

The Elk River flows through Curry County, and drains approximately 92 square miles (or 58,678 acres) (Maguire 2001). Historical logging, mining, and road building have degraded stream and riparian habitats in the Elk River basin. Limiting factors identified for salmon and steelhead production in this basin include sparse riparian cover, especially in the lower reaches, excessive fine sediment, high water temperatures, and noxious weed invasions (Maguire 2001).

The Rogue River drains approximately 5,160 square miles within Curry, Jackson, and Josephine counties in southwest Oregon. The mainstem is about 200 miles long and traverses the coastal mountain range into the Cascades. The Rogue River estuary has been modified from its historical condition. Jetties were built by the U.S Army Corps of Engineers (USACE) in 1960, which stabilized and deepened the mouth of the river. A dike that extends from the south shore near Highway 101 to the south jetty was completed in 1973. This dike created a backwater for the large shallow area that existed here, which has been developed into a boat basin and marina, eliminating most of the tidal marsh.

The quantity of estuary habitat is naturally limited in the Rogue River. The Rogue River has a large drainage area, but its 1,880 acre estuary is one of the smallest among Oregon's coastal rivers. Between 1960 and 1972, approximately 13 acres of intertidal and 14 acres of subtidal land were filled in to build the boat basin dike, the marina, north shore riprap and the other north shore developments (Hicks 2005). Jetties constructed in 1960 to stabilize the mouth of the river and prevent shoaling have altered the Rogue River, which historically formed a sill during summer months (Hicks 2005).

The Lower Rogue Watershed Council's watershed analysis (Hicks 2005) lists factors limiting fish production in tributaries to the Lower Rogue River watershed. The list includes water temperatures, low stream flows, riparian forest conditions, fish passage and over-wintering habitat. Limiting factors identified for the Upper Rogue River basin include fish passage barriers, high water temperatures, insufficient water quantity, lack of large wood, low habitat complexity, and excessive fine sediment (Rogue Basin Coordinating Council 2006).

The Chetco River estuary has been significantly modified from its historical condition. Jetties were erected by the USACE in 1957, which stabilized and deepened the mouth of the river. These jetties have greatly altered the mouth of the Chetco River and how the estuary functions as habitat for salmon migrating to the ocean. A boat basin and marina were built in the late 1950s and eliminated most of the functional tidal marsh. The structures eliminated shallow water habitats and vegetation in favor of banks stabilized with riprap. Since then, nearly all remaining bank habitat in the estuary has been stabilized with riprap. The factors limiting fish production in the Chetco River appear to be high water temperature caused by lack of shade, especially in tributaries, high rates of sedimentation due to roads, poor over-wintering habitat due to a lack of large wood in tributaries and the mainstem, and poor quality estuary habitat (Maguire 2001).

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The potential physical, chemical, and biological disturbance effects of this project would be limited to areas within ¼ mile of project activities; this area encompasses any potential effects of changes to habitat adjoining treatment areas, sedimentation associated with vegetation removal and soil disturbance, and effects from potential drift of pesticides (Figure 2). The Action Area also includes gated roads used to access the project sites.

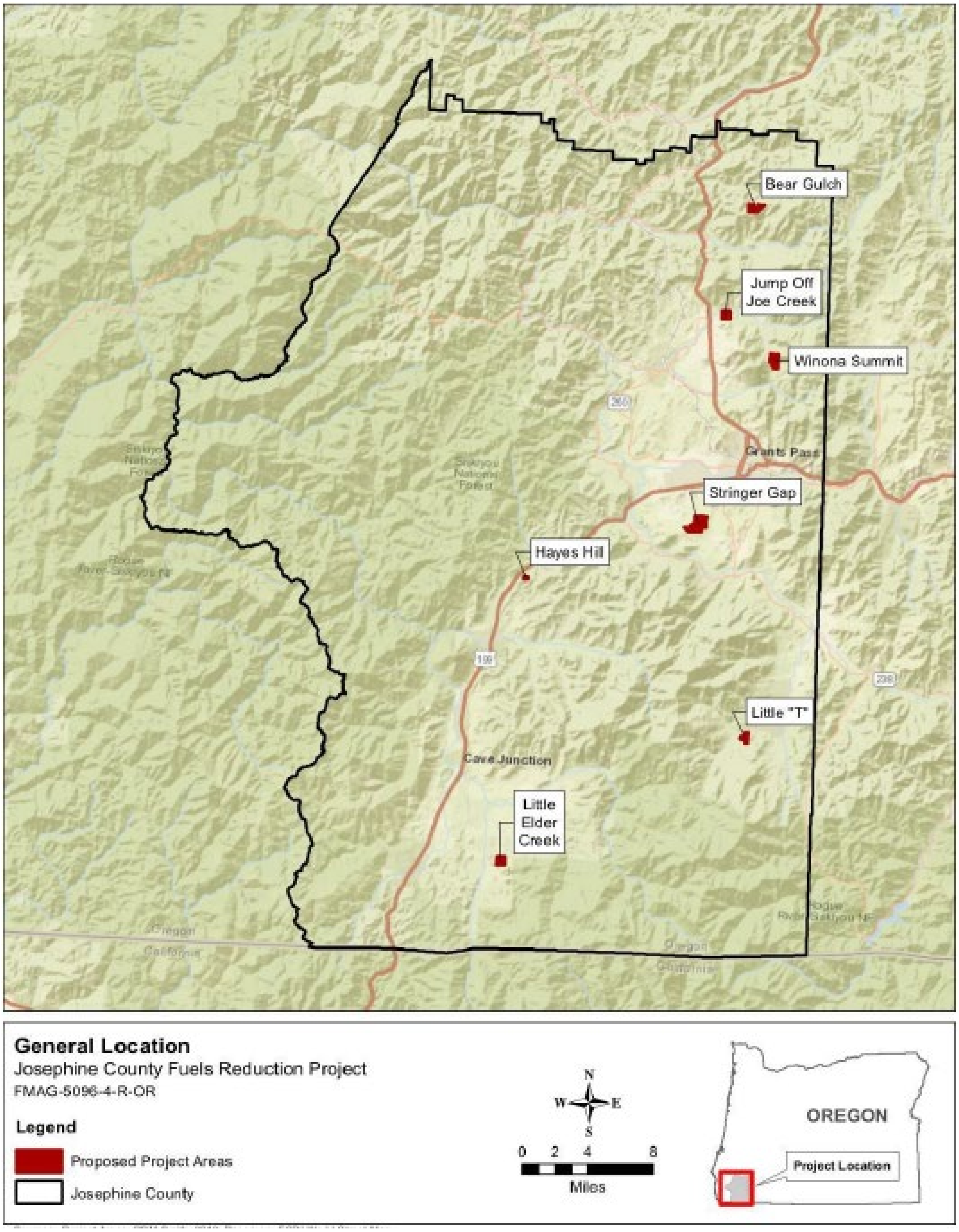

Figure 2. General location of the Josephine County Fuels reduction Project (taken from BA).

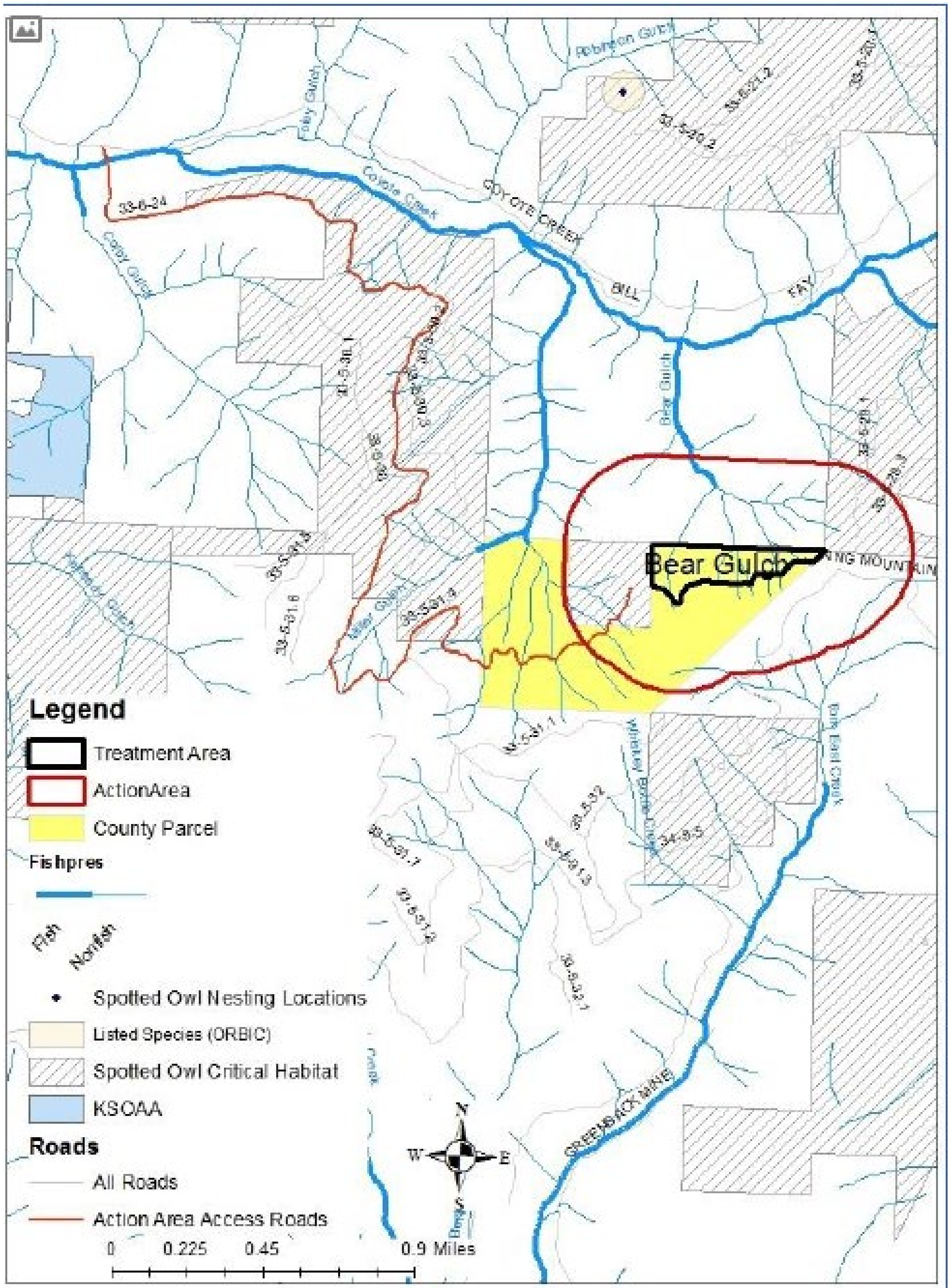

Figure 3. Bear Gulch Action Area (taken from BA).

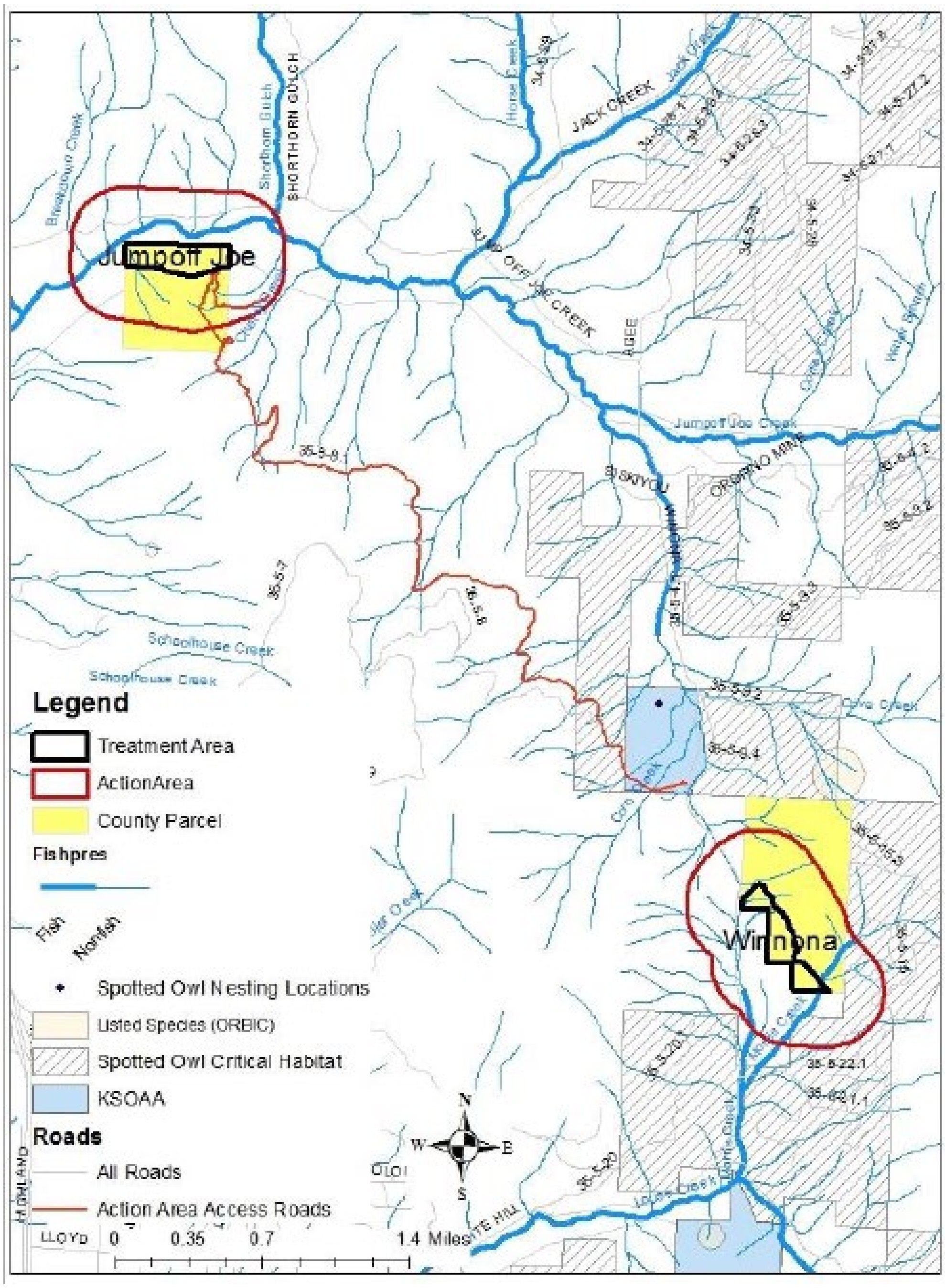

Figure 4. Jumpoff Joe and Winona Action Areas (taken from BA).

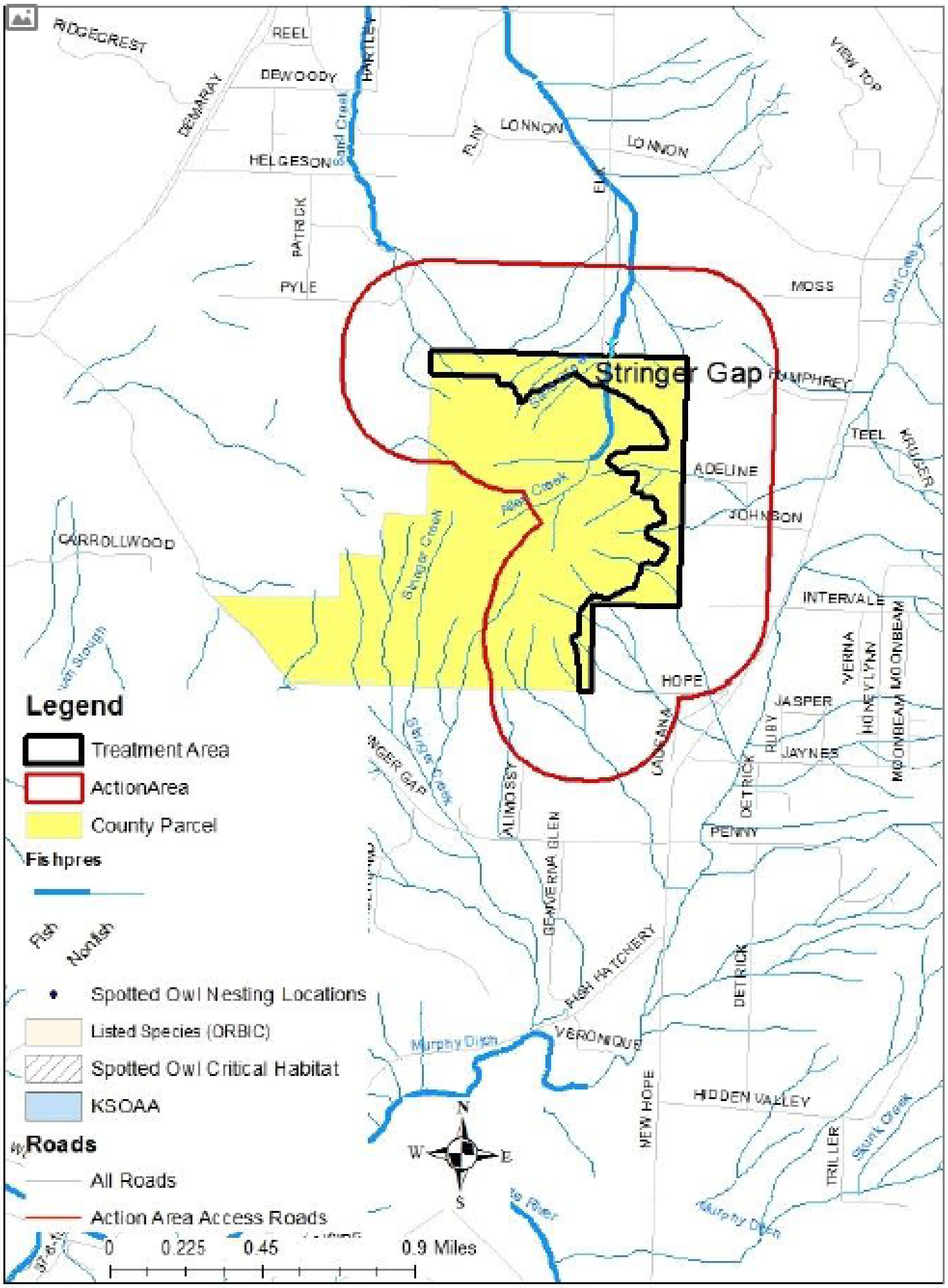

Figure 5. Stringer Gap Action Area (taken from BA).

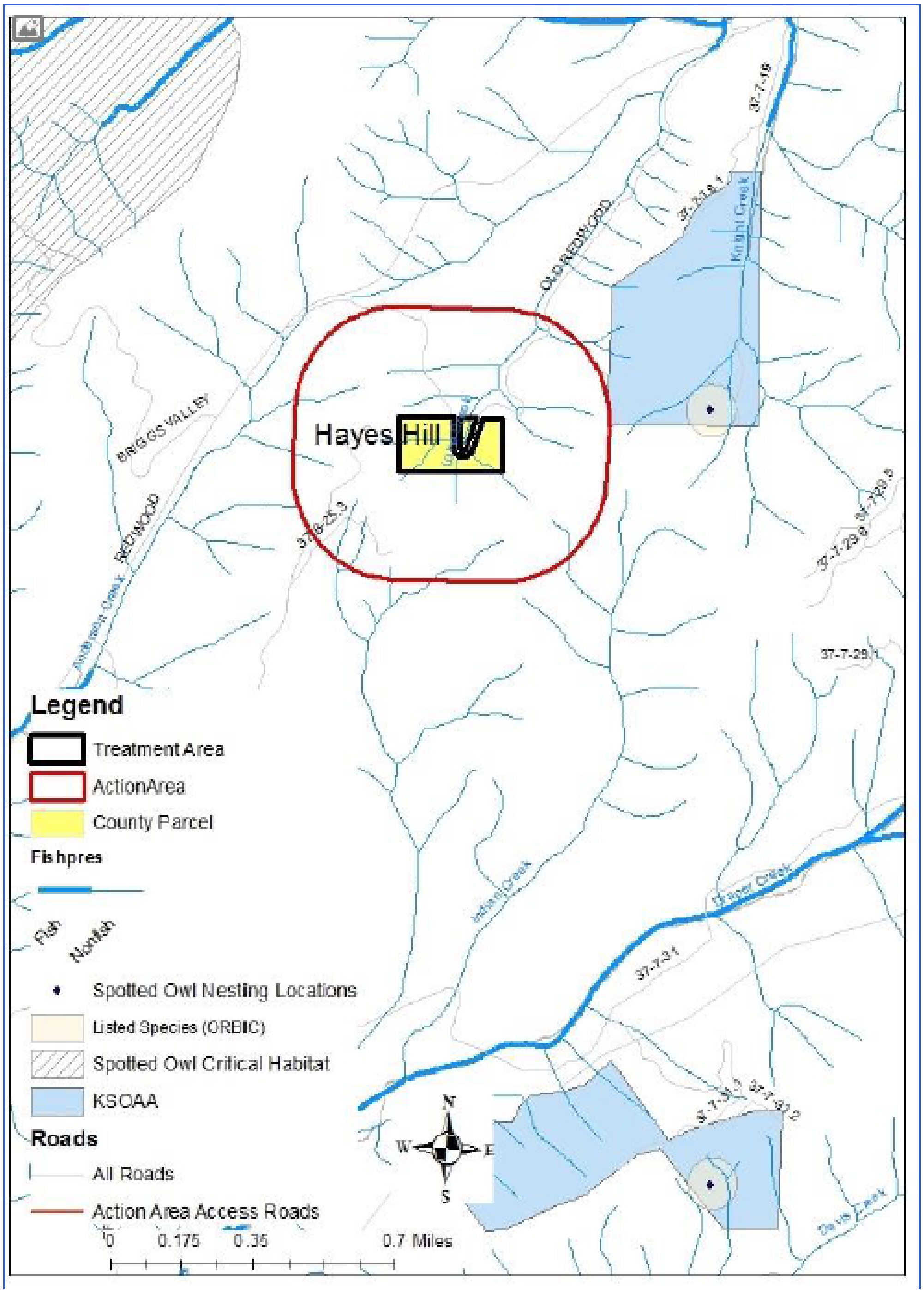

Figure 6. Hayes Hill Action Area (taken from BA).

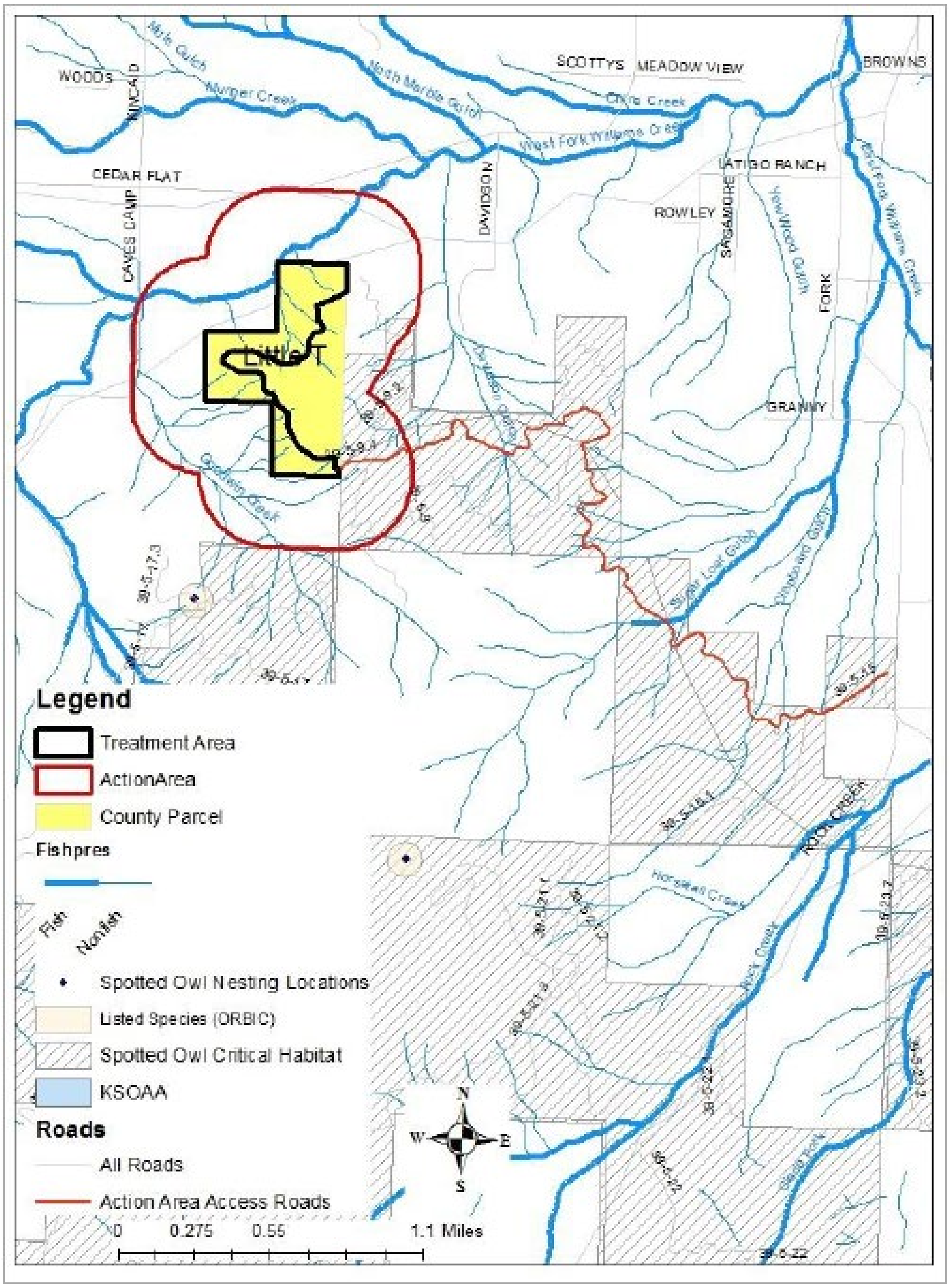

Figure 7. Little T Action Area (taken from BA).

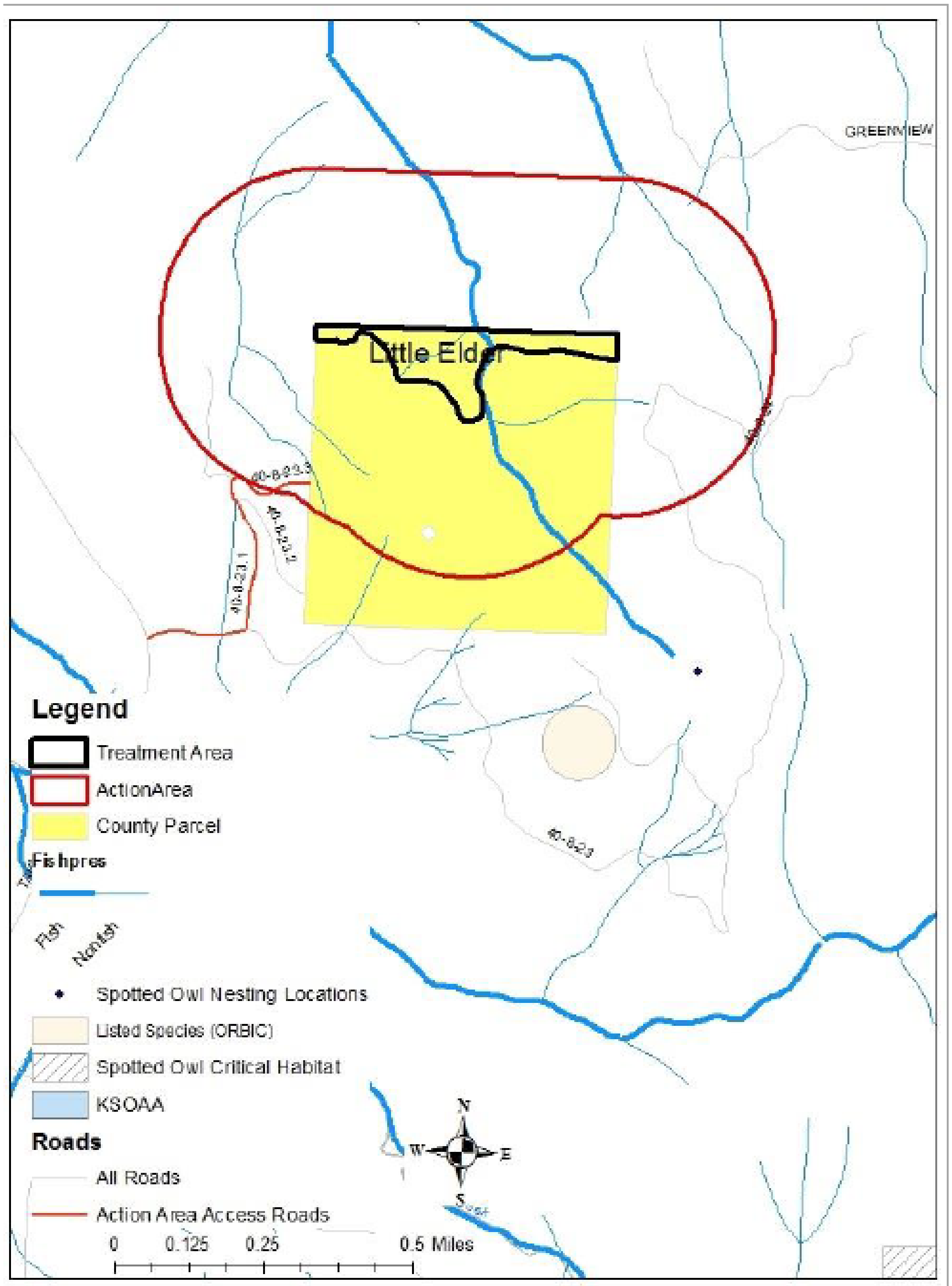

Figure 8. Little Elder Action Area (taken from BA).

2.4 Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The Rogue River drains approximately 5,160 square miles within Curry, Jackson, and Josephine counties in southwest Oregon. The mainstem is about 200 miles long and traverses the coastal mountain range into the Cascades. The action area is located within the Middle Rogue/Applegate Rivers population of SONCC coho salmon.

SONCC coho salmon migrate through the action area and use it for juvenile rearing. Juvenile's rear in the action area year-round and downstream juvenile migration is from mid-February through mid-July. Adult migration begins in September and ends mid-November. Adult spawning does not begin until November.

Salmon use waters that are warmer than their optimal thermal range during the summer, and portions of rivers and streams in the Pacific Northwest that historically supported this use most likely were naturally warmer than the optimal thermal range for these fish during the period of summer maximum temperatures (Poole *et al.* 2001a, b). In these warmer river reaches, some effects on baseline conditions of some individual fish are more likely to occur including slower juvenile growth, increased disease risk, and increased competition and predation during summer maximum temperatures. Therefore, coho salmon productivity is likely limited in the action area and the quality and function of critical habitat has been reduced, but it still provides support for SONCC coho salmon. Juvenile and adult SONCC coho salmon in the action area are exposed to modified environmental baseline conditions. Overall, under these environmental baseline conditions (i.e., elevated water temperatures, decreased flows, lack of habitat complexity), the baseline condition of an individual juvenile coho salmon in the action area is likely to be challenged, especially during summer maximum temperatures; but it is still able to grow at a reduced rate for relatively long periods with the ability to compensate through behavioral and physiological responses (Stenhouse *et al.* 2012). Adults are not present until after the warmest summer temperatures occur.

SONCC coho salmon distribution within the action area can be highly variable, both spatially and temporally. Coho salmon are a highly migratory species and they are dependent on fluctuations in marine survival; although individuals may not be found in an area at a particular time, they may be present in that same area at another time. Although abundance is depressed, we expect coho salmon will be present in areas designated as critical habitat for at least some time during the duration of the proposed action.

While there has been substantial habitat degradation across all land ownerships, habitat in many federal headwater stream segments is generally in better condition than in the largely non-federal lower portions of tributaries. The condition of aquatic habitats on federal lands varies from excellent in wilderness, roadless, and undeveloped areas to poor in areas heavily impacted by development and natural resources extraction. Because federal lands are generally forested and situated in upstream portions of watersheds, Bureau of Land Management and U.S. Forest Service lands now contain much of the highest quality aquatic habitat remaining in Oregon.

As described above in the Status of the Species and Critical Habitat section (2.2.1), factors that limit the recovery of species considered in this opinion vary with the overall condition of aquatic habitats on private, state, and federal lands. Within the action area, many stream, and riparian areas have been degraded by the effects of land and water use, including road construction, forest management, agriculture, mining, urbanization, and water development. Each of these economic activities has contributed to a myriad of interrelated factors for the decline of species considered in this opinion. Among the most important of these are changes in stream channel morphology, degradation of spawning substrates, reduced in-stream roughness and cover, loss of wetlands, loss and degradation of riparian areas, water quality (e.g., temperature, sediment, dissolved oxygen, contaminants) degradation, blocked fish passage, direct take, and loss of habitat refugia. Restoration actions within the action area, on balance, provide beneficial effects.

Climate Change
Climate change is likely to play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. Changes in climate have occurred throughout history and species have adapted to a wide variety of climatic conditions, therefore species may survive changes in climate provided these changes occur over a period of time and in the absence of anthropogenic stressors (NWFSC 2015). The previous general discussion and following domain specific discussion describes environmental stressors identifying current habitat conditions that have stressed the species considered in this document. Climate change is an on-going process and the predicted changes on the aquatic environment relate to thermal and hydrologic regimes (Mantua *et al*. 2010). The response by the different species to these changes to the current conditions of the environment depend on the species, their life history strategies, the life stage, watershed characteristics, and stock-specific adaptations to local environmental factors (Mantua *et al*. 2010, Beechie *et al*. 2008). As previously mentioned in the stock status section (2.2), changes in summer low flow and frequency of winter high flows have likely occurred and are predicted to increase due to climate change.

2.5 Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

The County proposes forest management on 332.7 acres as described in Section 1.3 above. The following analysis is focused on the general effects of the proposed action to the environment and relates those effects specifically to the PBFs of SONCC coho salmon critical habitat and then the response of individual SONCC coho salmon to these effects on the environment and critical habitat PBFs. Implementing the proposed action includes the potential for direct effects on individuals.

2.5.1 Effects on Critical Habitat

The effects of the proposed action will occur in the Jumpoff Joe Creek 5th field watershed (HUC No.: 1710031001), which is designated critical habitat for SONCC coho salmon. The conservation role of critical habitat in the action area is to provide habitat that supports successful juvenile and adult migration and successful juvenile rearing. The action area is used for rearing and freshwater migration. The PBFs of SONCC coho salmon in the action area are cover/shelter, food, riparian vegetation, space, water quality, water quantity, safe passage, substrate, water temperature, and water velocity.

Food, Space, Water Quantity or Water Velocity
The proposed action will not reduce food, space, water quantity or water velocity because the 60' no-touch buffers on perennial streams and the minimal amount of small trees removed in the intermittent streams and outer buffers of perennial streams (Table 2).

Safe Passage
The proposed action will not change the safe passage available for rearing and migration. There are no additional stream crossings or new road construction in the proposed action.

Water Quality (sediment)/Substrate
Living tree roots and vegetation help stabilize soil. Timber felling kills the roots of trees, which increases the probability of slope failure (Swanston and Swanson 1976), particularly on steep slopes (i.e., >70% concave, >80% planar or convex slopes) (Robison *et al*. 1999). This also increases the potential of sediment delivery to the stream network. The occurrence probability is related to the harvest intensity, soil properties, geology, unit slope, and precipitation level. Depending on the prescription used, fuels reduction will reduce the number of living trees within the treated stands. As the roots of harvested trees die and decompose, their effectiveness in stabilizing soils will decrease over time. However, the remaining larger trees are likely to experience rapid growth from decreased competition and, as a result, increase in their root mass and ability to stabilize soils in the treated stand.

Treatment in the inner zone (50 feet) of intermittent streams and outer zone of perennial streams would retain at least 50% canopy cover per acre and retain all trees greater than 12 inches DBH. Treatment of perennial streams will retain a 60 feet inner no-touch buffer (Table 2). Fuel treatments for the riparian thinning units could include lop-and-scatter, slash piling and pile burning, underburning, and biomass removal. There would be minimal ground disturbance associated with the riparian treatment units for the fuels component. Sediment transport to streams will be mostly interrupted and filtered by the vegetation in the protection buffers implemented in the RRs. Therefore, fuels treatment will only cause a small increase, if any, in suspended sediment and substrate embeddedness within critical habitat.

Canopy Cover/ Riparian Vegetation
Large wood is a critical habitat element of Pacific Northwest streams and forest that historically was abundant throughout the Pacific Northwest. Over the years, large wood has been removed from streams through timber salvage, splash damming, and stream cleaning. Additionally, large wood has been removed from riparian forest through commercial harvest, road building, forest thinning to improve tree growth, and forest clearing for agriculture and other land uses.

Large living and dead wood provides important habitat for coho salmon. Large riparian trees that die and fall into and near streams, such as within floodplains and wetlands, regulate sediment and flow routing, influence stream channel complexity and stability, increase pool volume and area, and provide hydraulic refugia and cover for fish (Bisson *et al*. 1987, Gregory *et al.* 1987, Hicks *et al*. 1991, Ralph *et al.* 1994, Bilby and Bisson 1998). The loss of wood is a primary limiting factor for salmonid production in almost all watersheds west of the Cascade Mountains (ODFW and NMFS 2011, NMFS ARBO 2013).

The County is planning to conduct fuels reduction in the dry forest of Southern Oregon. Dry forests respond more favorable to thinning than moist forest (Pollock 2016). However, wood potential continues to decline where thinning reduces the riparian area to 60 TPA (Pollock 2016). The County is thinning less than 12" DBH trees in the outer zone of perennial streams and all zones within intermittent streams. This will result in a reduction of wood potential to the stream. Wood forms pools in a wide range of channel sizes, but is particularly effective in smaller streams where relatively small pieces of wood can form pools (Bilby and Ward 1989, Montgomery *et al.* 1995, Beechie and Sibley 1997). As channel size increases, the size of wood required to form pools increases (Bilby and Ward 1989, Beechie and Sibley 1997, Abbe and Montgomery 2003).

Due to the small diameter of tree removal, the no-touch 60' buffer on perennial streams, the requirement to maintain at least 60 TPA in the outer RRs, and the 50% canopy cover requirement in RRs; the effects of fuels treatments will result in minimally reduced large wood availability to the stream channel. The remaining larger trees are likely to experience rapid growth from decreased competition and provide adequate stocking for future large wood recruitment into the stream. However, some smaller wood that may enter the stream through density dependent mortality will be reduced through fuels reduction of trees less than 12 inches DBH. These trees would have provided sediment retention in intermittent streams, and potential wood for increased cover in stream channels causing an adverse effect to critical habitat. These adverse effects are small as the prescriptions in the proposed action minimize the removal trees in the RRs though no-touch buffers, canopy cover, and trees per acre leave trees.

Water Temperature
Fuels reduction associated activities can influence water temperature at a sub-reach or reach scale. Removing trees in riparian areas reduces the amount of shade which leads to increases in thermal loading to the stream (Moore and Wondzell 2005). Substantial effects on shade in clearcut systems have been observed with no-cut buffers ranging from 20-30 meters (m) (66-99

feet) (Brosofske *et al*. 1997, Kiffney *et al.* 2003, Groom *et al*. 2011b), and small effects were observed in studies that examined no-cut buffers 46 m (151 feet) wide (Science Team Review 2008; Groom *et al*. 2011a). For no-cut buffer widths of 46-69 m (151-227 feet), the effects of tree removal on shade and temperature were either not detected or were minimal (Anderson *et al*. 2007, Science Team Review 2008, Groom *et al*. 2011a, Groom *et al.* 2011b). The limited response observed in these studies can be attributed to the lack of trees that were capable of casting a shadow > 46 m (150 feet) during most of the day in the summer (Leinenbach 2011).

While stream shade correlates with the width of no-cut buffers, the relationship is quite variable, depending on site-specific factors such as stream size, substrate type, stream discharge, topography (Caissie 2006), channel aspect, and forest structure and species composition. Inputs of cold water from the streambed, seepage areas on the stream bank, and tributaries can help cool the stream on hot summer days if they are sufficiently large relative to the stream discharge (Wondzell 2012). The density of vegetation in riparian areas affects shade and thermal loading to a stream due to the penetration of solar radiation through gaps in the canopy and among the branches and stems (Brazier and Brown 1973, DeWalle 2010). In some instances (such as narrow streams with dense, overhanging streamside vegetation, or stands on the north sides of streams with an east-west orientation), no-cut buffers as narrow as 30 feet adjacent to clearcuts can maintain stream shade (Brazier and Brown 1973). Wider buffers, in general will provide increased protection of stream temperature (Anderson *et al.* 2007, Science Team Review 2008, Groom *et al.* 2011a; Groom *et al*. 2011b).

Some of the best available science is found in the EPA modeling used to evaluate the effects of thinning prescriptions on stream shade (EPA 2013). The EPA addressed the following riparian vegetation attributes when evaluating the effects of riparian management on stream shade conditions: 1) Total width of the riparian buffer management zone; 2) width of the no-harvest buffer; 3) density of the vegetation within the no-harvest (expressed as canopy cover); 4) pre-harvest vegetation density within the outer "thinned" buffer; and 5) post-harvest vegetation density within the outer buffer. For EPA's modeling results, they referenced a BACI (before-after-control-impact) study on 33 streams exposed to riparian harvest (EPA 2013). Results showed an increase in stream temperature for streams that had a shade loss of greater than 6%. Based on the BACI results, the EPA developed a defensible shade loss Assimilative Capacity that used a maximum of 3% shade loss of streams to add a margin of safety. The 60 foot wide no-touch riparian width scenario on perennial streams from the proposed action indicates that the thinning has the potential loss of 10% of shade (Figure 9). However, the proposed action has conservation measures to maintain at least a 50% canopy cover in the outer zone (60-120'), thus minimizing the overall reduction of shade to the stream. Additionally, the County is only thinning the outside of the riparian areas to a 50% canopy cover verses clearcutting, and thinning is limited to trees <12" DBH. These conservation measure will reduce the overall reduction in shade to the stream. However, a reduction in shade could result in adverse effects to stream temperatures at a potential of 0.5 degrees Celsius as shown in Figure 10. Intermittent streams are dry in the summer and do not contribute to increased water temperature.

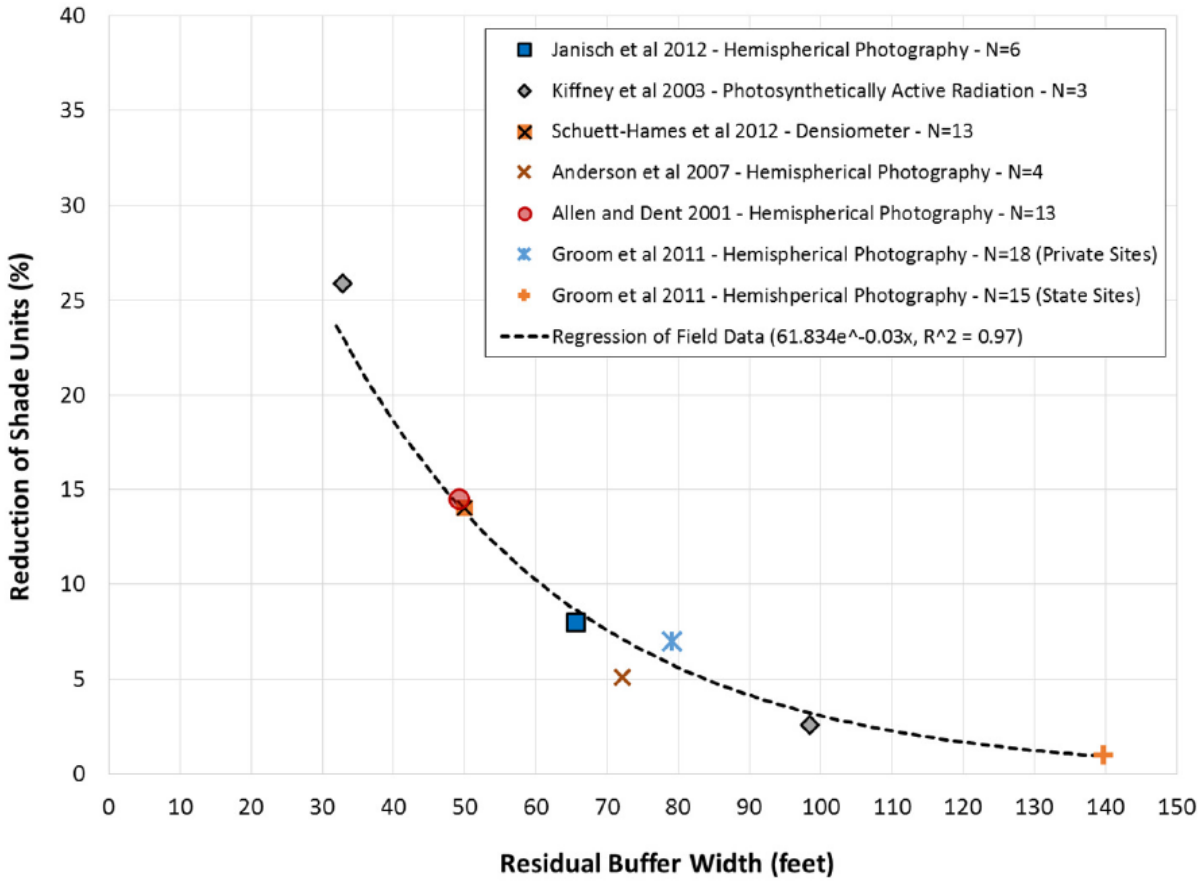

Figure 9. Observed mean stream shade response associated with "no-cut" riparian buffers with adjacent clearcut harvest. (taken from EPA Memorandum dated January 12, 2016).

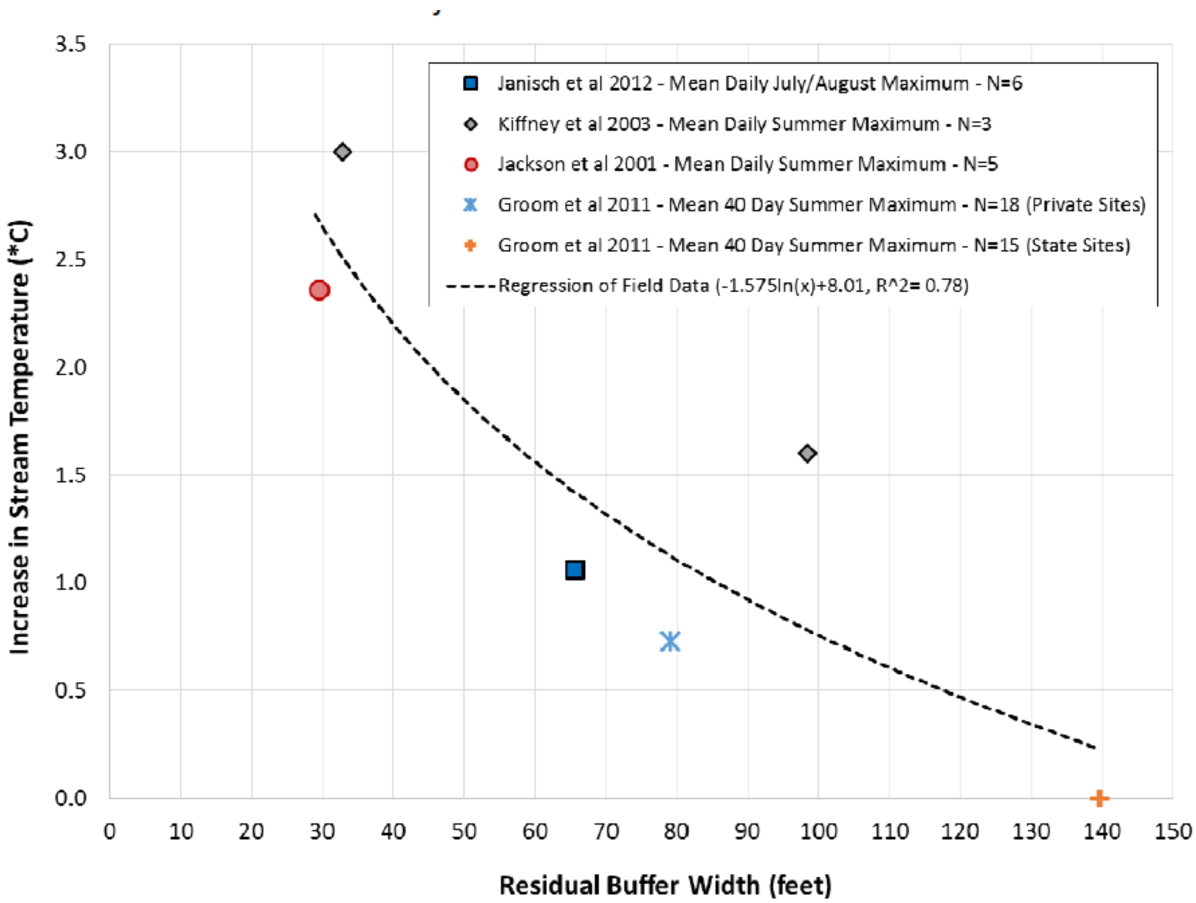

Figure 10. Observed mean stream temperature response associated with "no-cut" riparian buffers with adjacent clearcut.

Post-treatment Herbicide Treatment Actions on Critical Habitat

Water Quality - Chemical Contaminants
The County will apply herbicide to understory species that begin to recolonize. The County will use imazapyr or glyphosate depending on the vegetation to be treated. Herbicide applications will either occur through backpack foliar application or through cut-stump and hack and squirt methods.

Glyphosate bonds very strongly to soil and is expected to be immobile (U.S. EPA 1993). Therefore, there is a negligible risk for glyphosate to enter groundwater or streams from percolation through soil adjacent to treated tanoak. Sheetwash and rain splash are relatively ineffective in transporting sediment in undisturbed forested basins in the Pacific Northwest. High soil permeability and thick humus layer confine such activity to areas of recent disturbance (Dietrich *et al.* 1982). In addition, glyphosate would not be applied in the rain or when the soil is saturated or when a precipitation event likely to produce direct runoff to salmon bearing waters from the treated area is forecasted by NOAA/NWS (National Weather Service) or other similar forecasting service within 48 hours following application. Glyphosate transport to water with sediment in undisturbed areas would be unlikely.

Toxicity studies with imazapyr have failed to demonstrate any significant or substantial toxicity in test animals exposed to imazapyr via multiple routes of exposure (SERA 2011c). Imazapyr is effective at lower application rates and is less toxic than glyphosate. Imazapyr is soluble in water and can be strongly adsorbed by soils, but the adsorption coefficient varies for different types of soil. Degradation in water is photodegradation with a half- life of approximately 2 days. Exposure for fish can occur via direct contact to surface water that may contain the herbicide due to runoff after ground application. Bioaccumulation of imazapyr in aquatic organisms is low; therefore the potential of exposure through ingestion of exposed aquatic invertebrates or other food sources to fish is reduced. Toxicity to fish is considered practically non-toxic (insignificant) based on tests conducted using standardized EPA protocols. The 96-hour LC50 for the compound was recently established in rainbow trout fry exposed to the Arsenal formulation of the herbicide as 77,716 parts per million (ppm), or 22,305 ppm as the active ingredient. Sub-lethal tests with Chinook salmon smolts exposed to Arsenal at concentrations up to 1600 ppm showed no significant differences from the control population for plasma sodium or gill ATPase (Washington State Department of Agriculture 2003). Based on the results of the results of these tests and the proposed PDC, the risk of using imazapyr and glyphosate for brush treatments is low.

In summary, the herbicides proposed for use present little risk to coho salmon given the qualities of persistence, transport, and toxicity. In addition, the BMP's and avoidance and minimization measures that will be implemented will assure that any potential effects of herbicides on SONCC coho salmon are minimized.

Summary of Effects on Critical Habitat

The proposed action will result in a short-term effect (2-5 years) on water temperature PBFs from removal of shade trees in the RRs. Water temperature has the potential to increase 0.5°C in some reaches of streams where fuels reduction is occurring. Treatment areas that are adjacent to perennial streams include Winona (Figure 4), Stringer Gap (Figure 5), Little T (Figure 7), and Little Elder (Figure 8). Acres treated for these units total 274 acres. Conservative estimates based on maps provided estimate the RR area as 5% of the unit, or about 14 acres (274*5%). Given that riparian buffers are 120' in width, 14 acres of RRs equals about 5,082 feet which is approximately 1 mile of stream. These units are located on headwater perennial streams where flow is small. This increase in temperature will flow downstream until adjacent incoming tributaries mask this increase, which may include several overall stream miles.

The removal of trees <12 inches will result in loss of wood recruitment resulting in adverse effects to Canopy Cover/Riparian Vegetation PBFs. These effects may last from 10 to 20 years for future trees to grow and begin to fall into the stream. However, the adverse effects are small due to the removal of <12" trees, minimum no-touch buffers of 60', the 50% canopy cover leave requirement, and 60 trees per acre minimum leave trees in the outer zone.

The herbicides proposed for use present little risk to water quality indicator given the qualities of persistence, transport, and toxicity. The BMP's and avoidance and minimization measures that will be implemented will assure that any potential effects of herbicides on water quality indicator and SONCC critical habitat are minimized.

2.5.2 Effects on Species

Water Temperature

Water temperatures influence water chemistry, as well as every phase of salmonid life history. Research indicates that most salmonid species are at risk when temperatures exceed 22 to 25° C (Spence *et al.* 1996). In addition to the lethal effects of high temperatures, salmonids rearing at temperatures near the upper lethal limit have decreased growth rates because nearly all consumed food is used for metabolic maintenance (Bjornn and Reiser 1991). Temperatures exceeding the upper lethal limits may be tolerated for brief periods or fish may seek thermal refugia. Li *et al*. (1991) reported that resident rainbow trout in an eastern Oregon stream selected natural and artificially created cold water areas when temperature in the main stream channel exceeded 24°C and showed no preference for these areas when temperature in the main stream channel was less than 20°C. Coldwater refugia, such as springs and groundwater seeps, allow coho salmon to persist in areas where temperatures in mainstream channels exceed their upper lethal limit.

Adverse physiological and behavioral effects to salmon and steelhead accrue not only from persistent high temperatures in summer, but from intermittent exposure to high temperatures, increased diurnal variation in water temperature, and altered cumulative exposure history of the organism (McCullough 1999). Adverse effects to salmon from warm water temperature are likely to include: (1) Increased adult mortality and reduced gamete survival during pre-spawn holding; (2) reduced growth of alevins or juveniles; (3) reduced competitive success relative to non-salmonid fishes; (4) out-migration from unsuitable areas and truncation of spatial distribution; (5) increased disease virulence, and reduced disease resistance; (6) delay, prevention, or reversal of smoltification; and (7) harmful interactions with other habitat stressors such as pH and certain toxic chemicals, the toxicity of which is affected by temperature (Reeves et. al. 1987, Berman 1990, Marine 1992, Marine and Cech 2004, McCullough 1999, Materna 2001, McCullough *et al*. 2001, Sauter *et al*. 2001). These adverse effects are likely to affect all life stages of SONCC coho salmon.

As discussed above in Effects to Critical Habitat (2.4.1), water temperature will potentially increase 0.5°C in some reaches of perennial streams where fuels reduction occurs. NMFS has identified that take will occur at 0.3°C. We estimated that 5% of the units contain perennial streams, or about 1 mile of total riparian area length. This will lead to reduced survival of some juvenile SONCC coho salmon, caused by increased stress and reduced ability to capture food. However, since these streams are headwater streams, very few SONCC coho salmon are rearing in these small pools, and increased temperature will return to baseline temperatures as cool water tributaries enter the system.

Loss of potential Wood Recruitment

Large wood is a key habitat element of Pacific Northwest streams and forest that historically was abundant throughout the Pacific Northwest. Over the years, large wood has been removed from streams through timber salvage, splash damming, and stream cleaning. Additionally, large wood has been removed from riparian forest through commercial harvest, road building, forest thinning to improve tree growth, and forest clearing for agriculture and other land uses.

Large living and dead wood provides important habitat for SONCC coho salmon. Large riparian trees that die and fall into and near streams, such as within floodplains and wetlands, regulate sediment and flow routing, influence stream channel complexity and stability, increase pool volume and area, and provide hydraulic refugia and cover for fish (Bisson *et al*. 1987, Gregory *et al.* 1987, Hicks *et al.* 1991, Ralph *et al.* 1994, Bilby and Bisson 1998). The loss of wood is a primary limiting factor for salmonid production in almost all watersheds west of the Cascade Mountains (ODFW and NMFS 2011, NMFS ARBO 2013).

The County is planning to conduct fuels reduction in the dry forest of Southern Oregon. Dry forest respond more favorable to thinning than moist forest (Pollock 2016). However, wood potential continues to decline where thinning reduces the riparian area to 60 TPA (Pollock 2016). The County will maintain a 50 foot no-touch buffer on intermittent streams, and 60 foot no touch buffer on perennial streams. Additionally the County will maintain a 50% canopy cover and 60 TPA in the outer zone. These conservation measures will reduce the overall removal of trees in the RR. Additionally, overtime the remaining trees will increase in size contributing to large wood in the streams. The loss of trees will affect rearing potential for both summer and winter. This adverse effect will affect a small number of juvenile SONCC coho salmon due to the small size of headwater streams, and the small area of the fuels reduction program.

Water Quality
The herbicides proposed for use present little risk to SONCC coho salmon given the qualities of persistence, transport, and toxicity as discussed in above in the critical habitat section (2.5.1). The BMP's and avoidance and minimization measures that will be implemented will assure that any potential effects of herbicides on SONCC coho salmon are minimized.

2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The effects of non-Federal activities within the action area was described in the Environmental Baseline section above, and are expected to relatively stay the same or slightly increase in habitat quality. In particular, most of the adjacent lands are in private timber production where ODF State Forest Practice Act provides some protection for stream shade and wood recruitment. However, we have determined that ODF rules are still likely to reduce stream shade, slow the recruitment of large woody debris, and add fine sediments. Since there are no limitations on cumulative watershed effects, road density on private forest lands, which is high throughout the range of this ESU, when considered together, these cumulative effects are likely to have a negative effect on the abundance and productivity of SONCC coho salmon.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminishes the value of designated or proposed critical habitat for the conservation of the species.

SONCC coho salmon are at a high risk of extinction. Many of the PBFs for designated critical habitat in the domain are considered not fully functioning. A small percentage of Middle Rogue/Applegate population of the SONCC coho salmon are exposed to the proposed action. Currently, the Middle Rogue/Applegate population is at moderate extinction risk (NMFS 2014). The effects of the action on the SONCC coho salmon include increases in water temperature and potential reduction of large wood due to thinning of <12-inch trees in the riparian areas. The environmental baseline in the action area is degraded by past practices including road construction and timber harvest adjacent to streams. Effects from past forest management include increased suspended sediment, increased stream temperature, reduced woody inputs, and increased road density. Identified limiting factors for SONCC coho salmon included degraded floodplain connectivity and function, degraded channel structure and complexity, degraded riparian areas and large wood recruitment, degraded stream substrate, degraded water quality from altered water temperature, and degraded stream flows. The proposed action has conservation measures designed to minimize effects to limiting factors for stream complexity and water temperature; however, the proposed action is likely to increase stream temperatures and reduce large wood available for recruitment. This may occur in the short term (10-25 years) until new growth of trees will occur in the riparian areas to provide shade. Tree growth to achieve wood recruitment will occur over many decades. These adverse effects will affect several miles of headwater streams within several 6th Field HUCs. However, the adverse effects will be spread across two 5th Field HUCs (Jumpoff Joe Creek1710031001 and Grants Pass/Rogue River 1710030804) critical habitats.

Although the proposed action (habitat changes from increased water temperature and the potential reduction of wood) is likely to cause reduced feeding, rearing, and harassment of juveniles, the effects are not expected to cause a biologically meaningful effect at the species population scale or their designated habitat. This is because the effects will be spatially and temporally separated within two fifth field HUCS, and will likely only affect a small number of fish in the headwaters streams at any one time, and so the number of fish impacted will, by definition, be small.

Adverse effects to the quality and function of critical habitat PBFs influenced by this action will be of moderate intensity due to moderate magnitude of increased water temperature and reduction of large wood that is likely to occur. These effects are localized to the immediate action area and therefore the proposed action, on balance, is consistent with the recovery goals for the ESU for SONCC coho salmon critical habitat. The proposed action, taken together with the environmental baseline and cumulative effects, is not likely to appreciably reduce the likelihood of survival and recovery of SONCC coho salmon or their designated habitat.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SONCC coho salmon or destroy or adversely modify its designated critical habitat.

2.9 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

- Increased harm to juvenile SONCC coho salmon from increased water temperature in streams.
- Increased harm to juvenile SONCC coho salmon from potential loss of large wood.

The distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. Additionally, there is no practical way to count or observe the number of fish exposed to the effects of the proposed action over the period of time during which these effects will occur. In such circumstances, NMFS cannot provide an amount of take that would be caused by the proposed action and instead uses an indicator of the extent of take.

The indicator for the extent of take from increases in water temperature is represented by the sum of all the lengths of perennial streams adjacent to where fuels reduction will occur. NMFS calculates this sum from FEMA's proposed fuel reduction maps to be 5280 feet of perennial streams. This indicator is causally linked to the incidental take associated with stream temperature because the more riparian thinning occurs adjacent to perennial streams greater the loss of stream shade and increased water temperature. Thus, the extent of take indicator that will be used as a reinitiation trigger for this pathway is one mile of perennial streams adjacent to fuels reduction thinning.

The surrogate for incidental take caused by large wood indicator is related to the number of acres of thinning for the fuels reduction project. The severity of the harm caused by this proposed action component is causally linked to the number of acres because the number of acres of thinning results in fewer trees available for recruitment to streams, which results in fewer pools. This correlates with the number of juvenile SONCC coho salmon exposed and reduced carrying capacity, hence the amount of salmon that will be impacted. The surrogate that will be used as the reinitiation trigger for this take pathway is 332.7 acres.

Although the surrogates are somewhat coextensive with the proposed action, they nevertheless function as effective reinitiation triggers because the length of perennial streams and the number of acres used for fuels reduction will be monitored in real time and reported on annually, thus affording an opportunity to assess whether the take indicator has been exceeded on a periodic basis and prior to completion of the action.

2.9.2 Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

The following measures are necessary and appropriate to minimize the impact of incidental take of listed species due to the proposed action:

The FEMA shall:

1. Minimize the likelihood of incidental take resulting from adverse effects to water quality from increased water temperature.

2. Minimize the overall incidental take resulting from the adverse effects to SONCC coho salmon from loss of potential wood recruitment.

3. Complete monitoring and reporting to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and FEMA or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The FEMA or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following term and condition implements reasonable and prudent measure #1: Minimize the increase in Water Temperature. FEMA will require Josephine County to reduce the DBH of trees thinned to 8 inches or less within 120 foot of a perennial streams during fuels reductions.
2. The following term and condition implements reasonable and prudent measure #2: Reduction of Large Wood Recruitment. FEMA will require Josephine County to reduce the DBH of trees thinned to 8 inches or less within 50 foot of intermittent streams during fuels reductions.
3. The following term and condition implements reasonable and prudent measure #3:
   - Monitoring. FEMA shall develop and carry out an annual monitoring plan to collect the following information:
     - i. Josephine County will mark the perennial streams and distances that are planned thinning for Fuel Reduction. The County will ensure that fuels reduction will only occur adjacent to within 5280 feet of total sum within perennial streams. The County will develop a post report of total feet thinned adjacent to perennial streams.
     - ii. A total count of the number of acres of thinning that occur for the Josephine County Fuels Reduction Programs.
     - iii. Reporting. Submit each annual monitoring reports to NMFS by December 31 each year until all timber sale actions are complete, to the address below:

       National Marine Fisheries Service
       Oregon Washington Coastal Office
       Attn: WCRO-2019-00032
       1201 NE Lloyd Boulevard, Suite 1100
       Portland, OR 97232-2778

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. FEMA should coordinate with the County to install large wood into appropriate streams on the County land base.

2.11 Reinitiation of Consultation

This concludes formal consultation for Josephine County Fuels Reduction Program.

As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. The MSA (section 3) defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by FEMA and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plan developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

- The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of coho salmon as identified in the Fishery Management Plan for Pacific coast salmon (PFMC 2014).

3.2 Adverse Effects on Essential Fish Habitat

Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have adverse effects on EFH designated for Chinook and coho salmon. Adverse effects of the proposed action will include increases in water temperature and a reduction of large wood into the stream from the Josephine County Fuels Reduction Project.

3.3 Essential Fish Habitat Conservation Recommendations

1. Follow terms and conditions 1, 2, and 3 as presented in the ESA portion of this document to minimize adverse effects to coho salmon.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, approximately 332.7 acres of designated EFH for Pacific coast salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, FEMA must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

The FEMA 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(l)).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is FEMA. Other interested users could include Josephine County. Individual copies of this opinion were provided to FEMA. The format and naming adheres to conventional standards for style.

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation, contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA [*and MSA implementation, if applicable*], and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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