UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OR 97232-1274

Refer to NMFS No:
WCRO-2019-00431

July 13, 2020

Sean E. Callahan
Federal Aviation Administration
Northwest Mountain Region, Seattle Airports District Office
2200 S. 216th Street
Des Moines, Washington 98198

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Corona Municipal Works Facility, Larson Creek-Bear Creek (6th field HUC No.: 171003080110), Jackson County, Medford, Oregon

Dear Mr. Callahan:

Thank you for your letter of May 1, 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 the Federal Aviation Administration's (FAA) approval of property lease by the Jackson County Airport Authority to the City of Medford for development and operation of the Corona Municipal Works Facility. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). The enclosed document contains a biological opinion (opinion) prepared by NMFS pursuant to section 7(a)(2) of the ESA. In this opinion, NMFS concluded that the proposed action is not likely to jeopardize the continued existence of Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) or result in the destruction or adverse modification of their designated critical habitat.

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. This document also includes the results of our analysis of the action's likely effects on EFH.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion. 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 take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the FAA 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.

We have included one conservation recommendation to avoid, minimize, or otherwise offset potential adverse effects on EFH. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving this recommendation. If the response is inconsistent with the EFH conservation recommendation, the FAA must explain why the recommendation 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 response 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 Michelle McMullin in the Oregon Coast Branch of the Oregon Washington Coastal Area Office, at 541-957-3378 or Michelle.McMullin@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

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

Corona Municipal Works Facility
Larson Creek-Bear Creek (6th field HUC No.: 171003080110)
Jackson County, Medford, Oregon

NMFS Consultation Number: WCRO-2019-00431

Action Agency: Federal Aviation Administration

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 Coast 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: July 13, 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, as amended.

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 Oregon Washington Coastal Office.

1.2 Consultation History

On May 1, 2019, the Federal Aviation Administration (FAA) requested formal consultation for approval of a property lease by the Jackson County Airport Authority to the City of Medford for construction and operation of the Corona Municipal Works Facility. The FAA identified that the proposed action may affect, likely to adversely affect Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) and its designated critical habitat. The FAA also determined the proposed action would adversely affect EFH for Pacific Coast Salmon.

On May 20, 2019, NMFS sent the FAA a letter regarding completeness of the initiation package with a request for additional information because the consultation request did not include a post-construction stormwater management plan. The FAA provided a revised biological assessment (BA) on July 2, 2019, however the information provided remained insufficient. During a phone conversation and over e-mail on July 23, 2019, NMFS and FAA discussed the proposed action and strategized how to proceed with consultation. The FAA determined that they could provide a conceptual site specific stormwater management plan for the property but the adjacent roadwork portion of the proposed action would not be sufficiently designed at this time because the City of Medford is still in the planning stages. On October 7, 2019, the FAA provided updated information, which NMFS responded to on October 7, 2019, regarding clarifications. The FAA then provided clarifications on November 4, 2019, including a revised stormwater management plan (dated September 2019) and a stormwater information form (revised October 22, 2019). On November 22, 2019, the FAA requested to pause their consultation request while they undertook an internal review process of the proposed action with regard to the reauthorization bill of 2018, section 163. On December 4, 2019, NMFS requested that FAA clarify the proposed action due to the multiple revisions that had occurred since the receipt of the July BA. The FAA requested to re-start the consultation process on March 6, 2020 and on March 26, 2020, they provided a table summarizing differences between the amended BA received in July 2019 and the stormwater management plan received in October 2019. They also stated that e-mails received in October and November 2019 were to be construed as addendums to the amended BA. Consultation was initiated on March 6, 2020.

This opinion is based on information provided in the FAA's consultation request packet, in their amended BA, revised stormwater management plan, revised stormwater information form, and any information collected during phone calls and e-mails between May 1, 2019, and the finalization of the biological opinion. A complete record of this consultation is on file at the Oregon Coast Branch in Roseburg, Oregon.

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). The EFH definition of a 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 FAA proposes to approve the lease of an undeveloped, 6-acre portion of tax lot 4200 by the Jackson County Airport Authority (JCAA) to the City of Medford (City) for construction and long-term operation of the Corona Municipal Works Facility. The City is in the planning stages of the site's development for use as a public works facility, which is expected to include a storage area for inclement weather response materials (e.g., sand, spreaders, etc.), outdoor storage and maintenance buildings for vehicles and equipment, a fuel island with above-ground storage tanks, and office space. The FAA proposed that no construction will occur below the ordinary high water mark of any waterbody or in riparian areas; erosion and sediment controls will be implemented and maintained for all phases of the proposed development; construction vehicles and equipment will be stored, fueled, and maintained on designated areas; all disturbed areas will be restored by seeding and/or topsoil to stabilize exposed soils; the facility will have a prepared pollution prevention and spill response plan. The project area is more than approximately 0.3 mile from the nearest fish-bearing stream.

The City plans to construct the Facility in five phases. The precise layout, timing of each phase, and number of buildings has yet to be determined, but the general development concept is for nine or ten structures and/or enclosures with associated parking. Total new impervious surface proposed for the on-site developments will total approximately 3.5 acres.

The City is also planning to improve the adjacent street (Corona Avenue) by adding three driveway approaches to access the facility, by extending the terminus of the roadway by approximately 200 feet to the north, and by widening an existing road segment. The Corona Avenue improvements will result in approximately 0.35 acre of new impervious surfaces.

We considered whether or not the proposed action would cause any other activities and determined that the approval of the property lease to the City would cause the creation of new impervious surfaces and alter the amount of existing impervious surfaces. These activities are only occurring because the City intends to develop and use the leased property as a municipal public works facility for the long-term. NMFS did not identify any other activities that would be caused by the proposed action.

Regarding the treatment and management of runoff from impervious surfaces, the FAA provided a conceptual post-construction stormwater management plan for the on-site developments (i.e, approximately 3.5 acres). The proposed design is the construction and operation of 2 on-site extended detention basins that were developed based on the Rogue Valley Stormwater Design Manual (RVSS 2019) and were designed to fully treat the water quality design storm. Stormwater runoff from impervious areas will be divided into 2 drainage areas. Runoff in each area will be collected with “lynch style” catch basins for pretreatment and piped to an extended detention basin. Each extended detention basin will be vegetated with a minimum of a low-mow grass mixture and will be constructed with 18 inches of amended soil biofiltration mix of 40 percent sand, 30–40 percent topsoil, and 30–40 percent compost. The basins were sized using a stormwater management model (SWMM) in the AutoCAD Storm and Sanitary Analysis extension 2018. The SWMM uses the Santa Barbara Unit Hydrograph method to define the site hydrology and the Kinematic Wave method to route stormwater from the subbasin runoff, to stormwater facilities, and the proposed site outfalls. Runoff in each extended detention basin will have an approximate residence time of 72 hours. The south basin will be approximately 90 feet long with a capacity of 5,100 cubic feet. The north basin will be approximately 190 feet long with a capacity of 9,500 cubic feet. Orifice controls (2 per detention basin) will control the flow of water out of the facility. Combined flows released from the basins (i.e., post-construction flows) will be less than pre-development flows[1] for all storm events greater than the water quality design flow (up to the 10-year storm event; Table 1). For the water quality design flow (i.e., 50% of the 2-year, 24 hour event, post-construction flows will be slightly greater than the pre-development flows (Table 1). This was explained by FAA as being a result of a practical limitation on the size of the orifice; where pre-developed flows are quite low (less than 0.1 cubic feet per second) the small orifice size is impractical from a maintenance perspective because small orifices are prone to clogging.[2] Discharge from one basin will be routed through the City’s stormwater pipes for discharge to Bear Creek. Discharge from the other basin is anticipated to be routed through the City’s stormwater pipes to either Lone Pine Creek or to Bear Creek. It would be downstream of the project site, however, the precise discharge location is not currently known. Maintenance of the stormwater facilities will be performed by the City of Medford Public Works Facility Maintenance and Operations staff on a seasonal basis and after major rain events of one inch or more.

[1] NMFS defines “pre-development” site conditions for stormwater as the natural, undeveloped conditions of the project site prior to European settlement.

[2] E-mail from Sean Callahan, FAA, to Michelle McMullin, NMFS (November 4, 2019)(provided an explanation of the limitation).

Table 1. Summary of on-site discharge flows. Cfs = cubic feet per second.

24-hour storm	Pre-Development Flow (cfs)	Post-Construction Flow (cfs)
50% of the 2-year	0.04	0.06
2-year	0.36	0.32
5-year	0.75	0.54
10-year	1.20	1.03

The City will also design stormwater facilities to treat runoff from a total of approximately 0.68 acre of impervious surface; this includes a portion of the existing street adjacent to the site. The FAA did not provide a post-construction stormwater management plan for the Corona Avenue improvements, however, they did propose these stormwater facilities will be designed according to criteria in a NMFS programmatic biological opinion (NMFS 2016a). These criteria essentially include water quality treatment for 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (water quality design storm) and water quantity management that collectively limits discharge to match pre-developed discharge rates for flows between the water quality design storm and the 10-year, 24-hour storm.

The FAA also provided example contingency plan alternatives in the event that the site specific designs did not meet design criteria for water quality treatment or water quantity (flow) management. These alternatives for any deficit in stormwater treatment and management include depaving equivalent existing impervious surfaces at another location, removing one or more existing fish passage barriers, restoring riparian vegetation in the watershed, installing pervious pavement at another location where impervious surfaces are currently untreated, or installing stormwater retrofits at another location.

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 provide 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 an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably 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 CFR402.02). 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 as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation of critical habitat for SONCC coho salmon uses the term essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced 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 essential features. In this biological opinion, we use the term PBF to mean 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:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly 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, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- 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' "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 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; Kunkel *et al.* 2013, Abatzoglou *et al.* 2014). 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 percent 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.* 2009). 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 (Winder and Schindler 2004, Crozier *et al.* 2011, Tillmann and Siemann 2011). 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 (Crozier *et al.* 2008, Raymondi *et al.* 2013, Wainwright and Weitkamp 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 and steelhead 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).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10-32 inches by 2081-2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding, and shifts in the composition of nearshore habitats (Tillmann and Siemann 2011, Reeder *et al.* 2013). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick *et al.* 2007).

Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, 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 2013-2016 resulted in poor coho and Chinook salmon 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 (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 the Critical Habitat

Designation-wide, 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; and 10) elimination of habitat (62 FR 24049).

This section describes the status of designated critical habitat affected by the proposed action by examining the condition and trends of the essential PBFs of that habitat throughout the designated areas. These PBFs are essential to the conservation of the ESA-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 PBFs of freshwater spawning and rearing sites include suitable water quality, water quantity, space, and substrate conditions as well as habitat complexity and food (Table 2). These features are essential to conservation because without them the species cannot successfully spawn, produce offspring, or mature. The PBFs of migration corridors include the items identified above as well as suitable substrate, water velocity, water temperature, 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 smolts to proceed downstream and reach the ocean.

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 specific critical habitat analyzed in this opinion is the designated critical habitat for SONCC coho salmon within the Bear Creek 5th field watershed (HUC No.: 1710030801), the 6 watersheds that comprise the mainstem Rogue River between Bear Creek and the Lower Rogue River watershed, and the Lower Rogue River 5th field watershed (HUC No.: 1710031008) (Table 3). These eight specific critical habitat units are split into 3 descriptions: (1) Bear Creek watershed; (2) the 6 watersheds that comprise the mainstem Rogue River between Bear Creek and the Lower Rogue River watershed; and (3) the Lower Rogue River watershed.

Table 2. Physical and biological features of critical habitats designated for SONCC coho salmon and corresponding species life history events.

Physical and Biological Features		Species Life History Event
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Cover/shelter Food (juvenile rearing) Riparian vegetation Space Spawning gravel Water quality 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

Table 3. Description of the critical habitat units included in the biological opinion. Critical habitat units are designated at the 5th field watershed level but the sub-watershed is also included for the site of the proposed action. SONCC coho salmon use and populations are also included for each of the action area components.

Action area component	Critical habitat unit or sub-watershed	SONCC coho salmon use	Population(s) of SONCC coho salmon in the action area component	Designated critical habitat for SONCC coho salmon
Proposed Action	*Lone Pine Creek* - Larson Creek-Bear Creek 6th field HUC 171003080110	Juvenile over-winter refugia; potential for spawning, rearing, and migration	Upper Rogue River	Yes
Extent of action area based on downstream dispersion effects from the Proposed Action	*Mainstem Bear Creek at confluence with Lone Pine Creek and downstream* - Bear Creek 5th field HUC 1710030801	Adult spawning; juvenile rearing; adult and juvenile migration	Upper Rogue River	Yes
	*Mainstem Rogue River at confluence with Upton Creek and downstream to the Lower Rogue River**	Juvenile rearing; adult and juvenile migration	Upper Rogue River; Middle Rogue and Applegate Rivers†	Yes
	Mainstem Lower Rogue River - Lower Rogue River 5th field HUC 1710031008	Juvenile rearing; adult and juvenile migration; physiological transition between marine and freshwater environments	Upper Rogue River; Middle Rogue and Applegate Rivers; Illinois River; Lower Rogue River	Yes

*Includes the following 5th field watersheds (6 total): Gold Hill – Rogue River 5th field HUC 1710030802, Grants Pass – Rogue River 5th field HUC 1710030804, Hellgate Canyon – Rogue River 5th field HUC 1710031001, Horseshoe Bend – Rogue River 5th field HUC 1710031004, Stair Creek – Rogue River 5th field HUC 1710031005, and Shasta Costa Creek – Rogue River 5th field HUC 1710031006.
†Presence of individuals within the Middle Rogue and Applegate Rivers population would first occur in the Grants Pass – Rogue River 5th field HUC and continue to occur downstream to the Pacific Ocean.

Bear Creek Watershed
SONCC coho salmon use the Bear Creek 5th field watershed for spawning, migration, and juvenile rearing. There are approximately 290 miles of natural streams in the Bear Creek watershed and greater than 250 miles of irrigation canals (main canals only; ODEQ 2007a). The Rogue Basin Coordinating Council (2006) considers water temperature, water chemistry, sediment, water quantity, wood, stream complexity, and channel modification to need a significant amount of restoration activities to improve watershed conditions in the mainstem Bear Creek. These impacts have occurred from agriculture, forestry, grazing, irrigation impoundments and withdrawals, residential development, road building, and urbanization. Bear Creek has approved total maximum daily loads for dissolved oxygen and pH (ODEQ 2007b) and water temperature (ODEQ 2007a). The following PBFs in the Bear Creek watershed are likely degraded and are likely limiting the conservation role of this critical habitat unit: (1) Riparian

vegetation; (2) substrate/spawning gravel; (3) water quality; (4) water quantity; (5) water temperature; and (6) cover/shelter.

The Southwest Oregon salmon restoration initiative, as part of the Coastal Salmon Recovery Initiative, described "coho salmon core" areas and "high value" areas (RVCOG 1997). Core areas contain high quality habitat capable of sustaining coho salmon spawning and rearing year around. High value areas are stream sections that appear suitable for coho salmon spawning and rearing, whether or not fish are present. Approximately 47 percent of the Upper Rogue River (URR) population's high value coho salmon areas are located in the Bear Creek watershed. The Bear Creek high value habitat comprises approximately 26 percent of all the high value areas identified in the Rogue River basin. This information leads us to conclude that although the critical habitat within the Bear Creek watershed is degraded, it also has high conservation value and the area is an important spawning and rearing habitat and a critical migration corridor.

Mainstem Rogue River watersheds
The proposed action will also affect 6 units of critical habitat along the mainstem Rogue River between Bear Creek watershed and the Lower Rogue River watershed (Table 3). Adult and juvenile SONCC coho salmon use the mainstem Rogue River as a migration corridor and juveniles also use it for rearing. The Rogue Basin Coordinating Council (2006) considers water temperature, wood, stream complexity, barriers, and channel modification to need a significant amount of restoration activities to improve watershed conditions in the mainstem Rogue River from Curry County to Evans Creek. Between locations of the now defunct Gold Ray Dam and Lost Creek Dam, the Rogue Basin Coordinating Council (2006) state that sediment, wood, and gravel are the lowest ranking factors and that these need moderate to significant levels of restoration activities for improvement. Therefore, the following PBFs are likely degraded in these watersheds: (1) Cover/shelter; (2) water quality; (3) riparian vegetation; (4) substrate/spawning gravel; (5) water temperature; and (6) safe passage.

Lower Rogue River watershed
SONCC coho salmon use the Lower Rogue River for adult and juvenile migration, juvenile rearing, and physiological transition between marine and freshwater environments. The PBFs are the same as those listed above for the mainstem Rogue River watersheds. The Rogue Basin Coordinating Council (2006) considers water temperature, wood, and stream complexity to need a significant amount of restoration activities to improve watershed conditions in the Lower Rogue River watershed and they also listed channel modification as the lowest ranking factor for the estuary. Therefore, the following PBFs are likely degraded in the Lower Rogue River watershed: (1) Cover/shelter; (2) water quality; (3) riparian vegetation; and (4) water temperature.

2.2.2 Status of the Species

Table 4, below, provides a summary of listing and recovery plan information, status summaries, and limiting factors for SONCC coho salmon. More information can be found in the recovery plan and status review for SONCC coho salmon (NMFS 2014, NMFS 2016b). These documents are available at the NMFS West Coast Region website.

Table 4. Summarized listing, recovery plan, status review, and limiting factor information for SONCC coho salmon evolutionarily significant unit (ESU).

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern Oregon/ Northern California Coast coho salmon	Threatened 6/28/05	NMFS 2014	NMFS 2016b	This ESU comprises 31 independent, 9 dependent, and 5 ephemeral populations all grouped into 7 diversity strata. Of the 31 independent populations, 24 are at high risk of extinction and 6 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. Although recent changes in trend/viability of the ESU are considered to be mixed, there has not been a recent change in extinction risk (NMFS 2016b).	• Lack of floodplain and channel structure • Impaired water quality • Altered hydrologic function • Impaired estuary/mainstem function • Degraded riparian forest conditions • Altered sediment supply • Increased disease/predation/competition • Barriers to migration • Fishery-related effects • Hatchery-related effects

Rogue River Populations
Williams *et al.* (2006) delineated 4 coho salmon populations in the Rogue River Basin: (1) Upper Rogue River; (2) Middle and Applegate Rivers; (3) Illinois River; and (4) Lower Rogue River (Table 5). SONCC coho salmon in all four populations use portions of the action area for juvenile rearing, adult and juvenile migration, and physiological transition between marine and freshwater environments (Table 3). Individuals of the Upper Rogue River population also use portions of the action area for adult spawning, juvenile rearing, and juvenile overwinter refugia. The greatest factor limiting recovery of SONCC coho salmon Rogue River populations is the lack of suitable rearing habitat for juveniles (NMFS 2014).

Table 5. Viability information for the Rogue River populations of SONCC coho salmon (NMFS 2014).

Population	Extinction Risk	Spawner Level	IP-km[3]	Key Limiting Stresses	Key Limiting Threats
Upper Rogue	Moderate	Likely above depensation threshold	689	• Altered Hydrologic Function • Impaired Water Quality	• Agricultural Practices • Urban/Residential/ Industrial Development
Middle Rogue/Applegate	High	Likely above depensation threshold	603	• Lack of Floodplain and Channel Structure • Altered Hydrologic Function	• Dams/Diversions • Urban/Residential/ Industrial Development
Illinois	High	Likely above depensation threshold	590	• Altered Hydrologic Function • Degraded Riparian Forest Conditions	• Roads • Dams/Diversions
Lower Rogue	High	Likely below depensation threshold	81	• Lack of Floodplain and Channel Structure • Impaired Water Quality	• Roads • Urban/Residential/ Industrial Development

Upper Rogue River Population. The URR population includes individuals in Evans Creek and upstream. Productivity, abundance, and limiting factor information for the population are displayed in Table 5. The URR population is designated as a core, functionally independent population within the Interior Rogue stratum (NMFS 2014). Most high density rearing occurs in the upper watersheds, often immediately below public land that supplies cool water. There are 11 5th field watersheds within the geographic boundaries of the URR population.

Middle Rogue and Applegate Rivers population. The Middle Rogue and Applegate Rivers (MRAR) population includes individuals from the confluence of Evans Creek downstream to the confluence of the Illinois River. Productivity, abundance, and limiting factor information for the

[3] Intrinsic potential (IP) is a measure of habitat size and a proxy of abundance within the population (Williams *et al.* 2008). IP per kilometer is the intrinsic potential of a stream and is a modeled index of a potential habitat suitability based on the underlying geomorphology and hydrology of the watershed for rearing juvenile SONCC coho salmon. The output of this model is in terms of IP per kilometer and written as IP-km.

population are displayed in Table 5. The MRAR population is designated as a non-core 1, functionally independent population within the Interior Rogue stratum (NMFS 2014). MRAR reaches currently used by SONCC coho salmon represent only a fraction of the high intrinsic potential habitat.

Illinois River population. The Illinois River population includes individuals in the Illinois River and tributaries. Productivity, abundance, and limiting factor information for the population are displayed in Table 5. The Illinois River population is designated as a core, functionally independent population within the Interior Rogue stratum (NMFS 2014).

Lower Rogue River population. The Lower Rogue River (LRR) population includes individuals from the Pacific Ocean upstream to the confluence of the Illinois River. Productivity, abundance, and limiting factor information for the population are displayed in Table 5. The LRR population is designated as a non-core 1, potentially independent population within the Northern Coastal stratum (NMFS 2014).

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 project site is located on tax lot 4200 in Medford, Oregon and also includes portions of the adjacent road (Figure 1). The centroid of the project site is approximated at 42.355037 North, -122.864769 West and the property is 6 acres. The action area is defined as the 6-acre project site and approximately 500 feet of Corona Avenue, plus areas downstream of the project site where stormwater runoff from the impervious areas will discharge to the Pacific Ocean. This includes Lone Pine Creek, the mainstem of Bear Creek from the confluence of Lone Pine Creek to the Rogue River, and the mainstem of the Rogue River from the Bear Creek confluence to the Pacific Ocean (Table 3). This is because stormwater runoff from the project site will discharge into Lone Pine Creek and into Bear Creek. That discharge will then continue downstream into the Rogue River until it reaches the Pacific Ocean. Bear Creek enters the Rogue River at approximately River Mile (RM) 126.8; therefore, the entire extent of the Rogue River in the action area to the Pacific Ocean is approximately 127 miles. Bear Creek is a 34 mile tributary to the Rogue River, but just the lower 7 miles are part of the action area. There is approximately 1.4 miles of Lone Pine Creek between where stormwater is discharged from the project site and Bear Creek. The extent of the action area was determined based on the extent of effects from the dispersion of contaminants associated with stormwater discharge. Although there is some uncertainty regarding the discharge location from one basin of the project to Lone Pine Creek or Bear Creek, we have accounted for that uncertainty by including Lone Pine Creek as part of the action area.

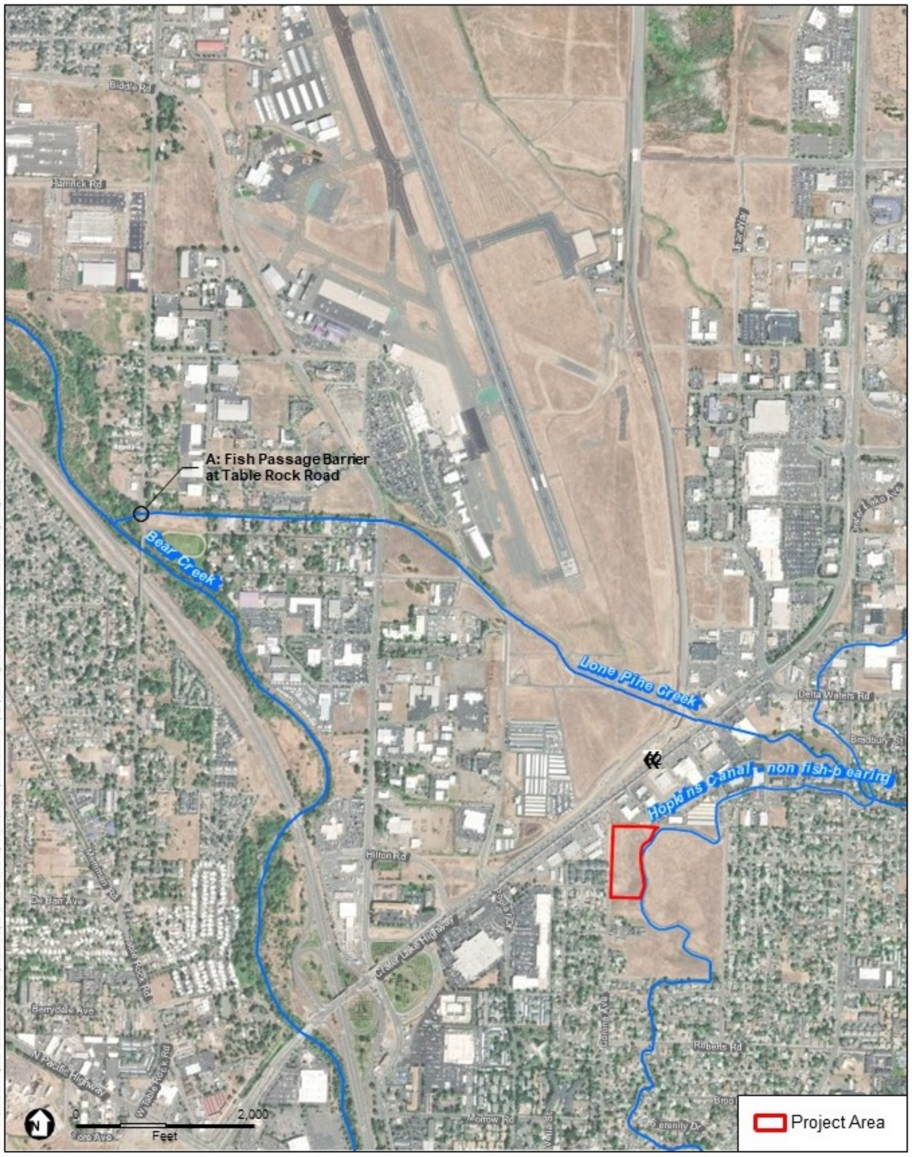

Figure 1. Location of the proposed action and its proximity to Lone Pine Creek (to the north) and Bear Creek (to the west). On the east side of the project area is Hopkins Canal, a non-fish bearing irrigation conveyance.

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).

SONCC coho salmon use of the action area varies by location and life history (Table 3). From head of tide (at approximate RM 5) to the Pacific Ocean, SONCC coho salmon use the mainstem Rogue River for physiological transition between marine and freshwater environments. In the mainstem Rogue River, adult SONCC coho salmon migrate from the ocean to freshwater spawning grounds from mid-August through January (ODFW 2003a and b). In the Bear Creek watershed, adult spawning occurs from November through January (ODFW 2003c). Downstream juvenile migration from Bear Creek into the Rogue River and to the Pacific Ocean begins in mid-February. Juvenile SONCC coho salmon in the mainstem Rogue River migrate to the ocean from April through July (ODFW 2003a and b, Pellissier 2007). Juvenile rearing in the mainstem and in tributaries in the action area occurs year-round.

Key limiting stresses for the Rogue River populations were listed in Section 2.2.2 above. They included altered hydrologic function, degraded riparian forest conditions, impaired water quality, and lack of floodplain and channel structure. The greatest factor limiting recovery of SONCC coho salmon in the Rogue River populations is the lack of suitable rearing habitat for juveniles. All of these population-level limiting factors apply to the Bear Creek portion of the action area, including Lone Pine Creek, and the mainstem Rogue River. Furthermore, the discussion in Section 2.2.1 describing the reduced condition of PBFs due to past and present impacts of human activities also applies to the environmental baseline in the action area. Climate change effects in the action area are as described for the aquatic environment in Section 2.2 and 2.2.2 above.

Bear Creek
Bear Creek is a highly urbanized watershed. Anthropogenic disturbance has modified the action area, and the PBFs within it, from historical conditions. Several factors have altered water chemistry in the action area, including upstream urban and rural uses of pesticides, herbicides, and fertilizers. The lack of riparian trees has led to low levels of wood debris and poor stream habitat complexity. Floodplain connectivity and off-stream wetlands have been modified extensively by development in the valley, confining the stream channel, which reduced energy dissipation and increased stress and erosion of stream banks. Channel modifications due to roads, such as Interstate 5, are prevalent. Bear Creek within the action area in summer has low water quantity due to irrigation and municipal water withdrawals and high water temperatures. In a study during the summer of 1990 and 1991, maximum water temperatures in lower Bear Creek exceeded 75°F (Dambacher *et al.* 1992). The extent of impervious surfaces in the watershed is elevated due to the high density development of Medford, Central Point, and other municipalities. Impervious surfaces concentrate storm runoff and increase peak flows, which increases erosion and lowers the quality of habitat for SONCC coho salmon.

The Bear Creek Valley receives an average rainfall of 18.37 inches per year. On average, the area receives measurable rainfall 102 times per year and an excess of 1.0-inch of rain in a 24-hour period 1.8 times per year (RVSS 2020). The area also receives 0.5 to 1.0 inch of rain in a 24-hour period approximately 9 times per year (WRCC 2012). Table 6 compares monthly surface water statistics for Bear Creek and the Rogue River.

Table 6. U.S. Geological Society mean monthly surface water discharge statistics for Bear Creek at Medford and the Rogue River at Raygold from 1978 to 2020. Only data from 1978 to present are used to eliminate influence from the construction of William Jess Dam. All values in cubic feet per second, unless otherwise indicated.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bear Creek	210	207	192	197	139	75	35	36	37	35	61	154
Rogue River	4,290	4,150	3,930	3,960	3,730	2,830	1,820	1,600	1,440	1,410	2,260	3,730
Percent	4.9%	5.0%	4.9%	5.0%	3.7%	2.7%	1.9%	2.3%	2.6%	2.5%	2.7%	4.1%

Presently, abundance of SONCC coho salmon is significantly depressed in the Bear Creek watershed. Smolt trapping surveys have demonstrated few SONCC coho salmon are surviving in the watershed. Over a period of 6 years, the Oregon Department of Fish and Wildlife (ODFW) smolt-trapping program captured 329 SONCC coho salmon smolts; two years resulted in none captured (Vogt 2001, Vogt 2002, Vogt 2003, Vogt 2004, Doino 2006).[4] The ODFW discontinued the program after 2006, however we do not expect that smolt abundance has meaningfully changed. Adult spawning counts have not occurred regularly in Bear Creek, but they have demonstrated low numbers of SONCC coho salmon spawning in the watershed. The Bear Creek watershed assessment reported that production of SONCC coho salmon smolts is approximately 3.7 SONCC coho salmon smolts per mile of habitat in the Bear Creek mainstem (RVCOG 2001a). Unfortunately, recent estimates for the number of SONCC coho salmon returning to the URR population are not available due to a lack of surveys. The last available surveys that did occur resulted in an estimated number of wild spawners for the URR population of approximately 319 to 2,929.[5] We do not expect that spawner abundance has meaningfully changed since the last surveys.

Lone Pine Creek

Lone Pine Creek is an 8.8 square-mile sub-basin to Bear Creek. Approximately 70 percent of the Lone Pine Creek watershed is classified as urban land use with 2 miles of streams, 5 miles of canals, and 92 miles of roads (RVCOG 2001b). It is extensively modified by residential and commercial development, and as a result, the stream channel is confined. Specific modifications include placement of stream reaches into underground pipes or concrete channels, stream channelization, and removal of woody vegetation (Wetland Consulting 2002). Lone Pine Creek is also influenced by irrigation and stormwater management. There are no natural barriers on Lone Pine Creek,[6] however, a box culvert potentially blocks upstream movement of juvenile salmonids at low water levels; the box culvert is approximately 0.06 mile upstream from the confluence with Bear Creek. Fish distribution in Lone Pine Creek has not been extensively studied. However, ODFW considers Lone Pine Creek to contain 1.4 miles of summer steelhead and trout use and 0.6 miles of fall Chinook salmon use (as documented by a visual sighting of

[4] E-mail from Jay Doino, ODFW, to Chuck Wheeler, NMFS (July 28, 2009) (discussing smolt trapping in Bear Creek).
[5] Data from ODFW available online at: https://odfw.forestry.oregonstate.edu/spawn/pdf%20files/coho/2002-18FinalSONCCEstimates.pdf (Last Accessed June 2020).
[6] Telephone conversation with Brent Crowe, ODFW, (September 23, 2005) (confirming absence of natural barriers on Lone Pine Creek and describing fish distribution).

one adult in 2000).[6] While SONCC coho salmon distribution in Lone Pine Creek is not known, some individuals are likely to be present, albeit in low numbers.

High erosion and turbidity results from storms and pollution is contributed by urban runoff. Average streamflows in Lone Pine Creek range from 2-10 cubic feet per second (cfs) in the summer to greater than 10 cfs in the winter (RVCOG 2001b). In comparison, average monthly streamflows in Bear Creek range from 35-139 cfs in summer and up to 210 cfs in winter (Table 6). Water quality is impaired for summer stream temperatures, dissolved oxygen, and pH (ODEQ 2012).

Many formal consultations have been completed in the action area. Effects from the various formal consultations are a mix of beneficial and negative effects. Some of the effects were one-time effects with a short-duration. Other effects have a long-term presence in the action area. Restoration actions have also been completed, such as removal of major dams within the Rogue Basin. Overall, consultation aims to minimize the adverse effects of the projects, such that while there have been a lot of actions; they are conducted in such a way as to avoid severe, long-term negative effects to SONCC coho salmon and designated critical habitat.

Juvenile and adult SONCC coho salmon in the action area, and particularly in Bear Creek and Lone Pine Creek, are exposed to modified environmental baseline conditions. Under these environmental baseline conditions (i.e., exposure to environmental stressors including degraded water quality, increased water temperatures, decreased water quantities, degraded substrate and spawning gravels, fragmented and degraded riparian areas, a lack of natural cover and shelter, a lack of floodplain connectivity, degraded passage, and poor aquatic habitat complexity), the baseline condition of an individual fish in the action area is likely to be stressed, but with the ability to compensate. Individuals are likely to be less efficient metabolically and physiologically compared to individuals in areas without numerous stressors.

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). During 1895-2011, temperature in the Northwest warmed by approximately 0.7ºC (Dalton *et al.* 2013) and stream flows in southwest Oregon have declined from 1953 to 2012 (Asarian and Walker 2016). Annual mean precipitation has exhibited a slight trend in greater variability since 1970 (Dalton *et al.* 2013). For the Northwest, an increase in average annual air temperature of 1.8°C to 5.4°C is projected by 2070 to 2099 (compared to the period 1970 to 1999) with the largest increases projected during summer (Mote *et al*. 2014). A major hindrance in projecting salmon responses to climate change stems from the difficulty in translating projections of future air temperatures to stream temperatures (Crozier 2015). Additionally, summer precipitation is projected to decrease by as much as 30 percent by the end of the century, although only 10 percent on average, and this relatively small projected change will likely be masked by natural variability. The sensitivity of stream temperature and stream discharge to climate changes varies among watersheds due to natural and anthropogenic factors (Mantua *et al.* 2010).

Although climate change is not a key limiting threat for any of the SONCC coho salmon populations in the action area, the URR population is likely to be more affected than some of the others in the action area (Table 7). The majority of watersheds in the action area are hydrologically rain-dominated, although some watersheds do include areas within the transient snow zone. As a result, the majority of the action area is considered to be less sensitive to hydrological changes as a result of changing precipitation and temperature increases compared to other areas of the Pacific Northwest that have a greater proportion of snow-dominated areas (Elsner *et al.* 2010, Vano *et al.* 2015). Mantua *et al*. (2010) project that shifts to increasingly stressful thermal regimes for salmon in Washington will be greater in eastern Washington than in western Washington and we expect a similar result for Oregon. Still, increases in temperature and changes in precipitation patterns in the action area are expected. The greatest risk is to juvenile summer rearing and smolt migration habitats (Table 7) with increased thermal stress for these life histories, including the potential for increasing the prevalence and virulence of fish diseases and parasites (see Section 2.2). Rain-dominated watersheds could also experience slightly greater stream flows during winter if average winter precipitation increases; however there is a large amount of variability and uncertainty present in hydrological models (MacArthur *et al.* 2012, Dalton *et al.* 2013). Adults of all SONCC coho salmon populations are likely to be negatively affected by ocean acidification and changes in ocean conditions and prey availability (NMFS 2014). Climate change is likely to affect the SONCC coho salmon populations considered in this opinion, and their habitat in the action area, because temperatures are expected to increase over the next 50 years. The effects of climate change are expected to be negative, but are not well predicted for any particular locale and thus are difficult to factor.

Table 7. Threats and expected changes due to climate change for SONCC coho salmon populations in the action area (NMFS 2014).

Population	Overall Threat Rank	Expected air temperature change over next 50 years	Precipitation Changes	Most At Risk Habitat	Most At Risk life history
Upper Rogue	High	• Average summer increase >2.8°C • Average winter increase >1°C	Seasonal patterns may change	Juvenile rearing & smolt migratory	Fry and juveniles
Illinois	High	• Average summer increase >2°C • Average winter increase >1°C	If the trend of decreasing snow pack below 6,000 feet in the Klamath Mountains continues, the water supply will be negatively affected in some watersheds.	Juvenile rearing & smolt migratory	Juveniles and smolts
Middle Rogue/ Applegate	Low	• Projected increase in July air temperature ranges from 1.5 to 3.0 °C • January temperatures are predicted to increase 1.0 to 1.5 °C	Increasing temperatures will likely result in less snow accumulation throughout most of the Middle Rogue-Applegate subbasin, and the resulting decreased flow will directly diminish available habitat.	Juvenile rearing	Juveniles
Lower Rogue	Medium	• Average summer increase up to 1.5°C • Average winter increase up to 1°C	Seasonal patterns may change	Juvenile rearing & smolt migratory	Juveniles, smolts, and adults

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).

As described in Section 1.3, there will not be any construction below the ordinary high water mark of any waterbody or in riparian areas. All proposed construction activities will occur at upland sites that are disconnected and remote from any floodplain, riparian, or aquatic habitats and will not require entry into, or any disturbance of, those habitats. Because the construction will be isolated in the upland, the only effect of these projects will be indirect effects caused by the development or redevelopment of impervious surfaces and stormwater drainage systems. Those impervious surfaces will impede the infiltration of water into the soil, alter the natural flow of water, and accelerate the delivery of pollutants in post-construction stormwater runoff to rivers and estuaries occupied by listed species. Although the City proposes to capture, manage, and treat runoff up to the design storm, treatment will not eliminate all pollutants in the post-construction runoff. Thus, adverse effects of post-construction stormwater runoff will occur and persist for the life of the impervious surfaces.

2.5.1 Effects on Designated Critical Habitat

The proposed action will occur in the Larson Creek – Bear Creek 6th field sub-watershed (HUC No.: 171003080110) with the effects of the proposed action reaching the Pacific Ocean. Lone Pine Creek is located within the Bear Creek 5th field watershed (HUC No.: 1710030801). Refer to Table 3 for all affected 5th field watersheds. All of these watersheds contain designated critical habitat for SONCC coho salmon. In this analysis we refer to the 5th field watersheds as critical habitat units because critical habitat units are designated at the 5th field watershed level. The conservation role of critical habitat in the action area is to provide habitat that supports successful juvenile and adult migration, juvenile rearing, and spawning. The PBFs present in the action area are: (1) Cover/shelter, (2) food, (3) riparian vegetation, (4) space, (5) substrate/spawning gravel, (6) water quality, (7) water quantity, (8) safe passage, (9) water temperature, and (10) water velocity (Table 2). Lone Pine Creek and Bear Creek provide spawning areas; the entire action area is used for rearing and migration.

Habitat effects in the action area from approving the proposed action are reasonably certain to include: (1) pollutants in stormwater runoff with episodic and permanent effects on water quality; and (2) minor changes in water quantity and water velocity. These effects are described in greater detail below. The proposed action will not change the quality and function of cover/shelter, food, riparian vegetation, space, substrate/spawning gravel, safe passage or water temperature PBFs.

Water Quality – Stormwater
Stormwater runoff from impervious surfaces delivers a wide variety of pollutants to aquatic ecosystems, such as metals (e.g. copper and zinc), petroleum-related compounds (polycyclic aromatic hydrocarbons - PAHs), and sediment washed off the roads, parking lots, driveways, etc. (Driscoll *et al.* 1990, Buckler and Granato 1999, Colman *et al.* 2001, Kayhanian *et al.* 2003, Van Metre *et al.* 2006, Peter *et al.* 2018). Aquatic contaminants often travel long distances in solution or attached to suspended sediments, or gather in sediments until they are mobilized and transported by the next high flow (Anderson *et al.* 1996, Alpers *et al.* 2000a, 2000b).

Treatment of post-construction stormwater runoff reduces the amount of contaminants entering streams and waterbodies. The treatment protocols proposed by the City will be based on a design storm (50 percent of the 2-year, 24 hour storm) that will generally result in more than 95 percent of the runoff from all impervious surfaces within the action area being infiltrated at or near the point at which rainfall occurs (NMFS 2016a). Stormwater infiltration treatment practices, such as bioretention and detention, supplemented with appropriate soil amendments, as proposed by the City, are highly effective treatments to reduce contaminants from runoff (Barrett *et al.* 1993, Center for Watershed Protection and Maryland Department of the Environment 2009, National Cooperative Highway Research Program 2006, Hirschman *et al.* 2008, Washington State Department of Ecology 2012, Spromberg, *et al.* 2016). Detention basins can remove litter, settleable solids, total suspended solids, particulate metals, and sorbed pollutants such as heavy metals, oil, and grease by capturing, temporarily detaining, and gradually releasing stormwater runoff (California Department of Transportation 2019). The mechanisms of pollutant removal in detention basins include density separation, sorption, filtration, uptake/storage, and microbial transformation (ODOT 2014). Pre-treatment catch basins proposed by the City will also aid in the reduction of these pollutants. However, treatment does not eliminate all pollutants in the post-construction runoff. Thus, adverse effects of post-construction stormwater runoff will persist for the design life of the proposed action.

The City will increase the amount of impervious surfaces by approximately 3.85 acres from both on-site and road construction. The City has also proposed to construct, operate, inspect, and maintain stormwater facilities that will treat pollutants in the runoff from all new impervious surfaces and from approximately 0.33 acre of existing impervious road surface. However, stormwater treatment facilities, including those proposed for this action, are not 100 percent effective in removing pollutants due to practical engineering constraints on contaminant removal technology. Although stormwater discharge from the proposed action will be small in comparison to the flow of the nearby waterways, it will have an incremental impact on pollutant levels. Contaminants harmful to listed species will be discharged and reduce the value of the water quality PBF.

Stormwater runoff only occurs when there is rainfall and the greatest increase of some pollutants in a receiving waterbody is when a first-flush storm mobilizes a collection of pollutants accumulated during dry periods between rainfall events (Kayhanian *et al.* 2003, Lee *et al.* 2004, Soller *et al*. 2005, Kayhanian *et al.* 2008, Nason *et al.* 2011). In Oregon's climate, the most significant of these rain events is the first fall rain; additional first-flush type events may occur 2-5 times annually per autumn, winter, or spring, given the seasonality of precipitation patterns in Oregon. The exact concentrations of the various contaminants that would remain in the stormwater discharge are unknown and are likely to be highly variable depending on the timing and intensity of individual storm events. There is a lot of uncertainty regarding the duration of elevated stormwater pollutant concentrations during first-flush events, largely due to the inherent unpredictability and natural variability in rainfall events. In general, the elevated concentrations of stormwater pollutants associated with first-flush events occurs within the first few minutes and up to the first hour after detection of observable runoff (Tiefenthaler and Schiff 2003, Stenstrom and Kayhanian 2005). Therefore, adverse effects on water quality from stormwater will occur at their greatest intensity in the fall after the first significant precipitation and will also occur at lower intensity episodically throughout the remainder of the wet season. This effect will be on-going, as the impervious surfaces will be a long-term or permanent feature on the landscape. The highest concentrations of stormwater pollutants will occur where discharge from the proposed action enters Lone Pine Creek and Bear Creek and will have a meaningful impairment of the water quality PBF in these streams. Although there is some uncertainty regarding the discharge location from one project basin to either Lone Pine Creek or Bear Creek, we are accounting for that uncertainty by analyzing the effects as if the discharge would occur to Lone Pine Creek, which is the furthest upstream location of the potential discharge points.

Temporal and spatial redistribution of pollutants in stormwater runoff occurs through complex fate and transport mechanisms. Therefore, upon entry to the much larger Rogue River (see Table 6), the stormwater pollutant concentrations will continue to spatially distribute and disperse and will likely be indistinguishable from background levels. At any given time, the contribution of pollutants from the proposed action in the Rogue River will not be measurable above background levels due to their larger volumes. However, water quality in the streams is impaired, and every point and non-point discharge of pollutants contributes to this problem at some level. Additionally, there are many uncertainties about fate and transport of contaminants found in stormwater run-off. Overall, discharged stormwater pollutants will also be distributed in minor concentrations downstream to the Pacific Ocean with immeasurable effects on the water quality PBF in the Rogue River.

In summary, pollutants in stormwater runoff from new impervious surfaces will have a permanent and adverse effect on the water quality PBF in the Bear Creek critical habitat unit due to episodic discharges. Because pollutants will continue to spatially distribute and disperse through complex fate and transport mechanisms downstream, the water quality PBF in the 7 downstream Rogue River critical habitats units is unlikely to be substantially altered by the proposed action.

Water Quantity and Water Velocity – Stormwater
Flow control management proposed by the City will control the volume rate, frequency, and flow duration of stormwater surface runoff for all storm events with the exception of water quality design storm from 3.5 acres of impervious surfaces. However, the increase in post-construction flows for the water quality design storm is only 0.02 cfs. This small increase is unlikely to result in meaningful increases to the water quantity or water velocity PBFs in Lone Pine Creek or in Bear Creek because mean monthly discharge during winter is more than 10 cfs in Lone Pine Creek and ranges from 35 cfs up to 210 cfs in Bear Creek.

In Section 2.2.1, we determined that the condition of the water quality, water temperature, cover/shelter, and riparian vegetation PBFs were limiting the conservation role of all the critical habitat units in the action area. Slight differences in the critical habitat units create variations such that each specific critical habitat unit has small inconsistencies in conditions and PBFs that limit the individual conservation roles; substrate/spawning gravel, water quantity, and safe passage are additional PBFs that are impaired in multiple units. The proposed action will meaningfully decrease the function and value of the water quality PBF in the Bear Creek critical habitat unit. Because of the small component of critical habitat adversely affected within the overall critical habitat unit, this effect is unlikely to adversely affect SONCC coho salmon critical habitat at the 5^{th} field watershed level or its conservation role. Although the current condition of critical habitat is not fully functional for the conservation of the species the proposed action will not preclude or significantly delay the natural trajectory of PBF development for critical habitat in the overall Bear Creek unit. The effects of the proposed action will not render the habitat unusable or incapable of supporting spawning, rearing, or migration and the critical habitat units will continue to provide functional support for SONCC coho salmon.

2.5.2 Effects on Species

Stormwater Pollutants

As previously discussed in Section 2.5.1, water quality effects are reasonably certain with stormwater runoff, as stormwater runoff discharged from new and modified impervious surfaces at the site of the proposed action will episodically deliver a variety of pollutants to the aquatic ecosystem for the foreseeable future, despite proposed treatment. Stormwater pollutants are a source of potent adverse effects to SONCC coho salmon, even at ambient levels (Loge *et al.* 2006, Spromberg and Meador 2006, Hecht *et al.* 2007, Johnson *et al.* 2007, Sandahl *et al.* 2007). These pollutants can accumulate in the prey and tissues of juvenile salmon where, depending on the level of exposure, they cause a variety of lethal and sublethal effects on salmon. These adverse effects include disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (Fresh *et al.* 2005, Hecht *et al.* 2007, LCREP 2007). Pre-spawn mortality of adult coho salmon is a common phenomenon in streams impacted by urban stormwater runoff (McCarthy *et al.* 2008, Feist *et al.* 2011, Scholz *et al.* 2011, McIntyre *et al.* 2015, Spromberg *et al.* 2016, Peter *et al*. 2018). Aquatic contaminants often travel long distances in solution or attached to suspended sediments, or gather in sediments until they are mobilized and transported by the next high flow (Anderson *et al.* 1996, Alpers *et al.* 2000a and 2000b).

Most published literature addresses acute toxicity of single pollutants, although pollutants from stormwater exist in mixtures and interact with each other (e.g., Niyogi *et al.* 2004, Feist *et al.* 2011). Rand and Petrocelli (1985) state that in "assessing chemically induced effects (responses), it is important to consider that organisms may be exposed not to a single chemical but rather to a myriad or mixture of different substances at the same or nearly at the same time." Environmental conditions (i.e., non-chemical conditions) can also influence the toxicity of pollutants and coho salmon vulnerability by altering susceptibility to pollutants (Brooks *et al.* 2012, Laetz *et al.* 2014). Exposure to two or more pollutants simultaneously may produce a response that is simply additive of the individual responses or one that is greater (synergistic) or less (antagonistic) than expected from the addition of their individual responses (Denton *et al.* 2002, Laetz *et al.* 2013). For example, mixtures of zinc and copper have greater than additive toxicity to a wide variety of aquatic organisms including freshwater fish (Eisler 1993). Although the large number of pollutants and much larger number of toxicological interactions in stormwater make specific mechanisms of toxicological effects on SONCC coho salmon difficult to predict, there is ample evidence that the mixture of toxins in stormwater can degrade habitat enough to substantially reduce its ability to support salmon spawning, feeding, and growth to maturity.

For example, Baldwin *et al.* (2003) exposed juvenile SONCC coho salmon to various concentrations of copper to evaluate sublethal effects on sensory physiology, specifically olfaction. These researchers demonstrated that short pulses of dissolved copper at concentrations as low as 2 micrograms per liter (µg/L) over experimental background concentrations of 3 µg/L reduced olfactory sensory responsiveness within 20 minutes such that the response evoked by odorants was reduced by approximately 10 percent. At 10 µg/L over background, responsiveness was reduced by 67 percent within 30 minutes. They calculated neurotoxic thresholds sufficient to cause olfactory inhibition at 2.3-3.0 µg/L over background. They also referenced three studies that reported copper exposures over four hours caused cell death of olfactory receptor neurons within rainbow trout, Atlantic salmon, and Chinook salmon. The concentrations tested are lower than common concentrations in stormwater outfalls, and thus indicate toxicity even after stormwater has been moderately diluted. The measured exposure times are likewise shorter than typical stormwater outfall discharge times. Inhibiting olfaction is detrimental to salmon because olfaction plays a significant role in the recognition and avoidance of predators and migration back to natal streams to spawn (Baldwin *et al.* 2003). Additional research indicates that the effect of 2 µg/L concentrations over experimental background concentrations of 3 µg/L reduces the survival of individuals (Hecht *et al*. 2007). Juvenile wild coho salmon exposed to low levels of dissolved copper did not display an alarm response (i.e., sharp reduction of swimming activity) in the presence of a predator or in response to other olfactory signals as compared to unexposed wild juveniles (McIntyre *et al.* 2012). Predators were also more successful in capturing copper-exposed juvenile coho salmon (McIntyre *et al.* 2012).

Also, fish embryos and larvae exposed to PAHs are likely to experience adverse changes in heart physiology and morphology, including pericardial edema and heart failure, leading to mortality, even with only temporary exposure to low concentrations (Hicken *et al.* 2011, Incardona *et al.* 2012, Brette *et al*. 2014, Incardona *et al.* 2014). Although exposed embryos and larvae may grow to look like normal fish on the outside, internally there are subtle changes in heart shape and also a significant reduction in swimming performance reducing individual survival due to long-term physiological impairment (Hicken *et al.* 2011). Swimming performance is an individual fitness indicator for migratory salmonids, including coho salmon. Reduced larval feeding associated with pericardial edema can lead to death during the transition period to juvenile stages (Hicken *et al.* 2011). Other individuals may experience a disturbance in heartbeat rhythm (Brette *et al*. 2014). Cardiotoxic PAHs are present in urban stormwater; their sources include vehicle exhaust, fuel spills, oil and grease, treated wood, and coal dust (N. Scholz, pers comm., Northwest Fisheries Science Center, Ecotoxicology Program Manager, February 2, 2014). PAHs will bind with organic materials and move downstream with high flow events. A similar pattern of dispersion as described above for all stormwater will likely be observed as the PAHs become more spatially distributed as they travel downstream. The highest concentrations of PAHs will be at the discharge point. In addition, during transport, PAHs are continually being re-partitioned between organic materials and water. Therefore, PAHs bind with organic materials, remaining there until high water events mobilize and re-suspend PAHs in the water column for downstream transport.

The City proposes to treat stormwater runoff from all new impervious surfaces and from approximately 0.33 acre of existing impervious road at the project site for a total of approximately 3.85 acres. However, stormwater treatment facilities, including those proposed for this action, are not 100 percent effective in removing pollutants. This results in exposure of SONCC coho salmon to pollutants present in the stormwater discharged from the project site, including the associated road work, and synergistic effects as these pollutants interact with other compounds already present in the receiving water bodies. Some of those pollutants will be absorbed or ingested by SONCC coho salmon in quantities sufficient to cause injury or death by modifying their behavior, disrupting endocrine functions, or causing immunotoxic disease effects.

While exposure to stormwater discharge from the proposed project cannot be associated with specific adverse responses in specific individuals downstream, pollutants in stormwater discharge have been shown to injure or kill individual fish either by themselves or through additive, interactive, and synergistic interactions with other pollutants (Spromberg and Meador 2006, Baldwin *et al.* 2009, Laetz *et al*. 2009, Feist *et al.* 2011, Hicken *et al.* 2011, Spromberg and Scholz 2011). Adverse effects to SONCC coho salmon from stormwater pollutants are reasonably certain to include mortality, injury, and a variety of sublethal and behavioral effects that will reduce growth, fitness, and survival. Sublethal effects (such as olfactory effects) are those that are not directly or immediately lethal, but are detrimental and have some probability of leading to eventual death via behavioral or physiological disruption. These adverse effects will only occur in Lone Pine Creek and in Bear Creek due to the immediate proximity of the discharge from the project site. Therefore, adverse effects will be limited to the URR SONCC coho salmon population. Some effects from stormwater contaminants will occur in the Rogue River but, due to downstream dispersal, these effects will be limited to minor effects that would not cause any impact to individual growth or survival. The proposed action will not adversely affect the Middle Rogue and Applegate Rivers, the Illinois River, or the Lower Rogue River populations of SONCC coho salmon that rear in the action area or migrate through it because adverse effects will not occur in the Rogue River.

Quantifying the number of individual SONCC coho salmon in Lone Pine Creek and in Bear Creek that will experience adverse effects due to decreased water quality caused by stormwater pollutants is impractical because the relationship between habitat conditions and the distribution and abundance of individuals in the action area is inexact and shows wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales. Additionally pollutant exposure is episodic and there is a thorough lack of survey and monitoring information of adult and juvenile SONCC coho salmon in Lone Pine Creek, with limited monitoring data available for Bear Creek (see Section 2.4). Although generalized standard density estimates are available, these are for juveniles and are based on summer rearing habitat; these are not applicable in this scenario because the adverse effects from the stormwater pollutants will occur at their greatest intensity in the fall during the first significant precipitation event and will continue at lower intensity throughout the remainder of the wet season, when both adults and juveniles will be exposed. Finally, concentrations of stormwater pollutants will vary seasonally (i.e., streams in this region have their greatest water volumes during the wet season which will serve to decrease stormwater pollutant concentrations) and will vary longitudinally through the stream system (i.e., stormwater pollutant concentrations from the proposed project will be greatest at the discharge points and will decrease as they are transported downstream), partially because of changes in overall river volume.

Although calculating the exact number of fish exposed to stormwater pollutants is impracticable, the amount of individual SONCC coho salmon injured or killed annually from increases in contaminant concentrations will be likely small in general and also when compared to the population as a whole. This is primarily because the number of SONCC coho salmon in Lone Pine Creek and in Bear Creek is likely low. Both streams also represent just a small portion of the SONCC coho salmon URR population.

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.

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).

The SONCC coho salmon recovery plan (NMFS 2014) identified urban/residential/industrial development as a key limiting threat. However, we were unable to identify any future non-Federal actions reasonably certain to occur that would affect the action area. Other ongoing, non-Federal activities within and upstream of the action area (as described in Section 2.3) likely will continue to follow recent patterns and carry their effects forward. In particular, urbanization on non-Federal lands will continue at levels similar to the recent past. Between 2010 and 2019, the population of Jackson County increased by 8.7 percent from 203,206 in 2010 to 220,944 in 2019.[7] Counties downstream of Bear Creek along the Rogue River had population increases that were smaller, for the same time period, ranging from 5.8 percent for Josephine County, and 2.5 percent for Curry County. Their overall populations are also much lower at 87,487 and 22,925. Bear Creek has three large urbanized cities: Medford, Central Point, and Ashland; it is likely that the majority of the future population increases will occur in these more populated centers.

Although no future private activities were identified in the consultation initiation request, many state and private land management activities that have degraded the baseline (urbanization, agricultural practices, roads, introduction of pollutants [PAHs, heavy metals, sediment, herbicides, and fertilizers], and water withdrawals) are likely to continue into the future and cause some adverse effects to SONCC coho salmon. However, regulations governing these actions have become more protective of SONCC coho salmon and their habitat over time. Effects of these non-federal activities are described in Section 2.4 and are not expected to change appreciably. We expect cumulative effects in the action area to have a slight negative impact on population abundance and productivity in the future. Likewise, we expect the quality and function of critical habitat PBFs to decline slightly in the future as a result of cumulative effects.

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,

[7] U.S. Census Bureau, State and County Quickfacts, Jackson County. Any county available: https://www.census.gov/quickfacts/fact/table/US/PST045219. (Last Accessed May 2020).

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 diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

We expect a negative trend on limiting factors over the long-term from climate change, with some populations likely to be more affected than others, the timing and extent of which, at this time, is too uncertain to sufficiently anticipate when such change would affect the extent or significance of this action's effects on the listed SONCC coho salmon ESU.

2.7.1 Critical Habitat

The condition of critical habitat at the designation scale varies, but in most areas, at least one essential feature is degraded. In Section 2.2.1, we determined that the condition of the water quality, water temperature, cover/shelter, and riparian vegetation PBFs were limiting the conservation role of all the critical habitat units in the action area. The PBFs in the Bear Creek critical habitat unit that are likely to be of a reduced quality are water quality, water temperature, water quantity, cover/shelter, riparian vegetation, and substrate/spawning gravel. However, the conservation value of critical habitat in the Bear Creek watershed is high, and the overall action area is an important spawning and rearing habitat and a critical migration corridor. The baseline condition of critical habitat function and value in the watersheds (Section 2.2.1) and in the action area (Section 2.4) is moderately to severely degraded, primarily due to residential development, road building, and urbanization, agriculture, forestry, grazing, irrigation impoundments and withdrawals.

The proposed action will affect 3 PBFs (Section 2.5), but only one of these will be adversely affected. The adverse effects will be localized and will only occur within the Bear Creek designated critical habitat unit. Therefore, the 6 mainstem critical habitat units (i.e., Grants Pass – Rogue River, Hellgate Canyon – Rogue River, Horseshoe Bend – Rogue River, Stair Creek – Rogue River, and Shasta Costa) and the Lower Rogue River critical habitat unit will not be adversely affected.

The proposed action will have small changes in the amount of water discharged from the project site which are unlikely to have meaningful effects on the quality and function of the water quantity and water velocity PBFs in the action area. The only adverse effect will be long-term impacts on the water quality PBF from stormwater pollutants. The City proposes to treat stormwater runoff from all new impervious surfaces and from approximately 0.33 acre of existing impervious road at the project site for a total of approximately 3.85 acres. However, stormwater treatment facilities, including those proposed for this action, are not 100 percent effective in removing pollutants. Although stormwater discharge from the proposed action will be small in comparison to the flow of the nearby waterways, it will have an incremental impact on pollutant levels and the water quality PBF. The largest effects will be where discharge from the project site enters Lone Pine Creek and Bear Creek, but downstream the pollutants will be distributed and dispersed in the larger water volumes of Bear Creek and the Rogue River. Because the adversely affected area is only a small component within a single critical habitat units, the effects of the proposed action are unlikely to have an adverse effect on the function of the water quality PBF at the 5th field watershed level or its conservation value. There will not be any changes to the cover/shelter, food, riparian vegetation, space, substrate/spawning gravel, safe passage or water temperature PBFs. We did not identify any cumulative effects for the action area that were not previously described in the environmental baseline (Section 2.4).

Overall, the effects of the proposed action, when added to the environmental baseline, cumulative effects, and status of critical habitat, will not appreciably reduce the condition and function of critical habitat PBFs in the affected critical habitat units. There will be some localized degradation of critical habitat quality and function, but only a small component of critical habitat will be adversely affected. Hence, the proposed action, when added to the environmental baseline, cumulative effects, and status of critical habitat, will not reduce the conservation value of designated critical habitat. The affected critical habitat units will retain their ability to serve their intended conservation role for SONCC coho salmon. Therefore, the value of the range-wide designation of critical habitat will not be appreciably diminished and will retain its current ability to play its intended conservation role for SONCC coho salmon, which is to help support viable populations of this ESU.

2.7.2 Species

Of the 31 independent populations of SONCC coho salmon, 24 are at high risk of extinction and 6 are at moderate risk of extinction. 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 (Section 2.2). SONCC coho salmon abundance in the action area is likely to be limited due to the variable impacts of high road densities, stream crossings, piping of stream channels, elevated water temperatures, and lack of in-stream habitat complexity (Section 2.4).

Adverse effects on SONCC coho salmon will be limited to individuals in the URR population. Minor effects will occur on individuals of other populations in the mainstem Rogue River, but these effects will be too small to impact individual growth or survival. The adverse effects of the proposed action will only occur within a portion of one of eleven 5th field watersheds occupied by the URR population. SONCC coho salmon abundance in these areas is likely to be low due to the small stream sizes and due to decreased flows, lack of in-stream habitat complexity, and reduced floodplain connectivity (Section 2.4). The effects on the URR population of SONCC coho salmon would be the integrated responses of individuals to the predicted environmental changes. Instantaneous measures of population characteristics, such as population size, growth rate, spatial structure, and diversity, are the sums of individual characteristics within a particular area, while measures of population change, such as a population growth rate, are measured as the productivity of individuals over the entire life cycle (McElhany *et al*. 2000). A persistent change in the environmental conditions affecting a population, for better or worse, can lead to changes in each of these population characteristics.

The proposed action is reasonably certain to cause injury or death of a small number of adult and juvenile SONCC coho salmon by modifying their behavior, reducing growth, disrupting reproduction or causing immunotoxic disease effects as a result of episodic discharges of pollutants in stormwater runoff from new impervious surfaces. These effects will occur in areas used as spawning, rearing, and migration habitat. Only a small number of individuals per year will experience these lethal or sublethal effects and is too few to meaningfully change important population characteristics of the URR population. Cumulative effects, as described in Section 2.6, are not likely to change appreciably, and will have a slight negative effect on population abundance and productivity.

Effects from the proposed action are related to a key limiting threat for the URR population of SONCC coho salmon: urban/residential/industrial development (Section 2.2). They are also related to a key limiting stress for the population: impaired water quality. The greatest factor limiting recovery of SONCC coho salmon in the Rogue River populations is the lack of suitable rearing habitat for juveniles. In the Environmental Baseline (Section 2.4), we determined that altered hydrologic function, degraded riparian forest conditions, and lack of floodplain and channel structure are also stresses limiting productivity in the action area, however these factors will not be affected by the proposed action. Overall, the proposed action will affect one limiting factor in Lone Pine Creek and Bear Creek. Adverse effects at the population scale are unlikely to be meaningful because they will only affect individuals within Lone Pine Creek and Bear Creek, which comprise a very small area and have limited numbers of individuals. Therefore, the resulting incremental change will not meaningfully increase the limiting threats or stresses of the populations.

The URR population is designated as a core independent population in the SONCC coho salmon recovery plan (NMFS 2014). The URR population is a historically functionally independent population. The population is at moderate risk of extinction (NMFS 2014) and the environmental baseline in the action area is moderately to severely degraded, as explained in section 2.4. The importance of the URR population of SONCC coho salmon is such that if it were to go extinct then recovery of the SONCC coho salmon species would not be possible. To assist in species survival and recovery, core independent populations must have all criteria in the “low risk” threshold. The reduction in abundance to the URR population from the proposed action is small and will not result in a measurable decrease in population-scale abundance and productivity, nor will it change the extinction risk of this population. We did not identify any cumulative effects for the action area that were not previously described in the Environmental Baseline (Section 2.3). However, we noted that human population growth within the action area may lead to a slight increase in the intensity of cumulative effects. Cumulative effects are likely to cause a slight reduction in SONCC coho salmon population viability over time. As a result, NMFS is reasonably certain that the effects of the proposed action, when added to the status of the URR population, the environmental baseline, and cumulative effects, will not appreciably reduce the likelihood of both the survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution. The effects of the proposed action are such that the survival of the SONCC coho salmon species will not change and its recovery will not be impeded.

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, the effects of other activities caused by the proposed action, 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:

Incidental take is reasonably certain to occur because some SONCC coho salmon individuals in the action area will be harmed from habitat modification caused by annual and episodic discharges of treated stormwater runoff from new and modified impervious surfaces when individuals are present. Incidental take caused by the adverse effects of the proposed action will occur within Lone Pine Creek and in Bear Creek. Adverse effects of the proposed action will include reduced water quality due to increased impervious surfaces and stormwater inputs of PAHs, metals, and sediment. This habitat modification will significantly impair essential breeding, spawning, rearing, migrating, feeding, or sheltering behavioral patterns such that fish will be injured or killed from the increases in pollution and will experience a reduction in fitness, growth or survival.

Accurately quantifying the number of fish harmed by these pathways is not possible because injury and death of individuals in the action area is a function of habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes are highly variable and interact in ways that may be random or directional, and may operate across broad temporal and spatial scales. The precise distribution and abundance of fish within the action area, at the time of the action are not a simple function of the quantity, quality, or availability of predictable habitat resources within that area. Rather, the distribution and abundance of fish also show wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales. Furthermore, there are no methods available to monitor this death and injury because it will occur throughout the year and after the proposed action has been completed. Therefore, it is not practical or realistic to attempt to identify and monitor the number of fish taken by the pathway described.

In cases such as this, where quantifying a number of fish is not possible, we use take surrogates or take indicators that rationally reflect the incidental take caused by the proposed action. Here, the best available indicators for the extent of take are the following:

Provision and review of the proposed stormwater facilities designed by the City for the existing street adjacent to the site, Corona Avenue, will be a take indicator. Because the FAA did not provide a post-construction stormwater management plan for the Corona Avenue Improvements, review of proposed facilities by NMFS will verify that the City/FAA included water quality treatment for 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (water quality design storm) and water quantity management that collectively limits discharge to match pre-developed discharge rates for flows between the water quality design storm and the 10-year, 24-hour storm, as proposed. If the Corona Avenue Improvements facilities do not meet the proposed design criteria for water quality treatment or water quantity (flow), then contingency plan alternatives (see Section 1.3) will be refined in coordination with NMFS and implemented to address any deficiencies.

A second take indicator is the combination of stormwater facility inspection, maintenance, and recording actions, because those variables will determine whether the proposed stormwater treatment system continues to reduce the concentration of pollutants in stormwater runoff as designed, and thus reflect the amount of incidental take analyzed in the opinion.

1. Each part of the proposed stormwater facilities at the Corona Avenue Municipal Works Facility and for the associated Corona Avenue Improvements must be inspected and maintained at least quarterly for the first three years, at least twice a year thereafter, and at least three times per water year (for the first three years) within 48 hours following a storm event with more than 0.5 inch of rain over a 24-hour period.[8]
    a. All structural components, including inlets and outlets, must freely convey stormwater.
    b. Desirable vegetation in the biofiltration swales and the smaller vegetated swale must cover at least 90 percent of the facility within 3 years – excluding dead or stressed vegetation, dry grass or other plants, and weeds.
    c. All stormwater must drain out of vegetated swales within 24-hours after rainfall ends and out of detention ponds within 96 hours after rainfall ends.

[8] Although a major storm event is frequently defined as a storm event with greater than or equal to 1.0 inch of rain during a 24-hour period, in the Medford area an excess of this amount only occurs 1.8 times per year (RVSS 2020); this would not provide sufficient opportunities to determine proper functioning condition of the swales. Inspecting within 48 hours following a storm event with more than 0.5 inch of rain over a 24-hour period is consistent with the typical recommendation, but provides a more precise indicator of proper system function.

These indicators are appropriate for the proposed action because they have a rational connection to the release of stormwater pollutants that cause take of listed species. The extent of take will be exceeded if the FAA or the City does not provide a Corona Avenue Improvements stormwater management plan that will implement water quality treatment for 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (water quality design storm) and water quantity management that collectively limits discharge to match pre-developed discharge rates for flows between the water quality design storm and the 10-year, 24-hour storm and does not develop and implement sufficient offsetting alternatives for any deficiencies, and if all stormwater facilities for both the Corona Avenue Municipal Works Facility and Corona Avenue Improvements are not inspected and maintained (as described in #1); if structural components are blocked (#1a); if desirable vegetation does not cover 90 percent of the filter swales (#1b); if water ponds in swales for longer than 24 hours, or detention ponds for longer than 96 hours, after rainfall ends (#1c); and if corrective action is not taken with respect to #1a-c within seven days of a required inspection.

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 or appropriate to minimize the extent of incidental take of listed species from the proposed action:

1. The FAA will minimize take of SONCC coho salmon from exposure to stormwater pollutants associated with impervious surfaces by ensuring that stormwater runoff produced by impervious surfaces of the Corona Avenue Municipal Works Facility and by the associated Corona Avenue Improvements that are modified through the proposed action are treated with stormwater facilities that are designed, constructed, operated, and maintained using the best available information on low impact development and best management practices for stormwater treatment and discharge. This includes water quality treatment for 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (water quality design storm) and water quantity management that collectively limits discharge to match pre-developed discharge rates for flows between the water quality design storm and the 10-year, 24-hour storm or implementation of sufficient offsetting alternatives for any deficiencies of these criteria.
2. The FAA will minimize take by ensuring completion of a monitoring and reporting program to confirm that the take exemption of 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 the FAA, JCAA, and the City of Medford must comply with them in order to implement the RPMs (50 CFR 402.14). The FAA and the City of Medford 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 terms and conditions implement reasonable and prudent measure #1 (stormwater pollutants associated with new impervious surfaces):
   a) The FAA and JCAA/City of Medford will submit a post-construction stormwater management plan (PCSMP) for Corona Avenue Improvements to NMFS a minimum of 90 days prior to the start of construction. The PCSMP must include the following information:
      i) Required documentation: all relevant plans, drawings, exhibits, the Stormwater Information Form (SIF; see Appendix), and a narrative report addressing iii-vi, below, that describes, explains, and defines the proposed stormwater facilities. Any engineering design sheets must be stamped and signed by a professional engineer licensed to practice in the state of Oregon.
      ii) Maps, Figures, and Exhibits: site map for the Corona Avenue Improvements that identifies the following:
         (1) Property boundaries and project boundaries, especially if the project includes activities extending beyond/outside the property or parcel boundaries.
         (2) Impervious areas, landscape areas, and undeveloped natural areas (e.g., forested areas, wetlands, riparian zones) within the project boundaries.
         (3) Location and extents of all low impact development (LID) stormwater facilities and BMPs by type and capacity.
         (4) Location and extent of proprietary stormwater treatment technologies[9] by type and capacity, if proposed.
         (5) Location and extent of other structural source control practices by type and capacity (e.g., special practices for known or suspected contaminated sites, methods for targeting specific pollutants of concern).
         (6) All runoff discharge points and conveyance paths to the nearest receiving water.
      iii) Water Quality Treatment Analysis: a description of how LID or commensurate practices will treat the water quality design storm (i.e., 50 percent of the cumulative rainfall from the 2-year, 24-hour storm).
         (1) Describe each proposed LID facility's capacity in terms of discharge managed for flow rate-based facilities and volume managed for volume-based facilities.

[9] A proprietary stormwater treatment system is a water quality treatment system constructed from engineered materials. Common proprietary stormwater facilities include filter vaults, modular wetlands, and other emerging technologies. Use of proprietary stormwater facilities must be certified for use by the Washington Department of Ecology. Such systems must be certified for General Use Designation (GULD) or Conditional Use Designation (CULD) in certain circumstances. Proprietary treatment systems proposed to treat stormwater from wearing surfaces (roadways, bridges, parking lots, driveways) must also be certified to provide "enhanced treatment" for removal of dissolved metals. Ecology's list of approved technologies can be accessed at: Washington Department of Ecology Emerging Stormwater Treatment Technologies.

(2) Describe each proprietary stormwater treatment facility's capacity to treat the water quality design storm, if proprietary facilities are proposed.
(3) Describe any other structural source control practices in terms of treatment efficiency relative to the specific treatment objective (i.e., amount or percent of contaminant reduction, treatment, or management).

iv) Flow Control Analysis: a description of how LID or commensurate practices will manage the quantity of stormwater discharged from the site and provide adequate flow controls (i.e., detention, retention) on stormwater discharges. Post-construction stormwater flow control methods shall demonstrate that the post-construction stormwater runoff is equal to, or less than, the pre-development[10] stormwater runoff for all storm events between the 50 percent of the 2-year, 24-hour storm event and the 10-year storm event.
(1) Describe each proposed LID facility's capacity in terms of retention/detention for flow rate-based facilities and retention/detention volume managed for volume-based facilities.
(2) Describe each proprietary stormwater facility's capacity in terms of retention/detention for flow rate-based facilities and retention/detention volume managed for volume-based facilities, if proprietary facilities are proposed.
(3) Describe any other structural source control practices in terms of detention/retention discharge for flow rate-based facilities and detention/retention volume managed for volume-based facilities.
(4) Provide the pre-development and post-development runoff for the following events:
(a) 50 percent of the 2-year, 24-hour storm,
(b) 2-year, 24-hour storm, and
(c) 10-year, 24-hour storm.
(5) If post-development discharge peak runoff is greater than 0.5 cfs during the 2-year, 24-hour storm and discharges into a water body in a watershed smaller than 100 square miles, then
(a) Additional flow control is required to limit post-development discharge peak runoff to no more than 0.5 cfs or information must be provided to describe why adverse hydromodification[11] effects will not occur in water receiving the discharged stormwater.
(6) Conveyance Description: a description of the stormwater conveyance system. The following requirements apply:
(a) Maintain natural drainage patterns such that runoff is not redirected to a different drainage basin (i.e., watershed, subwatershed) from the pre-project conditions.

[10] Pre-development site conditions assume the natural, undeveloped conditions of the project site prior to European settlement in the area, unless historical information indicates otherwise. Runoff curve numbers should reflect the site's likely natural habitat that was historically present and at its highest quality rating.

[11] Adverse hydromodification from stormwater discharge encompasses harmful changes to a receiving water's physical characteristics because of the rate, volume, or concentration of stormwater discharge. Common adverse hydromodification examples include erosion, sedimentation, down-cutting, accretion, or other alteration of the bio-geophysical conditions of the receiving water.

(b) Ensure that treatment for post-construction runoff from the site is completed before it is allowed to commingle with any offsite runoff in the conveyance.

(c) Prevent erosion of the flow path from the project to the receiving water.

v) Operations and Maintenance Plan: a description and schedule of the proposed inspection and maintenance activities for the stormwater facilities, including the party legally responsible for maintenance and monitoring activities. Provide a contact phone number and email address for the legally responsible party or parties. Refer to Term and Condition 2a.ii.b for inspection events required beyond quarterly/seasonal occurrences.

vi) The name, email address, and telephone number of the person responsible for designing the stormwater management facilities, so that NMFS may contact that person if additional information is necessary.

vii) Submit the post-construction stormwater management plan for Corona Avenue Improvements to NMFS a minimum 90 days prior to the start of construction by e-mail to Michelle.McMullin@noaa.gov. In the subject line be sure to include WCRO-2019-00431. If you do not receive an e-mail response indicating that the plan was received, please call 541-957-3378.

viii) The City of Medford will not begin work on the Corona Avenue Improvements until NMFS has verified the PCSMP is consistent with the design criteria described above. If the PCSMP contains sufficient information, NMFS will complete the verification to FAA within 30 days. If the PCSMP does not contain sufficient information or is not consistent with the design criteria described above, NMFS will notify FAA and the City within 30 days.

(1) If the City cannot meet the design criteria, as described above, for stormwater management and treatment for impervious areas associated with Corona Avenue Improvements, the PCSMP must include contingency measures to offset any deficiencies. The FAA included examples of these as part of the proposed action; therefore these alternatives can be used to offset deficits in stormwater treatment and management: depaving equivalent existing impervious surfaces at another location, removing one or more existing fish passage barriers, restoring riparian vegetation in the watershed, installing pervious pavement at another location where impervious surfaces are currently untreated, or installing stormwater retrofits at another location. These measures must be fully developed as part of the PCSMP for NMFS review and can be combined to achieve the equivalent stormwater treatment/detention.

b) The FAA and JCAA/City of Medford will be responsible for insuring installation, function and maintenance of all of the proposed stormwater facilities during construction.

c) The FAA will ensure JCAA/City of Medford will carry out the stormwater operation and maintenance plans for the Corona Avenue Municipal Works Facility and for the associated Corona Avenue Improvements including all provisions pertaining to: identification of responsible parties, inspection and maintenance schedule, and inspection and maintenance procedures. JCAA/City of Medford will also keep and preserve a log of all maintenance activities including the number of days after inspection corrective actions are performed.

d) The FAA will require JCAA/City of Medford ensures that vegetation in swales and detention ponds covers at least 90 percent of each facility within 3 years, excluding dead or stressed vegetation, dry grass or other plants, and weeds.

2) The following terms and conditions implement reasonable and prudent measure #2 (monitoring and reporting):
   a) The FAA shall submit the following reports to NMFS:
      i) A project completion report within 60-days of completing construction, including:
         (1) Project name;
         (2) FAA contact person;
         (3) Construction completion date;
         (4) As-built descriptions for all stormwater facilities for Corona Avenue Municipal Works Facility and for the associated Corona Avenue Improvements, including any on-site changes from the proposed action.
      ii) Three annual reports on stormwater facility operation and maintenance for three full years following construction, including the following information:
         (1) Stormwater facility monitoring logs for Corona Avenue Municipal Works Facility and for the associated Corona Avenue Improvements with:
            (a) The name of the contractor (if applicable) for all inspections;
            (b) the date of each regular inspection, and any additional inspection made within 48-hours of storm events with greater than or equal to 0.5 inch of rain during a 24-hour period (at least three per water year);
            (c) a description of any structural repairs, pond maintenance, or facility cleanout, e.g., sediment and oil removal and disposal, vegetation management, erosion control, structural repairs or seals, ponding water, pests, trash or debris removal;
            (d) An estimate of the percent cover of healthy vegetation in the biofiltration swales and the smaller vegetated swale, including a description of any corrective action needed to ensure 90 percent coverage within three years.
      iii) Each of the above reports and/or plans must be submitted to NMFS by email projectreports@wcr.noaa.gov, no later than September 30 of the calendar year. In the subject line be sure to include WCRO-2019-00431.

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). No conservation recommendations were identified at this time.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Corona Municipal Works Facility.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service 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 identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological 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 the FAA and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and the action area for this consultation are described above in Sections 1.3 and 2.3. The action area is also designated by the PFMC (2014) as EFH for Pacific salmon and includes spawning habitat. Spawning habitat and complex channel and floodplain habitat are identified by the PFMC as a habitat area of particular concerns (HAPC). The action area is also in an area where environmental effects of the proposed project would likely adversely affect EFH and HAPC for Pacific salmon. While the HAPC designation does not add any specific regulatory process, it does highlight certain habitat types that are of high ecological importance (PFMC 2014).

3.2 Adverse Effects on Essential Fish Habitat

The effects of the action, as proposed, on EFH are similar to those described above in the ESA portion of this document (Section 2.5). The habitat requirements (i.e., EFH) for the MSA-managed species in the action area are similar to those of the ESA-listed species. Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, we conclude that the proposed action will have the following adverse effects on EFH designated for Pacific Coast salmon, including the spawning habitat HAPC.

Freshwater EFH quality, including salmon spawning habitat HAPC, will be affected by pollutants in stormwater runoff with episodic and permanent effects on water quality and by minor changes in water quantity and water velocity.

3.3 Essential Fish Habitat Conservation Recommendations

We believe that the following EFH conservation recommendation would address the adverse effects described above. We recommend these measures, which are identical to the ESA terms and conditions described in Section 2.9 of the accompanying opinion, as actions that can be taken by the action agency to conserve EFH.

The FAA should implement Term and Condition #1 (Section 2.9.4) to minimize the delivery of stormwater pollutants to streams containing spawning, rearing, and migration EFH.

Additionally, although NMFS identified adverse effects on EFH from minor changes in stream flows, quantity, or velocity, NMFS has no EFH conservation recommendations at this time to address these adverse effects.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the FAA 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 FAA 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 users of this opinion are the FAA, JCAA, and City of Medford. An individual copy of this opinion was provided to the FAA. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. 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, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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6. APPENDICES

STORMWATER INFORMATION FORM

PROJECT INFORMATION	NMFS PROJECT TRACKING #: WCRO-2019-00431		
PROJECT NAME		COUNTY	
TYPE OF PROJECT (select all that apply)	☐ REDEVELOPMENT ☐ NEW DEVELOPMENT	☐ RESIDENTIAL ☐ COMMERCIAL	☐ INSTITUTIONAL ☐ OTHER
HAVE YOU CONTACTED ANYONE AT NMFS	☐ YES ☐ NO	If Yes, Who:	
NEAREST RECEIVING WATER			
STORMWATER DESIGNER / ENGINEER INFORMATION	NAME		
AFFILIATION/FIRM	PHONE	EMAIL	
STORMWATER DESIGN MANUAL USED, INCLUDING YEAR/VERSION			
DESCRIBE WHICH ELEMENTS OF YOUR STORMWATER PLAN THAT CAME FROM THE MANUAL EMPLOYED			

DESIGN STORMS			
1	2-YEAR, 24-HOUR STORM [Consult: http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm]	INCHES	IN/HR
2	WATER QUALITY DESIGN STORM (50% OF 2-YEAR, 24-HOUR STORM) [Except climate regions 4 & 9 (67%) and climate region 5 (75%)]	INCHES	
3	WATER QUANTITY DESIGN STORM (10-YEAR, 24-HOUR STORM) [Consult: http://www.wrcc.dri.edu/pcpnfreq/or10y24.gif]	INCHES	

SITE CHARACTERISTICS				
4	TOTAL PROJECT AREA [Lot/Parcel acreage + any additional ground disturbance area]		ACRES	FT^2
5	TOTAL IMPERVIOUS SURFACE AREA [Existing impervious acreage + Proposed impervious acreage]		ACRES	FT^2
6	TOTAL LANDSCAPE AREA [Landscaping acreage + Vegetated treatment facility acreage]		ACRES	FT^2
7	WILL IMPERVIOUS AREA BE REDUCED FROM CURRENT CONDITIONS? IF YES, BY HOW MUCH?	☐ YES ☐ NO	ACRES	FT^2
8	IS THE SITE CONTAMINATED? [If yes, provide investigation results to NMFS]		☐ YES ☐ NO	

Water Quality Information

9	Are low impact development (LID) methods incorporated into design? ☐ Yes ☐ No
10	How much of total stormwater is treated using LID? % FT^3
11	**Specific LID water quality treatment elements incorporated** **Site Design Elements** ☐ Site layout ☐ Clustered development ☐ De-pave existing pavement ☐ Conserve soils w/ best drainage ☐ Tree protection ☐ Construction sequencing ☐ Reforestation/Tree Planting ☐ Restored soils ☐ Porous pavement **Treatment Methods** ☐ Vegetated roof ☐ Infiltration rain garden / LID swale ☐ Infiltration Stormwater planters ☐ Soakage Trench ☐ Drywell ☐ Water quality swale ☐ Vegetated filter strips ☐ Lined Rain Garden/LID Swale ☐ Lined Stormwater Planter **Other LID Water Quality Treatment Methods** ☐ LID Name Source ☐ LID Name Source ☐ LID Name Source
12	Describe the treatment train, including pretreatment and LID BMPs used to treat water quality
13	Why this treatment train was chosen for the project site
14	Page in stormwater plan where more details can be found
15	Stormwater treatment required — Volume FT^3 — Peak Discharge CFS — Area Treated FT^2
16	Is the water quality design storm fully treated? Volume ☐ Yes ☐ No Peak Discharge ☐ Yes ☐ No
17	If answer to 16 is "No," why not? How will project offset the effects from untreated stormwater?

Water Quantity Information

18	Pre-development runoff rate & volume	Water Quality Design storm (50% of 2-year, 24-hour)	CFS	FT^3
		Water Quantity Design Storm (10-year, 24-hour)	CFS	FT^3
19	Post-development runoff rate & volume	Water Quality Design storm (50% of 2-year, 24-hour)	CFS	FT^3
		Water Quantity Design Storm (10-year, 24-hour)	CFS	FT^3

** Post-development runoff rate must be less than or equal to pre-development runoff rate **

Water Quantity Information (continued)

20	**Methods used to limit stormwater discharge from project**
21	**Page in stormwater plan where more details can be found**
22	**Specific LID discharge reduction elements incorporated** **Management Methods** / **Other LID water quantity Management elements** ☐ Porous pavement ☐ Soakage Trench ☐ LID Name ☐ Infiltration rain garden / LID swale ☐ Drywell Source ☐ infiltration Stormwater planters ☐ Downspout disconnection
23	**Are both water quantity design storms fully managed (i.e. attenuated)?** **Volume** ☐ **Yes** ☐ **No** **Peak Discharge** ☐ **Yes** ☐ **No**
24	**If No, why not? How will the project offset the effects from unmanaged stormwater?**
25	**Does the project discharge directly into a major water body?** [Large waterbody = ocean, estuary, mainstem Columbia River, Willamette River downstream of Eugene] ☐ **Yes** ☐ **No**
26	**Is the post-developed peak discharge >0.5 cfs during the 2-year, 24-hour storm event? If yes, flow control management required** ☐ **Yes** ☐ **No**
27	**Flow control proposed** **cfs** **% of 2-year, 24-hour storm Event**

Maintenance and Inspection Plan

28	**Have you included a stormwater maintenance and Inspection plan?** ☐ **Yes** ☐ **No**
29	**Contact information for the party/parties that will be legally responsible for performing/ contracting the inspections and maintenance of the stormwater facilities:**
	Name
	Affiliation/Responsibility
	Phone **Email**
	Name
	Affiliation/Responsibility
	Phone **Email**
	Name
	Affiliation/Responsibility
	Phone **Email**

OTHER RELEVANT INFORMATION