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TAKE PRIDE IN AMERICA

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Subject: U.S. Fish and Wildlife Service Biological Opinion addressing Implementation of the *U.S. v. Oregon* Management Agreement for Non-Treaty and Treaty Indian Fisheries in the Columbia River Basin from 2018 to 2027 – Biological Opinion
In Reply Refer to: 01FLSR00-2018-F-0001

Dear Administrators:

This correspondence transmits the U.S. Fish and Wildlife Service's (Service) biological opinion addressing the effects of activities covered by the subject agreement, which is herein incorporated by reference, on the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat, and on the threatened Bliss Rapids snail (*Taylorconcha serpenticola*), in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 USC 1531 et seq.). Impacts to species in the action area that did not result in adverse have been addressed in a separate Letter of Concurrence (TAILS ref. # 01FLSR00-2018-I-0003).

Our analysis in this document is based primarily on information provided in the June 21, 2017, *Biological Assessment of Incidental Impacts on Salmon Species Listed under the Endangered Species Act in the 2018-2027 United States v. Oregon Management Agreement*, prepared by the *U.S. v. Oregon* Technical Advisory Committee (TAC), the "*2018-2027 United States v. Oregon* Management Agreement," and separate biological assessments and biological opinions on the production programs that are a part of the *United States v. Oregon* Management Agreement

(Agreement). Additional information on listed species was obtained from published and unpublished scientific literature and Service file data. The complete decision record for this consultation consists of documents related to the subject action collectively on file at the Service's: Columbia River Fisheries Program Office in Vancouver, Washington; the Lower Snake River Compensation Plan Office in Boise, Idaho; and at the respective Ecological Services field offices where ESA section 7 compliance documents addressing site-specific production program activities were prepared.

Thank you for your continued interest in threatened and endangered species conservation; we look forward to continuing our cooperative working relationship with the Parties of *United States v. Oregon* as we implement the 2018 Agreement. If questions arise concerning this document, please call Ron Rhew of the Columbia River Fisheries Program Office at (360) 604-2500, or Mark Robertson of the Lower Snake River Compensation Plan office at (208) 378-5323.

Sincerely,

Julie Collins, Project Leader
Lower Snake River Compensation Plan

cc: Allyson Purcell, NMFS (Portland)
Jeromy Jording, NMFS (Portland)

Consultation History

Fisheries in the Columbia River are managed subject to provisions of United States v. Oregon (*United States v. Oregon*) under the continuing jurisdiction of the Federal court. The case now styled *United States v. Oregon* is the outgrowth of the consolidation of two cases filed in 1968, *Sohappy v. Smith*, No. 68-409 (D. Or.), and *United States v. Oregon*, No. 68-513 (D. Or.). These cases were first brought in 1968 enforce the reserved treaty fishing rights of the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Confederated Tribes and Bands of the Yakama Nation (collectively, "Columbia River Treaty Tribes"). The United States brought the case to define the Columbia River Treaty Tribes' right to take fish "at all usual and accustomed places" on the Columbia River and its tributaries and establish a limitation and prevent discrimination of the State of Oregon's regulation of Indian fishing. At the time the original complaint was filed, the Columbia River Treaty Tribes were limited to approximately 16% of the annual salmon harvest, based on 1960-1968 averages.

In the intervening decades, the courts have established several key principles. First, that the language of the treaties provided that the tribes retain the right to take fish at all usual and accustomed fishing places "in common with the citizens of the United States [or citizens of the territory]," reserved 50% of the harvestable fish destined for the tribes' traditional fishing places. Second, that the state may only regulate treaty fishing when reasonable and necessary for conservation. The conservation necessity applies when reasonable regulation of non-Indian activities is insufficient to meet the conservation purpose, the regulations are the least restrictive possible, the regulations do not discriminate against Indians, and voluntary tribal measures are not adequate.

In the early years of *United States v. Oregon*, harvest seasons were the subject of litigation and year-to-year court rulings. Since that time, the state and tribal Parties to *United States v. Oregon*, at the urging of the Federal District Court, have entered into negotiated agreements on allocation and management of upriver salmon runs and provisions related to hatchery production.

Beginning in 1977, the Parties have reached several agreements to meet this goal. Parties to those agreements have included the State of Washington, the State of Oregon, the State of Idaho, the United States (as represented by the National Marine Fisheries Service [NMFS], the Service, and the U.S. Bureau of Indian Affairs [BIA]), the Shoshone-Bannock Tribes, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Confederated Tribes and Bands of the Yakama Nation (collectively, the Parties). In reaching agreement, the Parties have used the 50% treaty share as a measure of the Treaty right for a fair allocation of fish.

In 1988, the Columbia River Fish Management Plan (CRFMP) was agreed to by the Parties and adopted by District Court Order as a partial settlement of *United States v. Oregon*. In later years, the Federal District Court described the CRFMP as "the seminal document governing in-river harvest activities." *Pac. Nw. Generating Co-op. v. Brown,* 822 F. Supp. 1479, 1486 (D. Or. 1993). The court noted that the CRFMP was a delicate, but effective structure for allocating and

planning harvest activities. *Id.* It further noted that the facts of the case were unique, stemming from "the absolute need for coordinated and centralized management of fish resource management in the Columbia River to protect fish and the balance between treaty Indian and non-treaty Indian fisheries." *United States v. Oregon*, No. CIV. 68-513-MA, 1992 WL 613238, at *2 (D. Or. Feb. 29, 1992).

In 1991, Snake River sockeye salmon were listed as endangered under the ESA. This was followed by listing of Snake River spring/summer-run Chinook and Snake River fall Chinook salmon as threatened in 1992. The Parties had already "greatly curtailed" harvest from historic levels in an effort to protect the fish. Indeed, "[p]reservation and conservation of the species through management, planning and study have been integral components of the CRFMP since its inception." *Pac. Nw. Generating Co-op*, 822 F. Supp. at 1485 n.13.

Fisheries in the Columbia River Basin were managed subject to provisions of the CRFMP from 1988 through 1998. Following 1998, fisheries were managed subject to provisions of a series of short term agreements among the Parties, the durations of which ranged from several months, covering a single fishing season, to five years. Annual agreements were implemented for fall Chinook and coho salmon, and summer steelhead during the period 1999 to 2003. A 5-year agreement for harvest was reached for spring Chinook, summer Chinook, and sockeye salmon for the period 2001 through 2005.

In 2005, the Parties negotiated a 3-year (2005 through 2007) Interim Management Agreement (2005 Agreement). Unlike some previous agreements, the 2005 Agreement covered fisheries year round (winter, spring, summer, and fall season fisheries). The 2005 Agreement and associated harvest provisions were the result of ongoing negotiations in *United States v. Oregon* and the evolution and development of fishery management in response to ESA-listings of Pacific salmon species. The 2005 Agreement expanded the use of abundance-based harvest schedules and served as the model for the next agreement that was completed in 2008. These agreements also gave precedence to the preservation and conservation on the species. As explained in the agreement's preamble, the purpose is to provide a framework within which the Parties may exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance upper Columbia River fish runs while providing harvests for both treaty Indian and non-treaty fisheries. The primary goals of the Parties are to rebuild weak runs to full productivity and fairly share the harvest of upper river runs between treaty Indian and non-treaty fisheries in the ocean and Columbia River Basin. In signing the agreement, the sovereign parties voluntarily agree to limit their harvest to levels that meet this purpose and goals.

The Parties to the 2018 Agreement initially requested formal consultation under Section 7 of the ESA on June 21, 2017 through submission of a Biological Assessment (BA) assembled by the *United States v. Oregon* Technical Advisory Committee (TAC). The BA (TAC 2017) assessed the effects of implementing the fishery management framework specified within the 2018 Agreement and an addendum assembled by the *United States v. Oregon* Production Advisory Committee (PAC) quantified effects associated with hatchery programs referenced in the 2018 Agreement to ESA-listed species. TAC submitted supplemental material in November of 2017 clarifying certain aspects of the original BA. This document therefore refers to the original BA with this additional information incorporated into a single reference both as TAC 2017.

Prior to consulting on the 2018 Agreement, the Service completed consultation on harvest actions only, as identified in the 2008-2017 *United States v. Oregon* Management Agreement (2008 Agreement). In accordance with the 2008 Agreement, the NMFS, the Service, and the Bureau of Indian Affairs continued to review production programs contained in the 2008 Agreement and undertook consultation for specific production programs, as appropriate. The results of completed consultations on specific production programs are presented and summarized in this document.

Consultations for various production programs addressed by the 2018 Agreement have occurred since the late 1990s as salmon and steelhead listing decisions have been finalized. Since the time of the 2008 Agreement, there has been a concerted effort to ensure all programs have undergone the ESA section 7 compliance process. A final push to complete and update consultations for all hatchery programs has occurred in the years leading up to the signing of the 2018 Agreement. These consultations occurred at the hatchery program level and were not considered in aggregate with implementing the 2018 Agreement. See Appendix A; all of these consultations are available from the originating Ecological Services field office.

As part of the ongoing consultation, the Service signed a Letter of Concurrence on February 16, 2018 (TAILS ref. # 01FLSR00-2018-I-0003), addressing species and critical habitat where adverse effects were not likely associated with the signing of the 2018 Agreement. Adverse effect determinations are being addressed via the associated Biological Opinion, the subject of this current effort. In combination, the Letter of Concurrence and the Biological Opinion document the Service's complete ESA compliance needs associated with this proposed action.

This current consultation effort is intended to ensure that State and Tribal fisheries and specified production programs, conducted from 2018 to 2027, are consistent with the provisions of section 7 of the ESA, as they relate to ESA-listed species and critical habitat under the jurisdiction of the Service. ESA-listed species and critical habitat under the jurisdiction of NOAA are addressed in a separate consultation.

BIOLOGICAL OPINION

I. Description of the Proposed Action

This section describes the proposed Federal Action, including any measures that may avoid, minimize, or mitigate adverse effects to listed species or critical habitat, and the extent of the geographic area affected by the action (i.e., the action area). The term "action" is defined in the implementing regulations for section 7 as "all activities or program of any kind authorized, funded, or carried out, in whole in in part, by the Federal agencies in the United States or upon the high seas." The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

I. A. Action Area

For the purpose of this Opinion, the action area is described by the physical effects to the environment caused by activities associated with both the harvest and production components of the 2018 Agreement. However, we are also including areas likely to be affected in a manner that causes direct or indirect effects to species or critical habitats, including effects associated with the infusion of marine derived nutrients and inter- and intra-specific competition.

There is significant overlap in physical effects of the action between the harvest and production programs, mainly associated with the mainstem Columbia River (generally described as Buoy 10 upstream to Wanapum Dam) and the lower Snake River (generally described as the Snake River confluence with the Columbia River upstream to the Washington/Idaho border). However, the production program expands the action area to include those areas of the Columbia Basin (including the Snake, Clearwater, and Salmon Rivers) where the physical effects of hatcheries, related infrastructure, and monitoring and evaluation activities associated with the 2018 Agreement are readily measurable. The majority of hatchery-related physical effects not already encompassed by the action area described above for the harvest program occur in the mainstem Columbia River and tributaries (Wenatchee, Entiat, Methow and Okanogan Rivers) from Wanapum Dam up to the end of the anadromous zone at the base of Chief Joseph Dam, in the mainstem Snake River below Hells Canyon Dam, the Clearwater River, and the Salmon River, near and downstream of the facilities and areas where monitoring and evaluation activities take place. In addition, a number of hatcheries are located in the middle Snake River, outside of the zone of anadromy; these areas are also considered part of the action area.

When considering the environmental and biological effects of the harvest and production programs, the action area extends to include all areas in the Columbia Basin (e.g., Columbia, Snake, Clearwater, and Salmon Rivers) accessible by wild or hatchery-origin salmon and steelhead addressed by the Management Agreement, and those areas in the immediate vicinity and just downstream of, hatcheries in the middle Snake River. Consideration was given as to whether the ocean should be included in the action area, but the effects analysis was unable to detect or measure effects of the proposed action beyond the area described above (i.e., outside of the Columbia River plume), based on best available scientific information (NMFS 2011).

Available knowledge and techniques are insufficient to discern the role and contribution of the proposed action to density dependent interactions affecting salmon and steelhead growth and survival in the Pacific Ocean. From the scientific literature, the general conclusion is that the influence of density dependent interactions on growth and survival is likely immeasurably small. While there is evidence that hatchery production can impact salmon survival at sea, the degree of impact or level of influence is not yet understood or predictable. NMFS will monitor emerging science and information and will reinitiate Section 7 consultation in the event that new information reveals effects of the action to ESA-listed species or critical habitat in a manner or to an extent not considered in this consultation (50 CFR 402.16).

Action area descriptions specific to individual production programs can be found in the completed Biological Opinions identified in Appendix A. These Opinions are hereby incorporated by reference.

I. B. Proposed Action

The proposed action considered in this opinion is for the Federal parties to sign the new 2018 Agreement, as negotiated by the parties to *United States v. Oregon*, and for NMFS and the Service to issue associated ITSs exempting take of ESA-listed species pursuant to the implementation of the new 2018 Agreement. This new management agreement would take effect after the current management agreement expires[1]. The new management agreement accomplishes two primary objectives. First, it memorializes the harvest policies that the parties have agreed should govern the amount of harvest. Second, it formalizes hatchery program release expectations, addressed individually at site specific locations, which augment harvest and are important to the conservation of salmon or steelhead runs above Bonneville Dam.

The new management agreement specifies harvest policies for salmon and steelhead stocks bound for upriver areas, for which the BA describes both treaty Indian and non-treaty fisheries that adhere to each harvest policy. A list of hatchery programs with expected production levels in the Columbia River Basin is also included. The new management agreement thereby provides a framework to keep healthy stocks healthy, rebuild weak stocks, and fairly share the harvest of upper river runs between treaty Indian and non-treaty fisheries.

The proposed 2018 Agreement, including the non-treaty and treaty Indian fisheries components, extends from January 1, 2018 to December 31, 2027. The fisheries will operate primarily in the mainstem Columbia River from its mouth (Astoria, Oregon area) upstream to Priest Rapids Dam, and in the Snake River from its confluence with the Columbia River upstream to Lower Granite Dam. Although not directly specified, the 2018 Agreement states that it covers the mainstem

[1] The 2008 Agreement was set to originally expire on December 31, 2017. A gap between the time the 2008 Agreement and associated biological opinion expired and when the 2018 Agreement and new opinion could be finalized and implemented existed. As a consequence, the Parties agreed to extend the 2008 Agreement through February 28, 2018. Given the circumstances, NMFS also extended its 2008 biological opinion and associated incidental take statement, and concluded, based on considerations sent to NMFS from the Parties through the TAC, that the activities that would occur during the two month extension were not likely to adversely affect several species and were not likely to jeopardize the continued existence of the remaining species or destroy or adversely modify any designated critical habitat (Wulff 2017).

Columbia and "certain tributary fisheries." Fisheries included in the proposed action are described in detail in the biological assessment submitted to NMFS and the Service by the TAC (TAC 2017), and are summarized below. Tributary fisheries were also identified in the TAC's biological assessment as part of the action and are therefore included in our analysis.

In describing the proposed action, it is first useful to clarify the distinction between the term "stock" and how it is used for management, and "species" as it is used under the ESA. A species of salmon designated for ESA listing is referred to as an Evolutionarily Significant Unit (ESU). ESA-listed steelhead species are referred to as a Distinct Population Segment (DPS). ESUs and DPSs include one or more populations that are reproductively isolated and represent an important part of the evolutionary legacy of the species. It is useful here to highlight and clarify that a biological opinion focuses on the effects of the proposed action on ESA-listed species. However, in fishery management, a stock is commonly used to describe one or more populations that are managed as a group and are exposed to similar fishery related impacts. Stocks generally represent the smallest unit of fish that can be enumerated and monitored in season. Stocks of fish include populations that can be grouped because of similar run timing and spatial distribution. Fisheries managed under the 2018 Agreement use several stocks that are generally not coincident with the ESA-listed ESUs and DPSs. The 2018 Agreement establishes harvest management policies for fisheries in the action area directed at Upriver salmon and steelhead stocks. We will further detail this approach in our effects analysis, but introduce the "stock" concept here as the following descriptions of fisheries use the term frequently.

Fishery Framework

This information is summarized from the BA developed by TAC (TAC 2017).

Across all of the following fishery descriptions, monitoring and evaluation activities occur throughout the year in the Columbia River to assess the stock status of salmon and steelhead returns and to monitor fishery effort, catch and impacts to fish listed under the ESA (TAC 2017). Fishery sampling is conducted by the Parties to estimate landed catch and to collect representative and unbiased samples using systematic or stratified sampling methods. The sampling goal is to sample at least 20% of the catch (by fishery / by week, month, etc.) to ensure adequate numbers of coded-wire tags (CWTs) are recovered to profile the stock composition of fish moving upstream and subsequently taken during authorized fisheries. Additionally, the Parties also strive to achieve biological minimum sampling goals for capturing enough fish scales for a 95% confidence interval (+10%) age composition estimate of the catch to use in run reconstruction and subsequent forecasting of fish runs (TAC 2017). Given these monitoring activities result in harvest estimates that are statistically based, they are considered indexes rather than exact point estimates.

Staff from the Parties, including TAC members, meet before every spring, summer, and fall season to review sampling of the various species and fisheries are coordinated, sampling rates and locations set, and deadlines confirmed. Examples of season-specific sampling matrices are contained in the BA submitted (TAC 2017). Creel monitoring along with biological sampling of treaty fisheries follows very similar methods to non-treaty fisheries and is also described in detail

in the BA (TAC 2017). As part of the proposed action the Parties expect to review all the sampling and monitoring methods they use for estimation for accuracy and continued pertinence.

Management Periods

Fisheries governed by the 2018 Agreement are managed within a winter/spring, summer, and fall season time frame, each referred to as a management period. As specified above, treaty Indian fisheries and non-treaty fisheries are considered in this opinion. Non-treaty fisheries are those that do not have a treaty reserving a fishing right within the action area. These include all state fisheries and certain Indian fisheries operated by tribes that are not party to *United States v. Oregon*. Non-treaty fisheries consist of both commercial and recreational fisheries. Treaty Indian fisheries are those guaranteed by one or more treaties. These fisheries include both commercial and ceremonial and subsistence (C&S) fisheries.

The winter/spring season extends from January 1 to June 15 (Table 1). During this management period fisheries in the mainstem Columbia River primarily target spring Chinook salmon stocks returning to the upper Columbia, the Willamette River, and lower Columbia River tributaries.

The summer season extends from June 16 to July 31 (Table 2). During this management period, fisheries target primarily Upper Columbia summer Chinook salmon, which is not ESA-listed, and Upriver Columbia sockeye salmon, which includes the ESA-listed Snake River sockeye salmon ESU. Snake River sockeye salmon comprise less than one percent of the Upriver sockeye salmon stock. These stocks constrain the summer season fisheries. Summer season fisheries are constrained primarily by the available opportunity for Upper Columbia summer Chinook salmon which includes fish returning to the Okanogan and Wenatchee rivers and fish which also spawn in the mainstem Columbia River, and by specific harvest limits for Snake River sockeye salmon.

Fall season fisheries begin on August 1 and extend to the end of the calendar year (Table 3). During the fall management period fisheries target primarily harvestable hatchery and natural-origin fall Chinook and coho salmon, and hatchery steelhead. Fall season fisheries are constrained by specific ESA related harvest rate limits for listed Snake River fall-run Chinook salmon, and both A-Index and B-Index components of the listed Upper Columbia River (UCR) and Snake River steelhead DPSs (A-Index and B-Index steelhead are stock designations that refer to components of the summer run steelhead DPSs, that have particular life history characteristics. This will be reviewed in further detail in the status section below).

Table 1. Fisheries subject to the 2018 Agreement during the winter/spring management period.

Fishery Management Period	Jurisdiction	Fishery Description	Target species	Location
Winter/Spring season (January 1 through June 15)	Non-Treaty	Commercial spring Chinook	Spring Chinook salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Commercial Fisheries in Select Areas	Select Area hatchery-origin Spring Chinook, fall Chinook, and coho salmon	Off-channel areas near the mouth of the Columbia River (upstream of Buoy 10 area)
		Recreational spring Chinook – below BON	Spring Chinook salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Recreational spring Chinook – BON - HWY 395 Bridge	Spring Chinook salmon	Bonneville Dam upstream to Highway 395 Bridge near Pasco, WA
		Recreational spring Chinook – Snake River (WA waters Downstream of LGR)	Spring Chinook salmon	Mouth of the Snake River upstream to Lower Granite Dam
		Recreational spring Chinook – Ringold Area	Spring Chinook salmon	Highway 395 Bridge near Pasco, WA upstream to Priest Rapids Dam
		Wanapum tribal spring Chinook	Spring Chinook salmon	Mainstem Columbia River from Priest Rapids upstream to Wanapum Dam
	Treaty Indian	Ceremonial and Subsistence (C&S)	Spring Chinook salmon	Action Area[1]
		Winter Gillnet (Zone 6)	White Sturgeon	Bonneville Dam to McNary Dam
		Spring gillnet (Zone 6)	Spring Chinook salmon	Bonneville Dam to McNary Dam
		Platform and Hook&Line (Zone 6 + downstream of BON)	Spring Chinook salmon	Buoy 10 to McNary Dam
		Permit Gillnet	Spring Chinook	Action Area[1]

			salmon	
		McNary - HWY 395 Bridge	Spring Chinook salmon	McNary Dam upstream to Highway 395 Bridge near Pasco, WA

[1] Treaty C&S fisheries generally occur in the mainstem Columbia and tributaries except the Snake River.

Table 2. Fisheries subject to the 2018 Agreement during the summer management period.

Fishery Management Period	Jurisdiction	Fishery Description	Target species	Location
Summer season (June 16 through July 31)	Non-Treaty	Recreational – mouth to McNary	Summer Chinook and sockeye salmon and summer steelhead	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Recreational – McNary to I-395	Summer Chinook and sockeye salmon and summer steelhead	McNary Dam upstream to Highway 395 Bridge near Pasco, WA
		Wanapum tribal summer Chinook	Summer Chinook salmon	Mainstem Columbia River from Priest Rapids upstream to Wanapum Dam
		Commercial salmon	Summer Chinook salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Select Area commercial	Select Area hatchery-origin spring Chinook and fall Chinook salmon	Off-channel areas near the mouth of the Columbia River (upstream of Buoy 10 area)
	Treaty Indian	Ceremonial and Subsistence (C&S)	Summer Chinook or sockeye salmon	Action Area[1]
		Commercial gillnet (Zone 6)	Summer Chinook and sockeye salmon, shad	Bonneville Dam to McNary Dam
		Platform and Hook&Line (Zone 6 + downstream of	Summer Chinook and sockeye salmon	Buoy 10 to McNary Dam

		BON)		
		Permit Gillnet (Zone 6)	Summer Chinook salmon	Bonneville Dam to McNary Dam
		McNary - HWY 395 Bridge	Summer Chinook and sockeye salmon	McNary Dam upstream to Highway 395 Bridge near Pasco, WA

[1] Treaty C&S fisheries generally occur in the mainstem Columbia and tributaries except the Snake River.

Fisheries in Tables 1-3 occur during one of the previously described management periods. However, there are a few fisheries that cross the management period time frames (Table 4). Additionally, the 2018 Agreement contains treaty tribal tributary fisheries that occur outside of the management periods. Also, Lamprey fisheries at Willamette Falls and in the Willamette River and any other Columbia tributaries are included. Treaty Indian fisheries directed at Shad, Walleye, and other fish account for incidental impacts of salmon and steelhead and also operate across management periods, but these non-ESA-listed species are also retained during C&S fisheries if caught (Table 4).

The tribes also manage a set of tributary fisheries discussed in further detail below. These fisheries target spring Chinook, fall Chinook, and coho salmon, or steelhead depending on the status of the stocks returning to each tributary.

Table 3. Fisheries subject to the 2018 Agreement during the fall management period.

Fishery Management Period	Jurisdiction	Fishery Description	Target species	Location
Fall season August 1 through December 31	Non-Treaty	Commercial gillnet	Fall Chinook and coho salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Commercial tangle net	Coho salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Commercial seine	Fall Chinook and coho salmon	Mouth of Columbia (Buoy 10) upstream to Bonneville Dam
		Select Area commercial	Select Area hatchery-origin fall Chinook and coho	Off-channel areas near the mouth of the Columbia River (upstream of Buoy 10 area)

			salmon	
		Recreational Buoy 10	Fall Chinook and coho salmon	Mouth of the Columbia River (Buoy 10/Estuary area)
		Mainstem Recreational – below BON	Fall Chinook, coho salmon, and summer steelhead	Upstream of Buoy 10 to Bonneville Dam
		Recreational – BON - HWY 395 Bridge	Fall Chinook, coho salmon, and summer steelhead	Bonneville Dam upstream to Highway 395 Bridge near Pasco, WA
		Recreational Lower Snake River	Fall Chinook salmon and summer steelhead	Mouth of the Snake River upstream to Lower Granite Dam
		Recreational steelhead (tributary dip-ins Klickitat, Deschutes, John Day)	Fall Chinook, coho salmon, and summer steelhead	Klickitat River, WA Deshcutes River, OR John Day River, OR
	Treaty Indian	C&S fisheries	Fall Chinook salmon or steelhead	Action Area[1]
		Commercial gillnet (Zone 6)	Fall Chinook salmon	Bonneville Dam to McNary Dam
		Platform and Hook&Line (Zone 6 + downstream of BON)	Fall Chinook salmon	Buoy 10 to McNary Dam
		Late Fall Commercial gill net	White Sturgeon	Bonneville Dam to McNary Dam
		Permit Gillnet	Fall	Action Area[1]

			Chinook salmon	
		McNary - HWY 395 Bridge	Fall Chinook and coho salmon	McNary Dam upstream to Highway 395 Bridge near Pasco, WA

[1]Treaty C&S fisheries generally occur in the mainstem Columbia and tributaries except the Snake River.

Table 4. Fisheries subject to the 2018 Agreement that span more than one management period.

Jurisdiction	Fishery Description	Target species	Location
Non-Treaty	Mainstem Recreational steelhead	Summer and Winter steelhead	Mouth of Columbia (Buoy 10) upstream to Highway 395 Bridge near Pasco, WA
	Recreational fisheries in Select Areas	Select Area hatchery-origin spring Chinook, fall Chinook, and coho salmon	Off-channel areas near the mouth of the Columbia River (upstream of Buoy 10 area)
Treaty Indian	Ceremonial and Subsistence (C&S)	Salmon and steelhead, and other species[1]	Action Area[2]

[1] Fisheries may retain Shad, Walleye, and other fish may be taken anytime as well, based on their adult availability.

[2] Treaty C&S fisheries generally occur in the mainstem Columbia and tributaries except the Snake River.

Treaty Indian Tributary Fisheries

The *United States v. Oregon* agreement includes a specified set of treaty Indian tributary fisheries (Table 5). Catch in some of the tributary fisheries, particularly in the lower reaches and river mouths, are known to catch "dip-in" fish from the overall run moving through the mainstem migration corridor. Catch in these areas is counted against the treaty fishery catch limits. Catch in tributary fisheries further upstream within the tributary itself target local stocks, and occur in areas where fish in the mainstem migration corridor are not likely to enter or occur. These terminal fisheries target non-ESA-listed spring Chinook, fall Chinook, and coho salmon, and hatchery reared steelhead, but still may affect ESA-listed species that are particular to each tributary. The BA (TAC 2017) characterizes expected catch and the expected take of ESA-listed fish for each of the tribal tributary fisheries.

Table 5. Treaty Indian tributary fisheries.

Jurisdiction	Fishery Description	Target species	Location
Treaty Indian	Little White Salmon/Drano Tributary	Spring Chinook, fall Chinook, and coho salmon	Drano Lake, WA
	Wind River Tributary	Spring Chinook	Mouth of the Wind River, WA
	White Salmon River Tributary	Spring and fall Chinook salmon	White Salmon River, WA
	Hood River Tributary	Spring Chinook salmon	Hood River, OR
	Klickitat River Tributary	Spring Chinook, fall Chinook, and coho salmon	Klickitat River, WA
	Deschutes River Tributary	Spring and fall Chinook salmon	Deschutes River, OR
	John Day River Tributary	Chinook salmon	John Day River, OR
	Umatilla River Tributary	Spring Chinook, fall Chinook, coho salmon, and steelhead	Umatilla River, OR
	Walla Walla River Tributary	Spring Chinook salmon	Walla Walla River, WA
	Yakima River Tributary	Spring, summer, and fall Chinook salmon	Yakima River, WA
	Icicle Creek Tributary	Spring Chinook salmon	Icicle Creek, WA

Fishery Location and Jurisdiction

Treaty Indian Fisheries

Treaty Indian fisheries included in the proposed new *United States v. Oregon* agreement would be managed subject to the regulation of the tribal signatories to the 2018 Agreement. The fisheries are managed primarily by specifying the time and area for fishery openings, allowable gear types, and monitoring the fisheries to ensure that they achieve catch targets and stay within conservation constraints. Treaty Indian fisheries are generally managed allowing the retention of all fish caught (full retention), but under some circumstances the tribes may choose to implement species selective fisheries. Treaty Indian fisheries generally occur in the mainstem Columbia River between Bonneville Dam and McNary Dam, although some fishing does occur both above McNary and below Bonneville Dam. Impacts associated with these fisheries are accounted for wherever they occur. Reservoirs of water behind each dam are designated separately (upstream of Bonneville Dam is Bonneville Reservoir, Zone 6/61; upstream of The Dalles Dam is Lake Celilo, Zone 6/62; and, upstream of John Day Dam is Lake Umatilla, Zone 6/63). However, they are commonly known collectively as "Zone 6" (Figure 1).

Fisheries implemented in the reservoir upstream of McNary Dam, known as Lake Wallula, up to the mouth of the Snake River are managed under the same mainstem harvest limits as the rest of the mainstem. The tribes also manage a set of tributary fisheries discussed in further detail below. These fisheries target spring Chinook, fall Chinook, and coho salmon, or steelhead depending on the status of the stocks returning to each tributary.

Non-Treaty Fisheries

Non-treaty fisheries considered in a new *United States v. Oregon* agreement would be managed under the jurisdiction of the states of Oregon and Washington. Generally, these include mainstem Columbia River commercial and recreational salmonid fisheries between Buoy 10 at the mouth of the Columbia River and Bonneville Dam (commonly known as Zones 1-5, described below), designated off channel Select Area Fishery Enhancement fisheries (SAFE fisheries, described in more detail below), mainstem recreational fisheries between Bonneville Dam and McNary Dam (commonly known as Zone 6), recreational fisheries between McNary Dam and Highway 395 Bridge in Pasco, Washington, recreational and Wanapum tribal spring Chinook salmon fisheries from McNary Dam to Priest Rapids Dam, and recreational fisheries in the Snake River upstream to the Washington/Idaho state boundary. Catch also occurs in a set of "dip-in" fisheries. These dip-in fisheries are located at mouths and lower reaches of certain tributaries in Zone 6 where migrating fish may hold prior to continuing their upstream migration. The catch of upriver stocks in these dip-in fisheries are included in the catch accounting for upriver stocks. Dip-in fishing areas include Drano Lake at the mouth of the Little White Salmon River, the lower Wind River, the lower Deschutes River (upstream to Shearers Falls), and the John Day River Arm of John Day Reservoir.

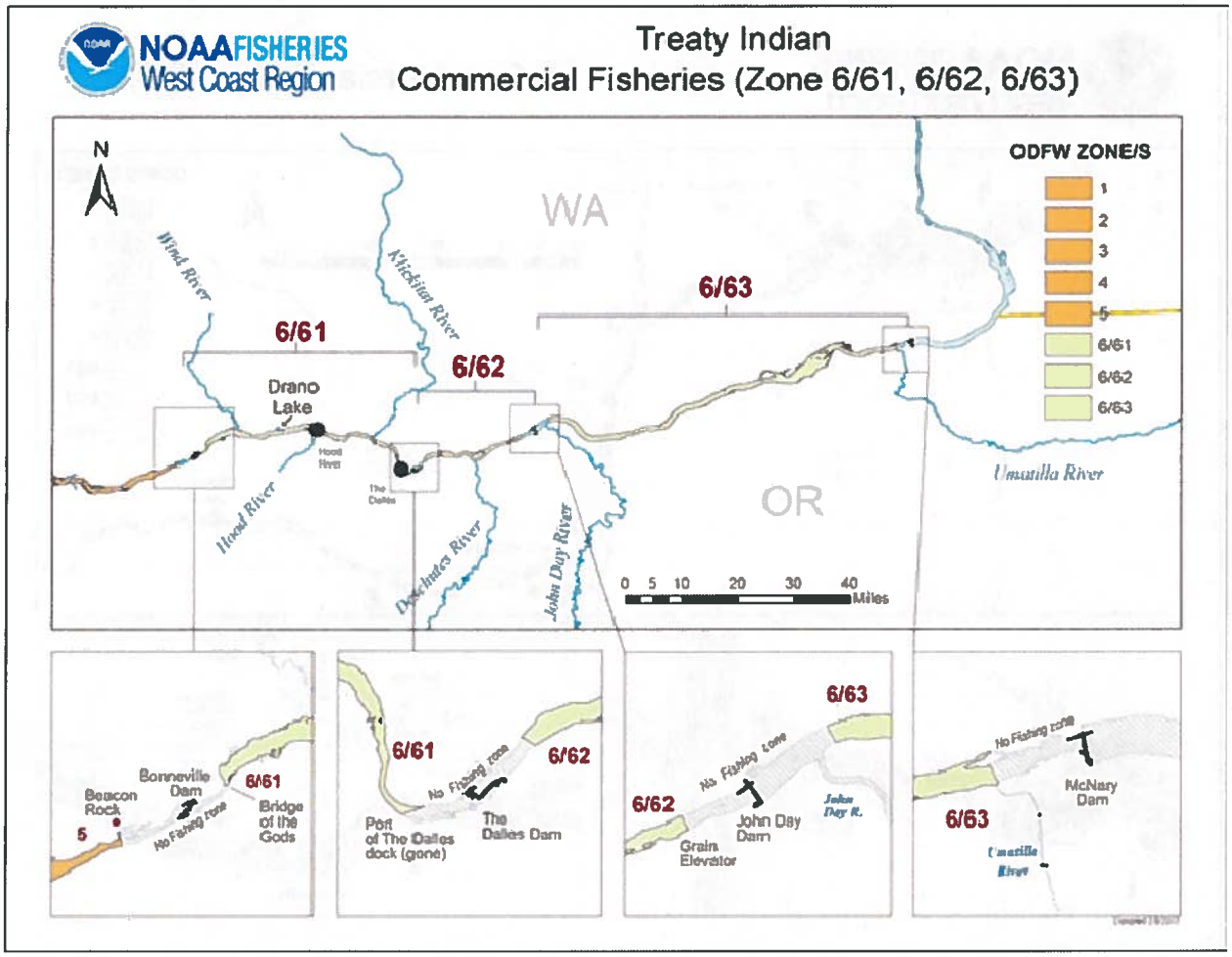

Figure 1. Location of mainstem treaty Indian fisheries downstream of McNary Dam, collectively known as Zone 6.

Mainstem Non-Treaty Commercial Fisheries

Commercial fisheries below Bonneville Dam occur in the lower Columbia River in commercial catch Zones 1-5 (Figure 2); the majority of commercial harvest occurs in Zones 4 and 5.

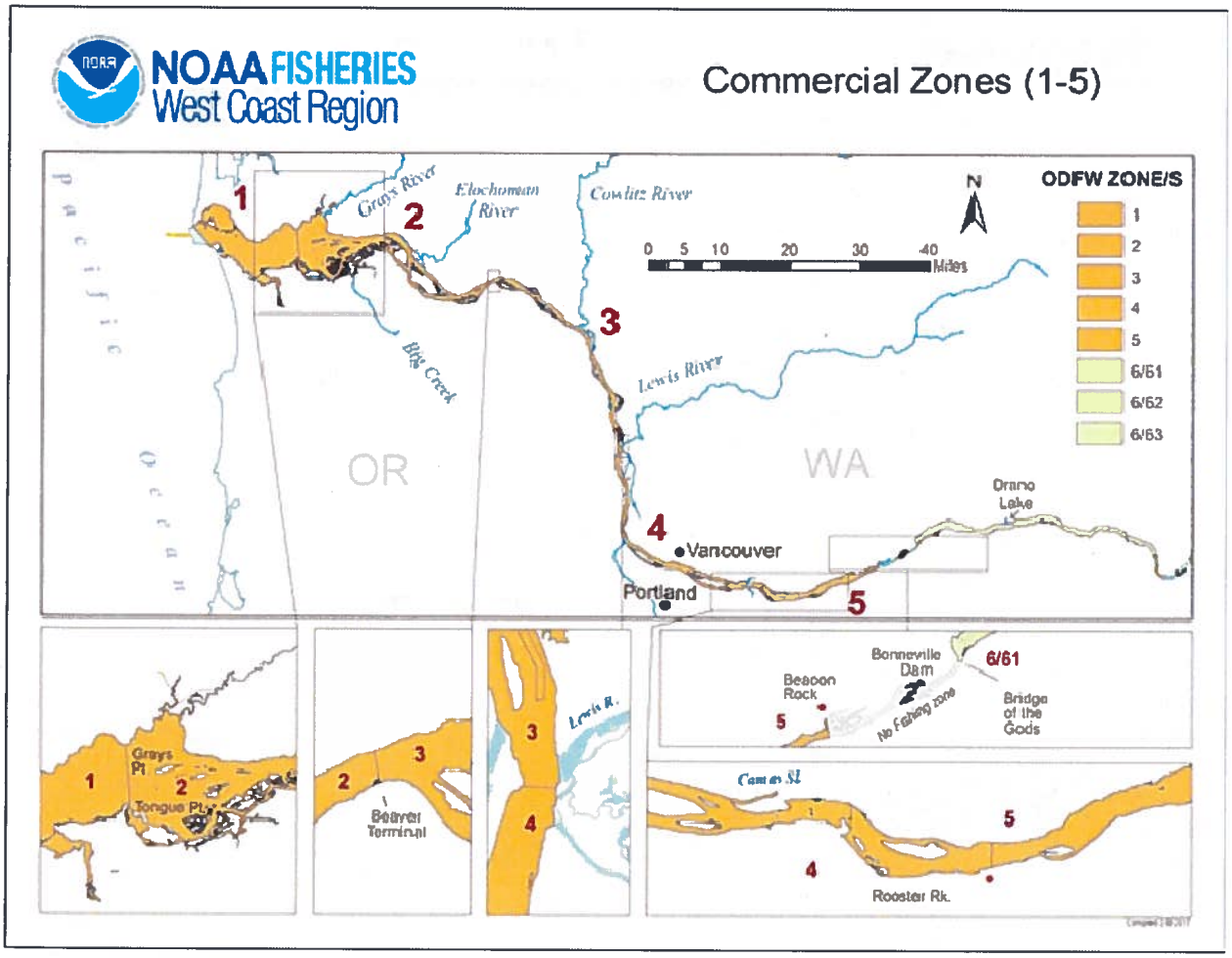

Figure 2. Commercial fishing zones downstream of Bonneville Dam.

Select Area Fisheries Enhancement (SAFE) Commercial Fisheries

SAFE fisheries occur in off-channel areas downstream of Zones 4 and 5 and target hatchery-reared and locally acclimated spring and fall Chinook and coho salmon. The SAFE area fisheries provide opportunity for expanded commercial and recreational fisheries directed at hatchery fish returning to their specific location. SAFE areas are described as follows (see Figure 3):

- *Youngs Bay* is located in Oregon waters adjacent to the city of Astoria and inland of the Highway 101 Bridge. The fishing area extends from the Highway 101 Bridge upstream to Battle Creek Slough below the confluence of the Youngs and Klaskanine rivers.

- *Tongue Point Basin* is just east of the city of Astoria in Columbia River waters bounded by the Oregon shore and Mott and Lois islands. The fishing area includes the South Channel from the mouth of the John Day River upstream to its confluence with the Prairie Channel.

- *Blind Slough* is located near Brownsmead, Oregon and comprises the lower reaches of Gnat Creek. The fishing area also includes Knappa Slough from the mouth of Blind Slough to the east end of Minaker Island.
- *Deep River* is located on the Washington side in the waters of Grays Bay and Deep River.

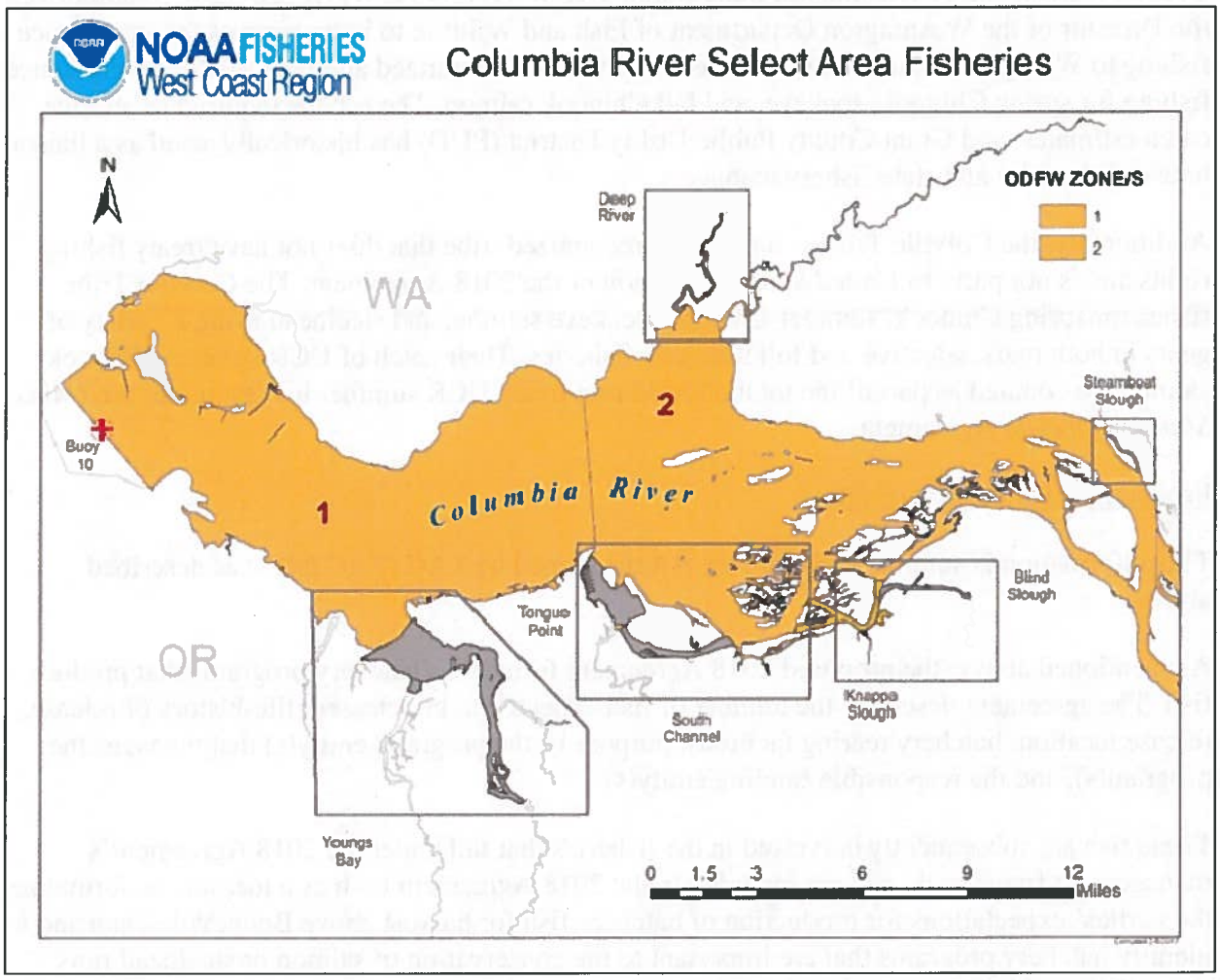

Figure 3. Location of SAFE fishery areas near the Columbia River mouth.

Columbia River Mainstem and Lower Snake River Recreational Non-treaty Fisheries

The states of Washington and Oregon individually set regulations concerning recreational fisheries in the mainstem Columbia River. These fisheries occur in the area from Buoy 10 upstream to Priest Rapids Dam, during the winter/spring, and fall management periods and upstream to Chief Joseph Dam in the summer management period. Fish targeted include hatchery spring Chinook, summer Chinook, fall Chinook, and hatchery coho salmon and hatchery steelhead. Sockeye salmon fishing may occur if run sizes permit. Washington recreational spring Chinook salmon in the Snake River upstream to the Washington/Idaho border near Clarkston are included.

Non-treaty Tribal Fisheries Included in Non-Treaty Catch

The Wanapum Tribe is a federally recognized tribe, but do not have treaty fishing rights, and are not a party to *United States v. Oregon* or the new *United States v. Oregon* agreement. Catch from Wanapum fisheries are accounted for as part of the non-treaty fisheries under the *United States v. Oregon* Agreement. A Washington State statute (RCW 77.12.453; WAC 220-32-055) authorizes the Director of the Washington Department of Fish and Wildlife to issue permits for subsistence fishing to Wanapum tribal members. Seasons have been authorized annually to allow subsistence fishing for spring Chinook, sockeye, and fall Chinook salmon. The tribe is required to provide catch estimates, and Grant County Public Utility District (PUD) has historically acted as a liaison between the tribe and state fishery managers.

Additionally, the Colville Tribe is a federally recognized tribe that does not have treaty fishing rights and is not party to *United States v. Oregon* or the 2018 Agreement. The Colville Tribe fishes for spring Chinook, summer Chinook, sockeye salmon, and steelhead using a variety of gears in both mark selective and full retention fisheries. Their catch of UCR summer Chinook salmon are counted as part of the total allowed non-treaty UCR summer harvest under the *United States v. Oregon* Agreement.

Production/Hatchery Programs

This information is summarized from the BA developed by TAC (TAC 2017) as described above.

As mentioned above, the proposed 2018 Agreement formalizes hatchery programs that produce fish. The agreement describes the number of fish expected to be released, life-history of release, release location, hatchery rearing facilities, purpose of the program, entity(s) that manages the program(s), and the responsible funding entity(s).

These fish are subsequently harvested in the fisheries that fall under the 2018 Agreement's management framework, and are included in the 2018 Agreement both as a measure to formalize the parties' expectations for production of hatchery fish for harvest above Bonneville Dam and to identify hatchery programs that are important to the conservation of salmon or steelhead runs above Bonneville Dam.

While the agreement includes a hatchery production component, the hatchery operations aspect is not solely dependent on the *United States v. Oregon* agreement and may occur regardless of the outcome of the *United States v. Oregon* agreement. Separate processes and actions have occurred outside the *United States v. Oregon* agreement that review and analyze the hatchery programs at site specific levels (see Appendix A.); these outside, but related consultations are considered part of the baseline. However, a review of the effects at a comprehensive/aggregate level of the total hatchery production referenced in the agreement is necessary to evaluate the inclusion of all of the hatchery programs collectively in the agreement. This will be described in more detail in our effects analysis.

II. Rangewide Status of Affected Listed Species and Critical Habitat

Bull Trout

The bull trout was listed as a threatened species throughout the coterminous United States on November 1, 1999 (64 FR 58909). The listing rule also included a special 4(d) rule that applies to bull trout wherever found in the coterminous lower 48 States, except in the Jarbidge River Basin in Nevada and Idaho. The principal effect of this special rule is to distinguish that take of the bull trout in accordance with the State, National Park Service, and Native American Tribal permitted fishing activities is not considered a prohibited taking of the species.

The Service completed a draft recovery plan for the bull trout in 2002, and a final plan in 2015 (Service 2015d). In 2008, the Service also completed a 5-year status review of the bull trout (Service 2008). The status review determined that the "threatened" status for the bull trout should be maintained throughout its coterminous United States range, and that the Service should evaluate whether distinct population segments (DPSs) of the bull trout exist and, if so, reclassify the listing of the bull trout accordingly (Service 2008).

The bull trout is native throughout the Pacific Northwest. It was historically found in rivers and their major and minor tributaries, east and west of the Cascades. The bull trout was also historically distributed in streams of the Klamath Basin. Currently, most bull trout populations in the Columbia River Basin are confined to headwater areas of tributaries to the Columbia and Snake rivers.

Habitat Requirements

Bull trout have habitat requirements that are more specific than those for many other salmonids (Rieman and McIntyre 1993). Four elements relate to suitable bull trout habitat, known as the "Four C's": (1) "Clean" substrate composition that includes free interstitial spaces; (2) "Complex" cover including large woody debris, undercut banks, boulders, shade, pools or deep water; (3) "Cold" water temperatures; and (4) "Connected" habitats through migratory corridors. Stream temperatures and substrate types are especially important to bull trout, with water temperature representing a critical habitat characteristic that is essential for bull trout to successfully complete their life cycle. Temperatures above 15° C (59° F) are thought to limit bull trout distribution (Rieman and McIntyre 1993). Spawning bull trout require hiding cover such as logs and undercut banks. Narrow habitat requirements make spawning and incubation habitat for bull trout limited and valuable (Fraley and Shepard 1989). Persistent bull trout populations require high stream channel complexity, and are most likely to be found in areas with low road densities, on forested lands, and in mid-size streams at relatively high elevations (> 5000 feet) (Quigley and Arbeldide 1997). However, because the bull trout exhibits a patchy distribution, even in undisturbed habitats (Rieman and McIntyre 1993), the bull trout is not likely to simultaneously occupy all available habitats (Rieman et al. 1997).

Life History

Preferred bull trout spawning habitat consists of low gradient streams with loose, clean gravel (Fraley and Shepard 1989) and water temperatures 5° to 9° C (41° to 48° F) (Goetz 1989). Spawning occurs from late summer to early fall in the upper reaches of clear streams in areas of flat gradient, uniform flow, and uniform gravel or small cobble. Bull trout typically spawn from August to November during periods of decreasing water temperatures. However, migratory bull trout frequently begin spawning migrations as early as April, and move upstream as far as 250 kilometers (km) (155 miles (mi)) to spawning grounds (Fraley and Shepard 1989). Water temperatures during spawning generally range from 4° to 10° C (39° to 51° F), with redds often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989; Pratt 1992; Rieman and McIntyre 1993). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992), and juveniles remain in the substrate after hatching. Time from egg deposition to emergence may exceed 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992; Howell and Buchanan 1992). Fry and juvenile bull trout are strongly associated with the stream bottom and are often found at or near it.

Resident adult and juvenile bull trout, and adult and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro-zooplankton, amphipods, mysids, crayfish, and small fish (Wyman 1975; Rieman and Lukens 1979 in Rieman and McIntyre 1993; Boag 1987; Goetz 1989; Donald and Alger 1993). Adult migratory bull trout are apex predators that are primarily piscivorous, known to feed on various trout and salmon (*Oncorhynchus* spp.), whitefish (*Prosopium* spp.), yellow perch (*Perca flavescens*), and sculpin (*Cottus* spp.) (Fraley and Shepard 1989; Donald and Alger 1993). The growth rate of bull trout varies depending upon the life-history strategy. Resident adults range in total length from 6 to 12 inches, and migratory adults commonly reach 24 inches or more in total length (Pratt 1985; Goetz 1989).

Older individuals of the bull trout are found in deeper and faster water compared to juveniles. Adults are often found in pools sheltered by large, organic debris or "clean" cobble substrate (McPhail and Murray 1979). Migratory bull trout may use a wide range of habitats ranging from first-to-sixth order streams and varying by season and life stage. In intermountain areas, lower-elevation lakes and rivers constitute important habitats for maturing and overwintering fluvial and adfluvial bull trout. Resident bull trout populations are generally found in small, high elevation, headwater streams where they spend their entire lives.

Where suitable migratory corridors exist, extensive migrations are characteristic of this species. Retention and recovery of migratory life history forms of the bull trout, and maintenance or re-establishment of stream migration corridors are considered crucial to the persistence of bull trout populations throughout its geographic range. Migratory bull trout facilitate the interchange of genetic material between local subpopulations and are necessary for recolonizing habitat where subpopulations are or become extirpated by natural or human-caused events.

Threats

Bull trout are vulnerable to many of the same threats that have reduced salmon populations in the Columbia River Basin. They are more sensitive to increased water temperatures, poor water quality, and low flow conditions than many other salmonids. Past and continuing land management activities such as timber harvest, livestock grazing, road construction, and mining have degraded stream habitats, especially those along larger river systems and stream areas located in valley floors, to the point where bull trout can no longer survive or successfully reproduce. Cumulative impacts of these activities have increased stream temperatures, increased more fine sediment in spawning gravels, increased loss of stream channel stability, and increased the creation of migration barriers. Road construction and maintenance account for a majority of man-induced sediment loads to streams in forested areas (Shepard et al. 1984; Cederholm and Reid 1987; Furniss et al. 1991). Sedimentation affects streams by reducing pool depth, altering substrate composition, reducing interstitial space, and causing braiding of channels (Rieman and McIntyre 1993), which reduce their carrying capacity for fish and their prey. Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities (Shepard et al. 1984; Pratt 1992).

Large dams built for flood control and power production have eliminated riverine habitat and restricted bull trout movement. Culverts installed at road crossings may also act as barriers to bull trout movement. Additionally, irrigation withdrawals, including diversions, can dewater spawning and rearing streams, impede fish passage and migration, and cause entrainment. Discharging pollutants such as nutrients, agricultural chemicals, animal waste, and sediment into spawning and rearing waters is also detrimental. The loss and degradation of habitat has isolated many populations, increasing the risk of extinction due to demographic, genetic, and environmental stochasticity, and other natural catastrophic events. In many watersheds, remaining bull trout are small, resident fish isolated in headwater streams.

Historically, both intentional reductions and liberal harvest regulations posed a threat to some bull trout populations. Bull trout can no longer be legally harvested in most areas, but misidentification of bull trout as brook trout or lake trout may result in some fish being killed accidentally. Illegal poaching of spawning adults may be a problem in some areas.

Hybridization, competition, and predation caused by non-native species have also been detrimental to the persistence of bull trout populations. Brook trout readily spawn with bull trout creating a hybrid that is often sterile. Lake trout have out-competed and replaced adfluvial populations of the bull trout in some lakes. Overall, interspecific interactions, including predation, with non-native species may exacerbate stresses on the bull trout caused by habitat degradation, fragmentation, isolation, and species interactions (Rieman and McIntyre 1993).

Warmer temperature regimes associated with a warming climate represent another risk factor for bull trout. Increased stream temperature is a recognized effect of a warming climate (ISAB 2007). Species at the southern margin of their range that are associated with colder water temperatures, such as the bull trout, are likely to become restricted to smaller more disjunct habitat patches or become extirpated as the climate warms (Rieman et al. 2007). Climate warming is projected to result in the loss of 22 to 92 percent of suitable bull trout habitat in the

Columbia River Basin (ISAB 2007). Habitat conservation and restoration will be needed to at least partially offset mitigate this projected habitat loss.

Bull Trout Critical Habitat

Litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 critical habitat designation for the bull trout. Subsequently the Service published a new proposed critical habitat rule on January 14, 2010 and a final rule on October 18, 2010 (Service 2010a, 75 FR 63898). The rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range within the Coastal, Klamath, Mid-Columbia, Columbia Headwaters, Upper Snake, and St. Mary Recovery Units (RUs). At the rangewide scale, the Service designated approximately 490,000 acres of reservoirs/lakes and 19,730 stream/shoreline miles in 32 critical habitat units (CHUs) as bull trout critical habitat. Bull trout critical habitat addresses two categories of habitat types that are essential to the conservation of the species: (1) spawning and rearing habitat; and (2) foraging, migrating, and overwintering (FMO) habitat. The conservation role of bull trout critical habitat is to support viable core area populations. The core areas reflect the metapopulation structure of the bull trout, and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of the bull trout.

In determining which areas to propose as critical habitat, the Service considered the physical and biological features (PBFs) that are essential to the conservation of the bull trout and that may require special management considerations or protection. The PBFs of bull trout critical habitat are defined as follows:

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including, but not limited to, permanent, partial, intermittent, or seasonal barriers.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

5. Water temperatures ranging from 2 to 15°C (36 to 59° F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on: the bull trout life-history stage and form; geography;

elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departures from a natural hydrograph.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

9. Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Bliss Rapids Snail

The Bliss Rapids snail was listed as threatened under the ESA on December 14, 1992. In 2009, its threatened status was re-affirmed by the Service, which determined that the Bliss Rapids snail continues to be restricted to a small geographic area in the Middle Snake River, Idaho. The Bliss Rapids snail may occur in portions of the action area near Hagerman National and Niagara Springs fish hatcheries in Gooding County, Idaho and near Magic Valley Fish Hatchery in Twin Falls County, Idaho. No critical habitat has been designated for the Bliss Rapids snail.

Life History

The Bliss Rapids snail is dioecious (has separate sexes). Fertilization is internal and eggs are laid within capsules on rock or other hard substrates (Hershler et al. 1994). Individual, life-time fecundity is not known, but deposition of 5 to 12 eggs per cluster have been observed in laboratory conditions (Richards et al. 2009c). Reproductive phenology probably differs between habitats and has not been rigorously studied in the wild. Hershler et al. (1994) stated that reproduction occurred from December through March. However, a more thorough investigation by Richards (2004) suggested a bimodal phenology with spring and fall reproductive peaks, but with some recruitment occurring throughout the year.

The seasonal and inter-annual population densities of Bliss Rapids snails can be highly variable. The greatest abundance values for Bliss Rapids snails are in spring habitats, where they frequently reach localized densities in the tens to thousands per square meter (Richards 2004; Richards and Arrington 2009). This is most likely due to the stable environmental conditions of

these aquifer springs, which provide steady flows of consistent temperatures and relatively good water quality throughout the year. Despite the high densities reached within springs, Bliss Rapids snails may be absent from springs or absent from portions of springs with otherwise uniform water quality conditions. The reasons for this patchy distribution are uncertain but may be attributable to factors such as habitat quality (USFWS 2008a), competition from species such as the New Zealand mudsnail (Richards 2004), elevated water velocity, or historical events that had eliminated Bliss Rapids snails in the past (e.g., construction of fish farms at spring sources, spring diversion, etc.).

By contrast, river-dwelling populations are subjected to highly variable river dynamics where flows and temperatures can vary greatly over the course of the year. Compared to springs in which water temperatures range between 14° to 17°C (57.2 to 62.6°F), river temperatures typically fluctuate between 5° to 23°C (41 to 78.8°F), and river flows within the species' range can vary from less than 4,000 cfs to greater than 30,000 cfs throughout the course of a year. These river processes likely play a major role in structuring and/or limiting snail populations within the Snake River (Dodds 2002; EPA 2002). While Bliss Rapids snails may reach moderate densities (tens to hundreds per m2) at some river locations, they are more frequently found at low densities (≤10 per m2) (Richards and Arrington 2009; Richards et al. 2009b) if they are present. It is likely that annual river processes play a major role in the distribution and abundance of the Bliss Rapids snail throughout its range within the Snake River by killing or relocating snails, and by greatly altering the benthic habitat (Palmer and Poff 1997; Dodds 2002; Liu and Hershler 2009). While declines in river volume due to a natural hydrograph are typically less abrupt than load-following, they are of much greater magnitude, and hence it is logical to assume these natural events play an important role in limiting snail populations within the river.

A genetic analysis of the Bliss Rapids snail based on specimens collected from throughout its range (Liu and Hershler 2009) indicated that spring populations were largely or entirely sedentary, with little to no movement between springs or between springs and river populations. Most spring populations were highly differentiated from one another as determined by DNA microsatellite groupings. By contrast, river populations exhibited no clear groupings, suggesting that they are genetically mixed (Liu and Hershler 2009) and without genetic barriers, or they have not been isolated long enough to establish unique genetic differentiation. This pattern supports the suggestion made by other biologists that the river-dwelling population(s) of the Bliss Rapids snail exist in either a continuous river population (Liu and Hershler 2009) or as a metapopulation(s) (Richards et al. 2009b) in which small, semi-isolated populations (within the river) provide and/or receive recruits from one another to maintain a loosely connected population.

Habitat

The Bliss Rapids snail is typically found on the lateral and undersides of clean cobbles in pools, eddies, runs, and riffles, though it may occasionally be found on submerged woody debris (Hershler et al. 1994) where it is a periphyton (benthic diatom mats) grazer (Richards et al. 2006). This species is restricted to spring-influenced bodies of water within and associated with the Snake River from King Hill RKM 879 (RM 546) to Elison Springs RKM 972 (RM 604). The snail's distribution within the Snake River is within reaches that are unimpounded and

receive significant quantities (ca. 5,000 cfs) of recharge from the Snake River Plain Aquifer (Clark and Ott 1996; Clark et al. 1998). It has not been recovered from impounded reaches of the Snake River, but can be found in spring pools or pools with evident spring influence (Hopper 2006, in litt). With few exceptions, the Bliss Rapids snail has not been found in sediment-laden habitats. It's typically found, and reaches its highest densities, on clean, gravel to boulder substrates in habitats with low to moderately swift currents, and is typically absent from whitewater habitats (Hershler et al. 1994).

Previous observations have suggested that the Bliss Rapids snail is more abundant in shallower habitats, but most sampling has been in shallow habitat since deeper river habitat is more difficult to access. Clark (2009) used a quantile regression model that modeled a 50 percent decline in snail abundance for each 3 m (10 ft) of depth (e.g., snail density at 3 m was approximately 50 percent less than that at shoreline). Richards et al. (2009a) used an analysis of variance (ANOVA) to assess snail densities at 1-meter intervals and only found a statistical difference (increase) in densities in the first meter of depth, with no declining trends with increasing depth. Nonetheless, these authors suggest that greater than 50 percent of the river population could reside in the first 1.5 m (5 ft) depth zone of the Snake River (Richards et al. 2009a).

Diet

Richards (2004) looked at periphyton (benthic diatoms) consumption by the Bliss Rapids snail and the New Zealand mudsnail (Potamopyrgus antipodarum) in competition experiments. He described the Bliss Rapids snail as a "bulldozer" type grazer, moving slowly over substrates and consuming most, if not all, available diatoms. The dominant diatoms identified in his controlled field experiments consisted of the bacilliariophyt genera Achananthus sp., Cocconeis sp., Navicula sp., Gomphonema sp., and Rhoicosphenia sp., although the species composition of these and others varied greatly between seasons and location. At least one species of periphytic green algae was also present (Oocystis sp.). Richards (2004) suggested that the Bliss Rapids snail appeared to be a better competitor relative to the New Zealand mudsnail in late successional diatom communities, such as the stable spring habitats where they are often found in greater abundance than the mudsnail.

A full accounting of this species is contained in the Snake/Salmon FWS BO (TAILS # 01EIFW00-2017-F-1079); this information is hereby incorporated by reference.

III. Status of the Affected Listed Species And Critical Habitat in the Action Area

III. A. Bull Trout

Mainstem Columbia River

At the Washington ladder on Bonneville Dam, one bull trout was observed in 1941, and another in 1994. A single bull trout was detected at Bradford Island in 1947, 1982, 1986, and 1994. One bull trout was collected at The Dalles Dam ladder when it was dewatered in the winter of 1995-1996. Records from the Fish Passage Center (2008) database for the Columbia River from 1998 to 2008 include one bull trout at the Bonneville Dam powerhouse 2, one at the John Day Dam, one at McNary Dam, one at Priest Rapids Dam, and one bull trout at the Wanapum Dam. Bull trout have been found in and around Bonneville Reservoir on five separate occasions in 2005, and there were four separate incidents of a bull trout being caught by anglers targeting northern pike minnow in Bonneville Reservoir during 1998 (Gray 2005). Large numbers of bull trout have been documented at mainstem dams operated by Chelan and Douglas County PUD in the Mid-Columbia bull trout RU. Between 2000 and 2003, 326, 355, and 856 bull trout were recorded at Wells, Rock Island, and Rocky Reach dams, respectively, passing upstream of each facility (BioAnalysts 2004). Barrows et al. (2016) identified additional, more recent bull trout detections in the mainstem Columbia River, and also documented that bull trout were captured by Tribal fishers as part of the pikeminnow gillnetting program. Data collected by the fish passage center indicate that the bulk of bull trout detections in the mainstem Columbia River (8/31/2008-12/31/2016) occur at Priest Rapids Dam to Wells Dam, with ladder counts ranging from 41 bull trout at Priest Rapids Dam to 1,091 bull trout at Rocky Reach Dam (www.fpc.org).

There are cases of radio-tagged or PIT-tagged bull trout entering the mainstem of the Columbia River from tributaries where spawning populations of bull trout reside. Kelly-Ringel and DeLaVergne (2001) found bull trout moving down from tagging locations in the upper Wenatchee River subbasin to the mainstem Columbia River during winter then moving back into the subbasin to spawn. This appears to be a fairly common life history characteristic in the Wenatchee and Entiat river systems, where bull trout have been recorded passing multiple Columbia River dams (Nelson et al. 2009, Nelson et al. 2011, Nelson et al. 2012, and Nelson 2015). Graham et al. (2011), tracked 4 bull trout, tagged in the Deschutes River in 2006-2007, to the Columbia River where they were harvested. Barrows et al. (2016) cite a number of sources of tagged bull trout being detected in the mainstem Columbia River, particularly, above Priest Rapids Dam. The locations of bull trout migrating from tributaries into the Columbia River include the Hood, Deschutes, Walla Walla (including the Touchet), Wenatchee, Entiat and Methow rivers (Barrows et al. 2016).

Mainstem Snake River

Snake River bull trout records from the Fish Passage Center (2008) include eight fish at Lower Monumental Dam, three fish at Little Goose Dam, and seven fish at Lower Granite Dam. Bull trout records for the Snake River from 2008 to 2016 do not indicate that any fish were detected in the fish ladders, but smolt monitoring records indicate that bull trout were recorded in traps on

the Imnaha and Grande Ronde rivers, and at Lower Granite, Little Goose and Lower Monumental dams (www.fpc.org).

There are also records of radio-tagged bull trout entering the mainstem of the Snake River from tributaries where spawning populations of bull trout reside. Faler et al. (2005) observed two bull trout that were radio-tagged during December of 2004 and January of 2005, respectively, within the Tucannon River move into the Lower Monumental Dam Pool and then return to the Tucannon River in the early spring of 2005. In the Snake River Basin, Barrows et al. (2016) reported that bull trout migrate from the Tucannon River, Asotin Creek, Imnaha River, and Sheep Creek into the mainstem of the Snake River.

Tributaries

Baseline status and life history information on the bull trout with respect to: spawning areas; population distribution, abundance, and connectivity to other populations; and habitat use, preference, and availability are the current focus of most bull trout research within the action area. Research focusing on all or some of these aspects of bull trout biology and life history has been occurring on the Entiat River (Nelson and Nelle 2008 and Nelson 2015), within the Wenatchee River subbasin (Kelly-Ringel et al. 2014), and on the Umatilla River (Sankovich et al. 2003), Deschutes River tributaries bordering the Warm Springs Reservation (Brun and Dodson 2001, Burchell and Brun 2005) and tributaries in the Walla Walla River sub-basin (Anglin et al. 2007). Information on incidental capture of bull trout in targeted salmon and steelhead fisheries has not been an objective of these bull trout research activities. Barrows et al. (2016) documented some angler-caught bull trout by tribal and non-tribal fishers in the mainstem Columbia and Snake rivers and in various tributaries to these rivers. Tribal harvest of the bull trout was documented from the Deschutes River, Columbia River mainstem, and near the mouth of the Klickitat River (Barrows et al. 2016). Other localities where bull trout harvest was documented include: the mainstem of the lower Snake River between Asotin and Clarkston; the Salmon River; and the Imnaha River (Barrows et al. 2016). Where the date of harvest was documented, the latest harvest was from 2007, although harvest from the Salmon River was indicated as "recent" in Barrows et al. (2016). Table 6 below identifies target fisheries occurring within "certain tributary fisheries" identified within the 2018 Agreement, fishing gear used, presence or absence of bull trout, and regulations relating to incidental capture of the bull trout.

Baseline summaries are provided below for bull trout populations by RU in the action area, based on information contained in individual Recovery Unit Implementation Plans (Service 2015a, b, c). Baseline summaries for bull trout critical habitat summaries are based on information in the Service's Critical Habitat Justification paper (Service 2010b).

Table 6. Tributary fisheries identified within the *United States v. Oregon* Technical Advisory Committee's June 21, 2017 biological assessment. These fisheries relate to "certain tributary fisheries" identified as having harvest within the May 2018 "*2018-2027 United States v. Oregon* Management Agreement" by Parties to the Agreement. Citations for specific bull trout presence or tribal regulations for incidental capture are identified in footnotes to the table.

Tributary Fishery	State	Gear or Method Used[2]	Time of Year	Target of Fishery	Bull Trout Present or Absent?	State Regulations for Incidental Capture	Tribal Regulations for Incidental Capture
Wind River	Washington	Dip or hoop net, setbag nets and hook and line (Tribal) Hook and line (State)	Spring and Early Summer	Spring Chinook salmon	Absent[3]	Not applicable	Retention of bull trout is not allowed (TAC 2017). Targeted salmon fisheries are restricted to the mainstem Wind River from the mouth to 100 feet below Shipherd Falls and from 200 feet above Shipherd Falls upstream to a marker 25 feet below the outlet stream for Carson NFH (Yakama Nation 2008). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008a email).
Drano Lake	Washington	Floating gill net (Tribal) Hook and line (State)	Spring and Fall	Spring and Fall Chinook Salmon	Intermittent Presence[4]	Cannot retain a bull trout or remove from the water.	Retention of bull trout is not allowed (TAC 2017). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008b email).
White Salmon River	Washington	Dip or hoop net, setbag nets and hook and line (Tribal) Hook and line (State)	Spring and Fall	Spring and Fall Chinook salmon	Intermittent Presence[5]	Cannot retain a bull trout or remove from the water.	Retention of bull trout is not allowed (TAC 2017). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008a email).
Hood River	Oregon	Dip net, hook and line (Tribal) Hook and line (State)	Spring and Early summer	Spring Chinook salmon	Present[6]	Closed to angling for bull trout and no retention.	Bull trout are allowed to be retained, however there are no records of bull trout in the creel (TAC 2017).
Klickitat River	Washington	Dip or hoop net, setbag nets and hook and line (Tribal) Hook and line (State)	Spring, Fall and early Winter	Spring and Fall Chinook salmon, steelhead and coho salmon	Present[7]	Cannot retain a bull trout or remove from the water.	Retention of bull trout is not allowed (TAC 2017). Targeted salmon and steelhead fisheries are restricted to the mainstem Klickitat River from the mouth upstream to its' confluence with Big Muddy Creek (Yakama Nation 2008). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008b email).
Deschutes	Oregon	Dip net, hook and line	Spring and	Spring and Fall	Present[8]	Closed to angling for	Warm Spring regulations allow retention of bull trout (TAC 2017). There are no

2 Fishing gear as described in TAC 2017 include: set gillnets, drift gillnets, platforms, set bag nets, hook and line, dipnets, spears or gaffs, hand harvest,traps, fish wheels, seines and small mesh gill nets or tangle nets.
3 Bull trout are not present within the Wind River according to the Wind River Draft Subbasin Plan (NWPPC 2004a).
4 Bull trout presence in the lake is thought to be a conditional response to juvenile salmon releases at Little White Salmon National Fish Hatchery (Gray 2007) and there has been two recent captures; one by ODFW (Gray 2005) just outside of Drano Lake on the Columbia River during April 2005 and one during small mesh gill net sets in May of 2006 (Gray 2007).
5 There have been observations of bull trout in the White Salmon River above Condit Dam during creel surveys in the 1980's (Normandeau 2004) and incidental captures below Condit Dam (Byrne et al. 2000). Currently, no bull trout have been found in snorkel surveys conducted in 2000 by Byrne et al. (2000) and by the Service in two years of electrofishing surveys in the the upper basin (Mike Hudson, Service, Columbia River Fisheries Program Office, personal communication June 26th, 2008).
6 Adult bull trout were routinely captured and passed at the Parkdale Fish Facility (2-28) during 1992-2004 (Olsen 2006). Most bull trout production occurs within the middle fork of the Hood River (Olsen 2006).
7 Byrne et al (2000) found bull trout within only the West Fork Klickitat River and there were cases reported by Gray (2007) of bull trout being captured by anglers both above and below Lyle Falls suggesting this is not a barrier for migration. Four years of adult fish trapping at Lyle Falls fish ladder has resulted in no bull trout captured (Roger Dick Jr.- Yakama nation personal communicaltion with Tim Roth – Service, July 22, 2008c email).

Tributary Fishery	State	Gear or Method Used[2]	Time of Year	Target of Fishery	Bull Trout Present or Absent?	State Regulations for Incidental Capture	Tribal Regulations for Incidental Capture
River (including Shitike Creek and Warm Springs River)		(Tribal) Hook and line (State) Hook and Line, dip nets, and gaffs (Tribal)	early summer Fall	Chinook salmon and Summer steelhead Spring Chinook Salmon and Steelhead	Present[9]	bull trout and no retention Closed to angling for bull trout and no retention	records of bull trout in the Deschutes creel although there are rare reports from fishers that bull trout have been retained (TAC 2017) CTWSRO in mainstem where bull trout are rare allow retention, Umatilla in North Fork do not allow retention (TAC 2017). No records of bull trout in creel (TAC 2017)
John Day River including North Fork and Mainstem to Sheep Rock		Hook and line (State)					
Umatilla River	Oregon	Dip net, hook and line (Tribal) Hook and line (State)	Spring and Fall	Spring and Fall Chinook salmon and steelhead	Present[10]	Closed to angling for bull trout	Bull trout are not allowed to be retained and there are no records of bull trout harvest (TAC 2017).
Walla Walla River (including South Fork Walla Walla River	Oregon and Washington	Dip net, hook and line (Tribal) Hook and line (State)	Spring	Spring Chinook Salmon and Summer steelhead	Present[11]	Closed to angling for bull trout (OR) Cannot retain a bull trout or remove from the water (WA)	Bull trout retention is not allowed (TAC 2017). Tribal fisheries are currently very limited in the Walla Walla River (Gary James -CTUIR, personal communication with Tim Roth-Service, July 1st 2008)
Yakima River	Washington	Dip or hoop net, setbag nets and hook and line (Tribal) Hook and line (State)	Spring and Fall	Spring and Fall Chinook salmon, and Summer steelhead	Present[12]	Cannot retain a bull trout or remove from the water	Bull trout retention is not allowed (TAC 2017). Targeted salmon and steelhead fisheries are generally restricted to the mainstem Yakima River one mile below Horn Rapids Dam Upstream to its' confluence with the Naches River (Yakama Nation 2008). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008 email).
Icicle Creek	Washington	Dip or hoop net, setbag nets and hook and line (Tribal) Hook and line (State)	Spring and Early Summer	Spring Chinook salmon	Present[13]	Cannot retain a bull trout or remove from the water.	Bull trout retention is not allowed (TAC 2017). Targeted salmon fisheries are restricted to the portion of Icicle Creek where it borders the property of the U.S. Fish and Wildlife Service at Leavenworth NFH (Yakama Nation 2008). No past history of bull trout incidental capture in Tribal fisheries (Roger Dick Jr. Yakama Nation, personal communication with Tim Roth-Service, July 22, 2008 email).

8 Bull trout population level studies of adults and juveniles occurred in both the Warm Springs River and Shitike Creek (Brun and Dodson 2001, Burchell and Brun 2005) and some distribution of the population occurs in the upper mainstem of the Deschutes River (ODFW 2005).

9 Bull trout utilization of the John Day River is described in Barrows et al. (2016). Most migrant fish remain in the headwaters, with migration into the lower mainstem rare.

10 Bull trout life history, genetics and movement studies have been conducted on larger populations in the Umatilla River Basin and adult bull trout movement was focused in the upper Umatilla River and North Fork Umatilla toward spawning (Sankovich et al. 2003).

11 Large-scale population level studies of bull trout have been conducted in the Walla Walla River. Recent PIT tag detections show adult presence of adult bull trout in Mill Creek downstream to Kiwanis Camp Bridge and the South Fork Walla Walla River downstream to the town of Milton-Freewater year-round (Anglin et al. 2007).

12 Bull trout are found throughout the upper basin in high and mid elevation streams. Fluvial populations exist in the Naches River and tributaries as well as the mainstem Yakima River from the Keechelus to Easton reach (NWPPC 2005). There were two bull trout observations at Roza Dam for the period of January through May 2003 – 2008. One observation occurred on 1/31/06 and the other on 4/2/08. Both fish were PIT tagged. (Roger Dick Jr. – Yakama Nation personal communication with Tim Roth – Service, July 22, 2008 email).

13 Bull trout are found within the upper Wenatchee basin in the Little Wenatchee, Chiwawa, Nason, Mainstem Wenatchee, Peshastin and within Icicle Creek (NWPPC 2004b). Bull trout release would be required and release mortality is expected to be zero but could be as high as one fish (TAC 2017).

Mid-Columbia Recovery Unit

Bull Trout

The Mid-Columbia RU comprises 24 bull trout-occupied core areas, as well as 2 historically occupied, but currently unoccupied, core areas. The RU is located within eastern Washington, eastern Oregon, and portions of central Idaho. Major drainages within the RU include the Methow River, Wenatchee River, Yakima River, John Day River, Umatilla River, Walla Walla River, Grande Ronde River, Imnaha River, Clearwater River, and smaller drainages along the Snake and Columbia Rivers.

The Mid-Columbia RU can be divided into four geographic regions: 1) the Lower Mid-Columbia, which includes all core areas that flow into the Columbia River below its confluence with the Snake River; 2) the Upper Mid-Columbia, which includes all core areas that flow into the Columbia River above its confluence with the Snake River; 3) the Lower Snake, which includes all core areas that flow into the Snake River between its confluence with the Columbia River and Hells Canyon Dam; and 4) the Mid-Snake, which includes all core areas in the Mid-Columbia RU that flow into the Snake River above Hells Canyon Dam. These geographic regions are composed of neighboring core areas that share similar bull trout genetic, geographic (hydrographic), and/or habitat characteristics. Conserving bull trout in geographic regions allows for the maintenance of broad representation of genetic diversity, provides neighboring core areas with potential source populations in the event of local extirpations, and provides a broad array of options among neighboring core areas to contribute recovery under uncertain environmental change. The Mid-C RU is recognized as an area where bull trout have co-evolved with salmon, steelhead, lamprey, and other fish populations. Reduced fish numbers due to historic overfishing and land management changes have caused changes in nutrient abundance for resident migratory fish like the bull trout within this RU.

The Mid-Columbia RU also includes seven segments of bull trout FMO habitat that are outside core area boundaries but may be used by bull trout originating from multiple core areas. These segments include portions of the Mid-Columbia River, Snake River, John Day River, Clearwater River, Grande Ronde River, Okanagan River, and Lower Chelan River. Bull trout FMO habitat is defined as relatively large streams and mainstem rivers, including lakes or reservoirs, estuaries, and nearshore environments, where subadult and adult migratory bull trout forage, migrate, mature, or overwinter. This habitat is typically downstream from spawning and rearing habitat and contains all of the physical elements to meet critical overwintering, spawning migration, and subadult and adult rearing needs. While year-round occupancy by bull trout in the seven FMO segments in the Mid-Columbia RU is possible, stream temperatures are often prohibitive during the warmest times of the year; for this reason, bull trout occupancy of these segments is more common from late fall through late spring.

The current demographic status of bull trout in the Mid-Columbia RU is highly variable at both the RU and geographic region scales. Some core areas, such as the Umatilla, Asotin, and Powder rivers, contain populations so depressed they are likely suffering

from the deleterious effects of small population size. Conversely, bull trout strongholds exist within the RU, predominantly in the Lower Snake geographic area. Populations in the Imnaha, Little Minam, Clearwater, and Wenaha Rivers are likely some of the most abundant. These populations are all completely or partially within the bounds of protected wilderness areas and have some of the most intact habitat in the RU. Bull trout status in other core areas within this RU is relatively unknown, but available information suggests that bull trout population trends in these core areas are declining, particularly in the John Day River Basin.

In the Lower Mid-Columbia Region, bull trout core areas are distributed along the western portion of the Blue Mountains in Oregon and Washington. Only one of the six Lower Mid-Columbia core areas is located completely in Washington. Bull trout demographic status is highly variable throughout the region. Bull trout status is the poorest in the Umatilla River and Middle Fork John Day River core areas. However, the Walla Walla River core area contains nearly pristine habitats in the headwater spawning areas and supports the most abundant populations in the region. Most core areas support both a resident and fluvial life history form; however, recent evidence suggests a significant decline in the resident and fluvial life history forms of the bull trout in the Umatilla River and John Day core areas, respectively. Connectivity between the core areas of the Lower Mid-Columbia Region is unlikely given degraded conditions in the connecting FMO habitats. Connectivity between the Umatilla, Walla Walla and Touchet core areas is uncommon but has been documented, and connectivity is possible between core areas in the John Day River Basin. Connectivity between the John Day River core areas and the Umatilla/Walla Walla/Touchet river core areas is unlikely.

In the Upper Mid-Columbia Region, bull trout core areas are distributed along the eastern side of the Cascade Mountains in Central Washington. This area contains four core areas (Yakima, Wenatchee, Entiat, and Methow), the Lake Chelan historic core area, and the Chelan River, Okanogan River, and Columbia River FMO areas. The core area populations are generally considered migratory, though they currently express both migratory (fluvial and adfluvial) and resident forms. Bull trout demographic status is variable in the Upper-Mid Columbia region and ranges from good to very poor. The Service's 2008, 5-year Review and Conservation Status Assessment described the Methow River and Yakima River core areas at risk, with a rapidly declining trend. The Entiat River core area was listed at risk with a stable trend, and the Wenatchee River core area is considered potentially at risk with a stable trend. Currently, the Entiat River core area is considered to be declining rapidly due to much reduced redd counts. The Wenatchee River core area exhibits all freshwater life history forms of the bull trout due to connectivity with Lake Wenatchee, the Wenatchee River and all of its local populations, and to the Columbia River and/or other core areas in the region. In the Yakima River core area, some bull trout populations exhibit life history forms different from what they were historically. Migration between local populations and to and from spawning habitat is generally prevented or impeded by headwater storage dams on irrigation reservoirs, and by the lack of connectivity between tributaries and reservoirs, and within lower portions of spawning and rearing habitat and the mainstem Yakima River due to changed flow patterns, low instream flows, high water temperatures, and

other habitat impediments. Currently, bull trout connectivity in the Yakima River core area is truncated because not all populations are able to contribute to gene flow in support of a functional metapopulation.

Bull trout demographic status is variable within the Lower Snake River Region. Although trend data are lacking, several core areas in the Grande Ronde River Basin and the Imnaha River core area are thought to be stable. The upper Grande Ronde River core area is the exception where bull trout population abundance is considered depressed. The Wenaha, Little Minam, and Imnaha river core areas are considered strongholds (as mentioned above), as are most core areas in the Clearwater River Basin. Most of these core areas contain populations that express both a resident and fluvial life history strategy. There is a potential that some bull trout in the upper Wallowa River are adfluvial. There is a potential for connectivity between core areas in the Grande Ronde River Basin, however conditions in FMO habitats are limiting that connectivity.

In the Middle Snake River Region, bull trout core areas are distributed along both sides of the Snake River above Hells Canyon Dam. The Powder River and Pine Creek basins are in Oregon, and Indian Creek and Wildhorse Creek are on the Idaho side of the Snake River. Bull trout demographic status within these core areas is poorest in the Powder River core area where populations are highly fragmented and severely depressed. The East Pine Creek population in the Pine-Indian-Wildhorse Creek core area is likely the most abundant bull trout population within the region. Bull trout populations in both core areas primarily express a resident life history strategy; however, some evidence suggests a migratory life history form still exists in the Pine Creek-Indian-Wildhorse Creek core area. Connectivity of bull trout populations is severely impaired in the Middle Snake River Region. Dams, diversions and temperature barriers prevent movement among populations and between core areas. Brownlee Dam isolates the bull trout population in Wildhorse Creek from other populations.

Critical Habitat

Within the action area, the Mid-Columbia RU contains 12 Critical Habitat Units (CHUs) and 17 subunits (CHSUs) of bull trout critical habitat. The Upper Columbia River Basin CHU includes the entire drainages associated with three CHSUs in central and north-central Washington on the east slopes of the Cascade Range and east of the Columbia River between Wenatchee, Washington, and the Okanogan River drainage: (1) the Wenatchee River CHSU in Chelan County; (2) Entiat River CHSU in Chelan County; and (3) the Methow River CHSU in Okanogan County. The Upper Columbia River Basin CHU also includes the Lake Chelan and Okanogan River basins which historically provided bull trout spawning and rearing habitats, and FMO habitat. The Upper Columbia River Basin CHU includes the Chelan River Basin, which provides FMO habitat to support migratory bull trout. A total of 667.9 mi of streams and 2,553.1 ac of lake surface area in this CHU are designated as bull trout critical habitat to provide for spawning and rearing habitats, and FMO habitat that support the persistence of three core areas that are essential for the conservation and recovery of the bull trout by maintaining the distribution and abundance of bull trout in this portion of the RU.

The Yakima River CHU supports adfluvial, fluvial, and resident life history forms of bull trout. This CHU includes the mainstem Yakima River and tributaries from its confluence with the Columbia River to its headwaters at the crest of the Cascade Range. The Yakima River CHU is located on the eastern slopes of the Cascade Range in south-central Washington and encompasses the entire Yakima River Basin located between the Klickitat and Wenatchee river basins. This CHU contains one bull trout core area but does not contain any CHSUs. A total of 731.5 mi of stream habitat and 15,531.0 ac of lake and reservoir surface area in this CHU are designated as critical habitat. One of the largest populations of the bull trout (South Fork Tieton River population) in central Washington is located in this CHU above Tieton Dam.

The John Day River CHU is essential for maintaining bull trout distribution and abundance within the southern portion of the Mid-Columbia RU; there are no major dams within this CHU to prevent connectivity through existing FMO habitats within and among this and other CHUs via the Columbia River; and this CHU appears to contain both resident and fluvial life history forms of the bull trout. Four CHSUs are defined within this CHU: (1) the Lower Mainstem John Day River; (2) Upper Mainstem John Day River; (3) North Fork John Day River; and (4) the Middle Fork John Day River. Bull trout in the John Day River CHU exhibit both resident and fluvial life history forms of the bull trout. The latter three CHSUs generally correspond to core areas. A total of twelve local populations of the bull trout are found in this CHU. Additional research is needed to more accurately characterize the status of bull trout populations in this CHU.

The Umatilla River CHU is located in northeastern Oregon in Umatilla and Union counties. There are two known bull trout local populations within this CHU: one in the North Fork of the Umatilla River, and one in the North Fork of Meacham Creek. Bull trout in this CHU are primarily fluvial migrants that overwinter in the middle and lower sections of the mainstem of the Umatilla River. The Draft Bull Trout Recovery Plan (Service 2002a) highlighted the need to maintain these local populations to provide for the distribution and abundance of the bull trout in this portion of its range. The Umatilla River local population provides connectivity between bull trout core areas in the middle Columbia River. The absence of brook trout in the Umatilla River also increases the recovery potential for bull trout in this Basin.

The proper function of the Walla Walla River CHU is essential to the conservation of the bull trout by helping to maintain its distribution and abundance in this portion of its range; this CHU contains a discrete population of the bull trout in the southeastern part of the Mid-Columbia RU with connectivity to FMO habitat in the Columbia River and the potential to interact with bull trout from other CHSUs. The fluvial population of the bull trout in the Walla Walla River is particularly significant because of its size and documented movement to and from the Columbia River. The Walla Walla River CHU straddles the Oregon/Washington state line in the eastern part of both states and includes two CHSUs: (1) the Walla Walla; and (2) Touchet CHSUs. The Touchet River is the largest tributary to the Walla Walla River. There are five known bull trout local populations within a single core area in this CHU; two in the Walla Walla River Basin and three in the Touchet River Basin. The Walla Walla River core area of the bull trout

is a stronghold population with fluvial and resident bull trout populations across diverse terrain. This CHU has the potential to recover its proper function, which is essential to the recovery of the bull trout in the Mid-Columbia RU.

The Lower Snake River CHU encompasses a bull trout core area and is located in southeastern Washington. This CHU contains two CHSUs: (1) the Tucannon River Basin CHSU; and (2) the Asotin Creek Basin CHSU. This CHU is part of the Mid-Columbia RU and contains at least 6 local populations of the bull trout. The Lower Snake River CHU is essential to the conservation of bull trout because both fluvial and resident bull trout life history forms occur in the Asotin and Tucannon rivers, and these basins are the only suitable bull trout refugia with adequate spawning, rearing, and FMO habitats in the lower Snake River basin. The Tucannon River and Asotin Creek basins are fairly isolated from other bull trout populations. Bull trout persistence in these basins is important for maintaining connectivity between bull trout populations in the upper Snake River Basin and the Columbia River. Although some areas of aquatic habitat within this core area are highly suitable for the bull trout, other areas of aquatic habitat are less suitable and may prove marginal given ongoing threats of habitat degradation and ongoing changes in climate. The Tucannon River and Asotin Creek are separated from one another by 132 km (82 mi) of the Snake River and two dams, so connectivity between bull trout populations in these basins is somewhat limited. However, habitat connectivity is better between Asotin Creek and the Grande Ronde River. The loss of the Tucannon River and/or the Asotin Creek bull trout populations would greatly reduce the potential for connectivity between bull trout populations in the middle/upper Snake River and the Columbia River. Within these basins, all suitable bull trout habitat is essential to population persistence given the limited amount of available habitat, particularly in the Asotin Creek Basin.

The Grande Ronde River CHU is located in northeastern Oregon and southeastern Washington, and includes the mainstem of the Grande Ronde River from its headwaters to its confluence with the Snake River. This CHU contains two bull trout core areas: the Grande Ronde River and the Little Minam River. The Grande Ronde River CHU is essential to the conservation and recovery of the bull trout because it supports strong bull trout populations and provides high-quality habitat to potentially expand bull trout distribution within the Mid-Columbia RU. The eleven bull trout local populations occurring in this CHU are spread over a large geographic area with multiple age classes, containing both resident and fluvial fish. These local populations include: (1) the Upper Grande Ronde River; (2) Catherine Creek; (3) Indian Creek; (4) Minam River/Deer Creek; (5) Lostine River/Bear Creek; (6) Upper Hurricane Creek; (7) N.F. Wenaha River; (8) S.F. Wenaha River; (9) Butte Creek and W.F. Butte Creek; and (10) Lookingglass Creek. This bull trout stronghold also has: a healthy prey base; connectivity with the Snake River; general distribution of bull trout throughout available habitat; and varying habitat conditions. In several of the local populations, including the Wenaha River, Lostine River, Lookingglass Creek, and Little Minam River populations, excellent habitat conditions exist. The Little Minam core area includes the Little Minam River, a tributary to the Minam River. This core area encompasses tributaries containing one local

population located above a barrier falls at approximately km 9 (mi 5.6) as well as the Little Minam River below the barrier to the confluence with the Minam River.

Many streams and rivers within the Grande Ronde River CHU are designated as Wild and Scenic Rivers and/or located within or near Wilderness areas. Two wilderness areas are designated within the Grande Ronde River CHU: Eagle Cap and Wenaha-Tucannon. The Little Minam core area is located entirely within the Eagle Cap Wilderness on the western edge of the Wallowa River subbasin, in both Union and Wallowa Counties, Oregon. The Eagle Cap Wilderness is located in the Wallowa-Whitman National Forest, encompasses 361,446 acres, and includes most of the Minam, upper Wallowa and Lostine river drainages as well as Bear Creek and Hurricane Creek and a small portion of Catherine Creek. Federal Wild and Scenic River status is designated for the Lostine and Minam rivers and Oregon State Scenic Waterway status is designated to the Minam and Wallowa rivers. The Grande Ronde River with its headwaters in the Wallowa-Whitman National Forest is designated as a Federal Wild and Scenic River and a State Scenic Waterway from the confluence with the Wallowa River to the Washington border. The Wenaha-Tucannon Wilderness is located in the Umatilla National Forest, encompasses 177,465 acres and includes most of the Wenaha River drainage. The Wenaha River is designated as a Federal Wild and Scenic River.

The Imnaha River CHU contains one bull trout core area and is considered essential to the conservation of bull trout because it supports strong bull trout populations within this portion of the Mid-Columbia RU. This CHU contains four generally healthy bull trout populations spread over a large geographical area. These populations contain multiple age classes of both resident and fluvial life history forms. This bull trout stronghold also has: good prey base conditions; connectivity with the Snake River; a wide distribution throughout available habitat; and overall, excellent habitat conditions. Primary spawning activity has been documented in the headwaters of the Imnaha River, which lie within a wilderness area, and contain higher elevation, coldwater habitat that should help ameliorate future climate change effects on the bull trout in this portion of the Columbia River Basin.

The proper function of the Sheep and Granite Creeks CHU is essential for maintaining bull trout distribution and abundance within this unique geographic region of the Mid-Columbia RU. This CHU occurs immediately below Hells Canyon Dam. Two drainages occur within this CHU: Sheep and Granite creeks, both within Idaho. The proper function of this CHU supports the presence of both fluvial and resident life history forms of the bull trout. The migratory behavior of the fluvial life history form is especially important for the long-term conservation of the species because it promotes genetic diversity and demographic support. Some of the resident bull trout populations in this CHU may also contain unique genes that promote resistance to specific threats within this portion of the bull trout's range in this RU.

The Clearwater River CHU encompasses 1,679.0 mi of streams and 16,610.2 ac of lake and reservoir surface area designated as bull trout critical habitat. The proper function of this CHU is considered essential for maintaining bull trout distribution and abundance

within this unique geographic region of the Mid-Columbia RU. This CHU extends from the confluence of the Clearwater and Snake rivers at Lewiston, Idaho, to the headwaters of the Clearwater River in the Bitterroot Mountains along the Idaho and Montana border. The Clearwater River CHU represents the easternmost extent of the Mid-Columbia RU. This CHU is among the largest CHUs in the Mid-Columbia RU and contains several large and stable core area populations of the bull trout. Fluvial and resident bull trout are the predominant life history forms known to occur within this CHU with several adfluvial populations also occurring in headwater lakes. This CHU includes five CHSUs: (1) Middle–Lower Fork Clearwater River; (2) South Fork Clearwater River; (3) Selway River; (4) Lochsa River (and Fish Lake); and (5) the North Fork Clearwater River (and Fish Lake).

The proper function of the Mainstem Upper Columbia River CHU is essential for maintaining bull trout distribution within this unique geographic region of the Mid-Columbia RU and conserving the fluvial migratory life history types exhibited by many of the populations from adjacent core areas. Its location between Chief Joseph Dam and John Day Dam provides key connectivity for the bull trout within the Mid-Columbia RU. The proper function of this CHU is essential for maintaining bull trout distribution and genetic contributions within populations in the Lower Columbia River and Snake River Mainstems and 13 other CHUs. Bull trout are known to reside year-round as sub-adults and adults in this CHU. Spawning adults may utilize the mainstem of the Columbia River for up to at least 9 months, often returning to the mainstem once spawning in headwater tributaries is completed. Several studies of the bull trout in the upper Columbia and lower Snake rivers indicate migration between the Mainstem Upper Columbia River CHU and tributary core areas, generally during periods of cooler water temperatures. FMO habitat provided by the mainstem Columbia River is essential for conservation of the bull trout because it supports the expression of the fluvial migratory life history form for multiple core areas.

The proper function of the Mainstem Snake River CHU is important to maintaining bull trout distribution within this portion of the Mid-Columbia RU. The Snake River, from its mouth at the Columbia River to the upper end of Brownlee Reservoir, is occupied by the bull trout in several reaches and is essential to the long-term conservation of the species because it helps conserve the migratory life history form of the bull trout, which facilitates genetic exchange, and ensures connectivity between local populations and core areas. The mainstem of the Snake River plays an important role in the recovery of bull trout populations by providing essential FMO habitat necessary to support persistence of bull trout populations found in the Tucannon River, Asotin Creek, Grande Ronde River, Imnaha River, Clearwater River, Salmon River, Sheep Creek, Granite Creek, Powder River, Pine Creek, Indian Creek, and the Wildhorse Creek core areas. The entire reach of this CHU, from the mouth to the upper end of Brownlee Reservoir, is considered essential to conserving the bull trout and included in designated critical habitat because: (1) it is presently used or could potentially be used as FMO habitat by bull trout from tributary streams; (2) quality habitat containing several primary constituent elements exists in this reach during the FMO period for the bull trout; and (3) including this area in critical habitat reflects two recovery objectives: (1) maintaining stable or increasing trends in

abundance (indirectly by providing for the needs of migratory forms); and (2) restoring and maintaining suitable habitat conditions for all bull trout life history stages. The Snake River mainstem is or could be used as FMO habitat by the bull trout and provide connectivity for at least ten bull trout core area populations and between two RUs (the Mid-Columbia RU and the Upper Snake RU).

Upper Snake River Recovery Unit

Bull Trout

The Upper Snake River RU includes portions of central Idaho, northern Nevada, and eastern Oregon. Major drainages within this RU include the Salmon River, Malheur River, Jarbidge River, Little Lost River, Boise River, Payette River, and the Weiser River. The Upper Snake River RU contains 22 bull trout core areas within 7 geographic regions or major watersheds (note: only the Salmon River geographic region will be affected by the proposed action): Salmon River (10 core areas, 123 local populations), Boise River (2 core areas, 29 local populations), Payette River (5 core areas, 25 local populations), Little Lost River (1 core area, 10 local populations), Malheur River (2 core areas, 8 local populations), Jarbidge River (1 core area, 6 local populations), and the Weiser River (1 core area, 5 local populations). The Upper Snake River RU includes a total of 206 local populations, with almost 60 percent being present in the Salmon River watershed. Three major bull trout life history forms are present in the Upper Snake River RU: (1) adfluvial; (2) fluvial; and (3) resident. Large areas of intact habitat exist primarily in the Salmon River drainage, as this is the only drainage in the Upper Snake River RU that still flows directly into the Snake River; most other drainages no longer have direct connectivity due to irrigation uses or instream barriers. Bull trout in the Salmon River Basin share a genetic past with bull trout elsewhere in the Upper Snake River RU. Historically, the Upper Snake River RU is believed to have largely supported the fluvial life history form; however, many core areas in this RU are now isolated or have become fragmented watersheds, resulting in replacement of the fluvial life history form with resident or adfluvial forms.

As noted above, the Salmon River Basin represents one of the few basins that are still free-flowing down to the Snake River. The bull trout core areas in the Salmon River Basin do not contain any major dams and to a large extent (approximately 89 percent) are federally managed, with large portions of the Middle Fork Salmon River and Middle Fork Salmon River - Chamberlain core areas occurring within the Frank Church River of No Return Wilderness. Most core areas in the Salmon River Basin contain large bull trout populations with many occupied stream segments. The Salmon River Basin contains 10 of the 22 core areas in the Upper Snake River RU and contains the majority of the occupied habitat. Over 70 percent of bull trout-occupied habitat in the Upper Snake River RU occurs in the Salmon River Basin as well as 123 of the 206 local populations. Connectivity between core areas in the Salmon River Basin is intact, and it is possible for bull trout in the mainstem of the Salmon River to migrate to almost any Salmon River core area or even to the Snake River. Connectivity between core areas in the Salmon River Basin is mostly intact except for the Pahsimeroi River and portions of the Lemhi

River. The Upper Salmon River, Lake Creek, and Opal Lake core areas contain adfluvial populations of the bull trout, while most of the remaining core areas contain fluvial populations; only the Pahsimeroi contains strictly resident populations. Most core areas appear to have increasing or stable trends but trends are not known in the Pahsimeroi, Lake Creek, or Opal Lake core areas. The Idaho Department of Fish and Game reported trend data from 7 of the 10 core areas. The trend data indicate that bull trout populations were stable or increasing in the Upper Salmon River, Lemhi River, Middle Salmon River-Chamberlain, Little Lost River, and the South Fork Salmon River core areas. Population trends were stable or decreasing in the Little-Lower Salmon River, Middle Fork Salmon River, and the Middle Salmon River-Panther Creek core area.

Habitat and demographic threats are likely the major limiting factors for bull trout in the Upper Snake River RU. These factors affect individuals and local populations as well as habitat for the species. Although in some basins, reservoirs formed by dams have allowed bull trout to exhibit adfluvial life histories, dams, irrigation diversions, and road crossings have also formed impassable barriers to fish movement within these basins, further fragmenting habitats and isolating bull trout populations. Land management activities that degrade aquatic and riparian habitats by altering stream flows and riparian vegetation, such as water diversions, past and current mining operations, timber harvest and road construction, and improper grazing practices, have negatively affected the bull trout in several areas of the RU. Bull trout are also subject to negative interactions with non-native brook trout in some streams. Brook trout populations are prevalent throughout the Upper Snake River RU; the brook trout has been identified as a significant threat to the bull trout in some core areas. In some local populations and core areas, bull trout abundance appears to be related to brook trout competition and hybridization. Low abundance of bull trout appears to be related to high road density, sedimentation, passage barriers, and the presence of brook trout.

Critical Habitat

The Salmon River Basin CHU is the only CHU in the Upper Snake River RU within the action area. Its intended conservation role is to maintain bull trout distribution within this portion of the RU. This CHU extends along the Salmon River from the Idaho–Montana border to the Oregon–Idaho border before it enters the Snake River; this area represents the most northern and eastern extent of the Upper Snake River RU. This CHU is the largest CHU in the Upper Snake River RU, and it contains the largest populations of the bull trout in this RU. The area encompassing this CHU supports bull trout populations that exhibit adfluvial, fluvial/migratory, and resident life history forms. The migratory life history form is especially important for the long-term conservation of the bull trout because it provides for demographic support and genetic diversity, although some resident bull trout populations may also contain unique genes that promote persistence in the face of specific threats. Large portions of this CHU occur within the Frank Church—River of No Return Wilderness, which implies that many CHSUs in the Salmon River Basin have few threats compared to other areas in the Upper Snake River RU.

The Salmon River Basin extends across central Idaho from the Snake River to the Montana– Idaho border. The Salmon River Basin CHU extends across portions of Adams, Blaine, Custer, Idaho, Lemhi, Nez Perce, and Valley counties in Idaho. This CHU contains 10 CHSUs: (1) the Little-Lower Salmon River; (2) Opal Lake; (3) Lake Creek; (4) South Fork Salmon River; (5) Middle Salmon–Panther River; (6) Middle Fork Salmon River; (7) Middle Salmon-Chamberlain River; (8) Upper Salmon River; (9) Lemhi River; and (10) the Pahsimeroi River. The Salmon River Basin CHU includes 4,583.5 mi of stream and 4,160.6 ac of lake and reservoir surface area designated as bull trout critical habitat.

Coastal Recovery Unit

Bull Trout

The Coastal RU is located within western Oregon and Washington including the Olympic Peninsula, Puget Sound, and Lower Columbia River basins. However, only the Lower Columbia River Basin lies within the action area of the 2018 Agreement. The Lower Columbia River region includes the lower mainstem Columbia River, which is an important migratory corridor for the bull trout and provides both habitat and population connectivity within this region. The current demographic status of the bull trout in the Coastal RU is variable across the unit. The Lower Deschutes River core area occurs in the Lower Columbia River region and is noteworthy because it contains a very abundant bull trout population that has been used as a donor stock for re-establishing the Clackamas River population of the bull trout.

Seven bull trout core areas occur in the Lower Columbia River region; the majority of these are distributed along the Cascade Crest on the Oregon side of the Columbia River. Most core areas in the region historically supported a fluvial life history form, but many are now adfluvial due to reservoir construction. However, there is at least one core area supporting a natural adfluvial life history (Odell Lake) and one supporting a natural, isolated, resident life history (Klickitat River [West Fork Klickitat]). Bull trout status is highly variable across this region, with one relative stronghold (the Lower Deschutes core area noted above) existing on the Oregon side of the Columbia River. Adult bull trout abundance within the majority of core areas in this region is relatively low, generally 300 or fewer individuals. Most core area populations in this region are not only isolated from one another due to dams or natural barriers, but they are internally fragmented as a result of manmade barriers. Local bull trout populations are often disconnected from one another or from potential foraging habitat. In the Coastal RU, adult bull trout abundance may be lowest in the Hood River and Odell Lake core areas, which each contain fewer than 100 adults.

Ongoing habitat threats related to dams are present in three core areas (Lewis River, Hood River, and Upper Willamette River) within this region. Dams have hampered natural fluvial processes such as large woody debris and sediment transport, resulting in oversimplified mainstem reaches that are lacking pools and instream channel complexity. Dams have also resulted in entrainment of bull trout and caused changes in water

temperature regimes. Habitat threats from residential development, transportation systems, and forest practices are affecting four bull trout core areas in this region. Bull trout spawning and rearing habitats and migratory corridors continue to be degraded as a result of sedimentation, channel instability, channel simplification, reduced instream flows, and increases in water temperature. The Lewis River core area has a key local population that also continues to recover from persistent adverse impacts (principally simplified channel structure and channel instability) caused by the eruption of Mount St. Helens.

Critical Habitat

Within the Coastal RU in the action area (i.e., the Lower Columbia River region), there are four CHUs and three CHSUs (within the Lower Columbia River Basin CHU). The Lower Columbia River Basin CHU is essential for maintaining bull trout distribution within this unique geographic region of the Coastal RU. It is also essential for maintaining a broad distribution of the migratory life history form of the bull trout within the lower Columbia River Basin that may still have the potential to re-express amphidromy. The Lower Columbia River Basin CHU consists of portions of the Lewis, White Salmon, and Klickitat Rivers and associated tributaries in southwestern and south-central Washington. This CHU extends across Clark, Cowlitz, Klickitat, Skamania, and Yakima counties. Approximately 224.3 mi of stream and 11,999.7 ac of reservoir surface area are designated as critical habitat for the bull trout within the Lower Columbia River Basin CHU, which currently supports three bull trout local populations in the Lewis River watershed and one in the Klickitat River watershed.

The Hood River CHU includes the mainstem Hood River and three major tributaries: Clear Branch Hood River, West Fork Hood River, and East Fork Hood River. Portions of the mainstem Columbia River utilized as FMO by Hood River bull trout are discussed in the Lower Columbia River Mainstem CHU section of this document. The Hood River CHU, located on the western slopes of the Cascades Mountains in northwest Oregon, lies entirely within Hood River County, Oregon. Currently there are two local populations (in the Clear Branch of the Hood River above Clear Branch Dam, and in Hood River and tributaries below Clear Branch Dam) that are recognized as being essential to maintaining bull trout distribution within this portion of its range. Establishing additional local populations in the West Fork of the Hood River and its associated tributaries is also recognized as being important for the conservation and recovery of the bull trout. Given that less than 100 adult bull trout are estimated to occur in the Hood River CHU reflects the importance of establishing additional local populations.

The Lower Deschutes River CHU serves to support the distribution and abundance of the bull trout in this portion of its range. Bull trout populations currently occupying this CHU are genetically diverse; have diverse life history expressions including fluvial, adfluvial, and resident populations with extensive connectivity within and outside of the CHU; and are the most robust in this part of the Mid-Columbia RU. The Deschutes River Basin contains a variety of representative habitats, including high Cascade headwater streams, glacially fed streams, spring systems, lake habitat, and mainstem river habitat.

Maintaining and recovering these populations will ensure conservation of adaptations to these unique habitats, and adequate redundancy within this basin and relative to adjacent core areas (e.g., Hood River, John Day River, etc.). Protecting and maintaining all five of the local populations of the bull trout found in the Deschutes River Basin will help ensure the long-term viability of these bull trout by protecting a geographically widespread distribution of unique but related bull trout (see Appendix 1 for more detailed information).

The Columbia River, from the Pacific Ocean upstream to John Day Dam, is essential for maintaining bull trout distribution and provides essential FMO habitat for extant tributary populations of the bull trout in the Lewis, Hood, Klickitat, and Deschutes rivers and connectivity between these core areas, as well as facilitates the potential reestablishment of a bull trout population within the White Salmon River. Habitat connectivity from the Pacific Ocean and upriver allows for the opportunity to maintain or reestablish amphidromous and fluvial life history forms of the bull trout and facilitate genetic exchange and diversity within the bull trout population in this RU; such factors should enhance the resilience and persistence of bull trout populations in the mid-Columbia RU. The entire reach of the Columbia River from its mouth to John Day Dam, is considered essential for conserving the bull trout and is included in designated critical habitat because (1) it is or could potentially be used as FMO habitat by bull trout from tributaries; (2) quality habitat containing several primary constituent elements exists during the FMO period for the bull trout; and (3) inclusion of this area in critical habitat reflects two Recovery Objectives: (1) maintaining stable or increasing trends in abundance (indirectly by providing for the needs of migratory forms); and (2) restoring and maintaining suitable habitat conditions for bull trout life history stages.

Climate Change Effects to Bull Trout

Changes in hydrology and temperature caused by changing climate have the potential to negatively impact aquatic ecosystems in the action area, with salmonid fishes being especially sensitive. Average annual temperature increases due to increased carbon dioxide are affecting snowpack, peak runoff, and base flows of streams and rivers (Mote et al. 2003). Increases in water temperature may cause a shift in the thermal suitability of aquatic habitats (Poff et al. 2002). For species that require colder water temperatures to survive and reproduce, warmer temperatures could lead to significant decreases in available suitable habitat. Increased frequency and severity of flood flows during winter can affect incubating eggs and alevins in the streambed and over-wintering juvenile fish. Eggs of fall spawning fish, such as bull trout, may suffer high levels of mortality when exposed to increased flood flows.

Isaak et al.'s 2010 study of changing stream temperatures over a 13 year period in the Boise River basin estimated an 11 to 20 percent loss of suitable coldwater bull trout spawning and early juvenile rearing habitats. These results suggest that a warming climate is already affecting suitable bull trout in-stream habitats. This finding is consistent with Rieman et al. (2007) and Wenger et al. (2011) conclusions that bull trout distribution is strongly influenced by climate, and predicted warming effects could result

in substantial loss of suitable bull trout habitats over the next several decades. For the bull trout, which tends to have lower thermal requirements than other salmonids, Rieman et al. (2007) predicted that global warming could reduce suitable habitat in the interior Columbia River basin by up to 92 percent (range 18 to 92 percent). Bull trout already seem to inhabit the coldest available streams in study areas (Wenger et al. 2011), and in several watersheds bull trout do not have the potential to shift upstream with warming stream temperatures at lower elevations.

III. B. Bull Trout Effects From On-going Hatchery Programs

Additional baseline information for the bull trout and bull trout critical habitat relative to the production/hatchery component of the 2018 Agreement in the Columbia River tributaries and in the Snake River Basin can be found in the individual consultation compliance documents for site-specific hatcheries (See Appendix A); these documents are herein incorporated by reference. These hatchery programs have been ongoing for many decades. While numbers and stocks of fish produced for these programs has varied over these years, the general location of hatcheries and most associated facilities, as well as the various off-site Research, Monitoring, and Evaluation (RM&E) activities have remained fairly static. In the intervening time, bull trout information collected incidental to production activities has increased our understanding of bull trout distribution and population trends across the Columbia River and Snake River basins, due in large part to the RM&E activities required of hatchery managers to assess the success of their individual programs. To date, there is no indication that hatchery programs have negatively impacted local populations of the bull trout even after considering impacts to individual fish. In addition, bull trout population trends in most areas affected in the past by *U.S. v. Oregon* Agreement-related activities have remained stable or have increased, although this may be a reflection of increased monitoring efforts required of these programs.

More than 80 hatchery facilities (including ancillary facilities) for salmon and steelhead in the Columbia River Basin are operated by Federal and state agencies, tribes, and private entities (Figure 4). Currently, these Columbia River hatchery facilities support approximately 160 individual hatchery programs (see Appendix A.), and release upwards of 144 million juvenile salmonids. Many of the hatchery facilities support one or more hatchery programs, and funding for these facilities can come from multiple entities. The total number of hatchery facilities normally remains fairly constant, but individual programs can change from year to year depending environmental conditions, broodstock collection, juvenile survival, fisheries management changes, ESA concerns, and funding.

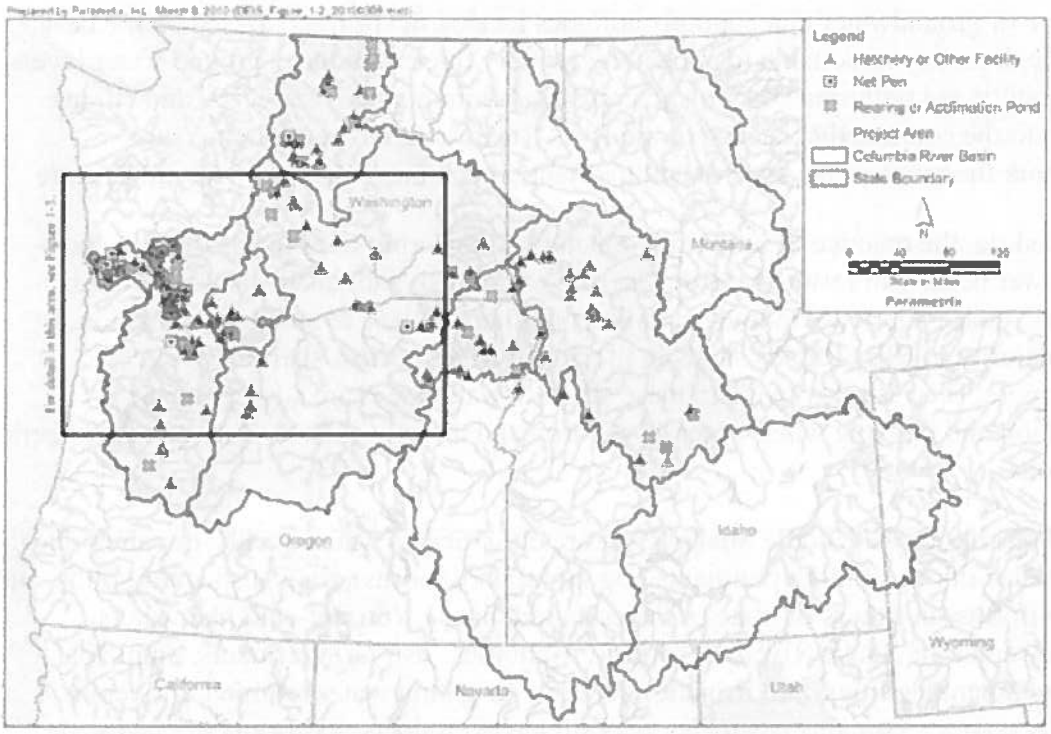

Figure 4. Hatchery facilities in the action area.

This opinion includes the baseline effects of operations and monitoring/evaluation activities associated with individual hatchery programs in the Columbia River Basin. These effects constitute factors that may increase risk to the recovery of the bull trout, but also include beneficial effects that may enhance recovery opportunities. These effects, incorporated here by reference, are described in detail in the individual hatchery program consultations identified in Appendix A. In addition, Appendix B summarizes bull trout take that has been exempted through these individual Biological Opinions; exceedance of take or tripping a different reinitiation trigger at the individual level will necessitate a review of this consultation to determine whether reinitiation is warranted. Aggregate effects of hatchery programs in the Columbia Basin are addressed below.

III. C. Bliss Rapids Snail

The distribution of the threatened Bliss Rapids snail is restricted to the Middle reach of the mainstem Snake River and its associated tributaries, and is wholly contained by the action currently under evaluation. A full summary of its status in the action area was presented in the Service's Hells Canyon/Salmon River Biological Opinion (TAILS # 01EIFW00-2017-F-1079) which is herein incorporated by reference and summarized below.

Our understanding of the threats to the continued existence of the Bliss Rapids snail has changed since 1992 when the species was listed under the ESA as threatened (57 FR 59244). In summary, since the time of listing some threats are now known to be removed (e.g., new hydropower dam construction) while other threats have emerged (e.g.,

depletion of groundwater that supports colonies located in springs). Based on the best available data, it is reasonable to expect the primary threats (reduced ground water levels, water quality and pollution concerns, competition from nonnative species, and climate change) to the continued existence of the Bliss Rapids snail to continue to occur throughout the range of the species and to affect all colonies into the foreseeable future.

Peak-loading, the practice of artificially raising and lowering river levels to meet short-term power needs can result in the dewatering of mollusk habitats in shallow, littoral shoreline areas. Our current understanding based on the best available information, is that a majority of Bliss Rapids snails in the Snake River occupy shallow water. Furthermore, Bliss Rapids snails in these shallow-water areas are susceptible to desiccation and freezing when water levels drop and directly expose snails to atmospheric conditions.

Several reaches of the Middle Snake River are classified as water-quality-impaired due to the presence of one or more pollutants (e.g., total phosphorus), total suspended solids, and total coliforms) in excess of State or Federal guidelines. Nutrient-enriched waters primarily enter the Snake River via springs, tributaries, fish farm effluents, municipal waste treatment facilities, and irrigation returns. Irrigation water returned to rivers is generally warmer, contains pesticides or pesticide byproducts, has been enriched with nutrients from fish farms and land-based agriculture (e.g., nitrogen and phosphorous), and frequently contains elevated sediment loads. Pollutants in fish farm effluent include nutrients derived from metabolic wastes of the fish and unconsumed fish food, disinfectants, bacteria, and residual quantities of drugs used to control disease outbreaks. Furthermore, elevated levels of fine sediments, nitrogen, and trace elements (including cadmium, chromium, copper, lead, and zinc), have been measured immediately downstream of several aquaculture discharges. The effects of these elevated levels of nutrients and trace elements on Bliss Rapids snails, both individually and synergistically, are not fully understood.

Threats to cold water spring-influenced habitats from ground water withdrawal and diversions for irrigation and aquaculture are likely to adversely affect the Bliss Rapids snail throughout its range. In concert with the historical losses of habitat to surface diversions of spring water for irrigation and aquaculture, the continuing decline of the groundwater aquifer is one of the primary threats to the long-term viability of the Bliss Rapids snail (Richards et al. 2006). As a result of more efficient irrigation practices from 1960 to the present (i.e., switching from flood irrigation or direct surface diversion to more efficient center-pivot irrigation systems utilizing ground water), more water was pumped from the aquifer while water percolation into the aquifer declined. The current total spring flow levels are declining, and we anticipate spring flows will likely continue to decline in the near future, even as water-conservation measures are implemented and are being developed as water demands in the vicinity continue to increase. The state of Idaho has taken steps to improve ground water recharge and limit new ground water development within the eastern Snake River Plain; however, the Snake River Plain aquifer level continues to decline (USFWS 2008a). Effects from the over-allocation of

ground water and the subsequent declining ground water levels appear to be more of a threat than previously thought.

Interspecific competition between mollusk species is a potential threat to the status of the Bliss Rapids snail. Although the Service has no direct evidence that New Zealand mudsnails have displaced colonies of Bliss Rapids snails, New Zealand mudsnails have been documented in dark mats at densities of nearly 400 individuals per square inch in free-flowing habitats within the range of the Bliss Rapids snail, and it is thought that Bliss Rapids snail densities would likely be higher in the absence of New Zealand mudsnails (Richards et al. 2006). New Zealand mudsnails have become established in every cold water spring-fed creek or tributary to the Hagerman Reach of the Snake River that has been surveyed, however, they do not appear able to colonize headwater spring habitats, which may provide Bliss Rapids snails refugia from competition with New Zealand mudsnails. The physiological tolerances of the New Zealand mudsnail, including temperature and water velocity; life history attributes such as high fecundity and growth rates; and wide variety of habitat use such as springs, rivers, reservoirs, and ditches may provide the New Zealand mudsnail a competitive advantage over Bliss Rapids snails outside of cold, headwater springs.

This opinion includes the baseline effects of operations and monitoring/evaluation activities associated with individual hatchery programs in the Columbia River Basin. These effects, specifically associated with the Hells Canyon/Salmon River Biological Opinion (TAILS # 01EIFW00-2017-F-1079), constitute factors that may increase risk to the recovery of the Bliss Rapids snail, and are incorporated here by reference. Appendix B summarizes Bliss Rapids snail take that has been exempted through this specific Biological Opinion.

IV. Effects of the Action

IV. A. Bull Trout and Critical Habitat

The following narrative specifically addresses the adverse effects to bull trout expected from the fishery component of the 2018 Agreement. Production/hatchery programs have been addressed separately, and are included here by reference. The actions, conservation measures, and any associated Terms and Conditions from these completed production program biological opinions are part of the baseline and considered as such in addressing the greater 2018 Agreement action through this current effort. Regarding the production programs, aggregate effects on bull trout are the focus of the evaluation in this section, although effects gleaned from the individual production programs will be summarized. The jeopardy analysis will consider both the fishery and production/hatchery components of the 2018 Agreement.

Bull Trout

Harvest Activities

There are no directed harvest programs targeting the bull trout under the 2018 Agreement. In the 2008, 5-year status review report (Service 2008), the Service reported that across the range of the bull trout, directed bull trout fisheries continue to be very uncommon, occurring in only those areas with relatively large bull trout populations. The incidental harvest of bull trout can occur, with the risk of incidental catch being relative to the level of fishing effort for the targeted fish species. The threat of bull trout being harvested has not significantly increased since the time of listing, as most waters have been closed to bull trout angling since that time.

Within the mainstem of the Columbia River, fishing-related encounters with bull trout are expected to be extremely limited. Bull trout may only rarely or intermittently be present in mainstem locations when tribal fishing is occurring. In general, bull trout are too small to be taken in gillnets. In addition, bull trout are not subject to targeted recreational fisheries in the mainstem of the Columbia River. Recreational fisheries in the mainstem of the Columbia and Snake rivers are not allowed to keep bull trout and all bull trout incidentally hooked in recreational fisheries must be released immediately (TAC 2017).

Bull trout are likely to occur simultaneously in time and place with several of the identified tributary fisheries. However, none of the fisheries under the 2018 Agreement target the bull trout. The allowable gear for those fisheries is generally dipnets, hoopnets, and hook and line. These types of gear allow for rapid release of any captured bull trout. Floating gillnets targeting hatchery spring and fall Chinook are permitted during limited time periods in Drano Lake. Tribal regulations specifically preclude bull trout retention in some of the tributary fishing areas (Table 1). Tribal fisheries targeted at salmon and steelhead in the specified tributaries are generally in the lower reaches of the subbasins, away from headwater areas where bull trout would be most prevalent.

In addition, State and Tribal fishery restrictions have generally increased with the listing of salmon and steelhead since the special rule went into effect, further minimizing the potential for those fisheries to encounter bull trout; reduced harvest rates likely lead to reduced harvest effort which minimizes the potential for encountering bull trout. Based on available information, implementing the proposed action is not likely to increase the interception rate of bull trout as a result of fishing activities covered under the 2018 Agreement. For the above reasons, and taking into account bull trout harvest results from implementing the 2008 Agreement (no bull trout captures were reported for treaty Indian and non-treaty fisheries in the mainstem or tributaries), bull trout bycatch is expected to be infrequent in the fisheries considered within the 2018 Agreement (TAC 2018).

Although incidental take of the bull trout is possible in non-targeted fisheries, the rate of incidental take is expected to be low and at the time of listing the Service found that "statewide angling regulations have become more restrictive in an attempt to protect bull trout in Washington, Idaho, Oregon, California, and Montana and are adequate to provide

continued conservation benefits for bull trout in the Klamath River, Columbia River, Coastal-Puget Sound and the St. Mary-Belly River population segments." (Service 1999). Based on these restrictions that limit direct harvest areas and require catch and release where bull trout are incidentally harvested, the Service developed a special 4(d) rule under the ESA to authorize take of bull trout in situations where such take occurs in accordance with State, National Park Service, and Tribal conservation laws and regulations that were in place at the time of the bull trout's listing. This level of incidental take was found to be compatible with conservation of the species (64 FR 58910-58933, 1999). The proposed action is generally more restrictive than regulations in place when the special rule was promulgated (1999); actual anadromous fish harvest rates are generally lower than rates identified in the proposed action (and no bull trout captures were reported during the time frame of the 2008 Agreement under allowable harvest rates); the status of many local and core area populations of bull trout has remained static and no DPS-level declines have been observed; there is little new information relative to bycatch; and anecdotal information that is available suggests that bycatch is extremely limited. Therefore, the existing conclusion that harvest is compatible with bull trout conservation remains sound today.

Based on best available information with respect to fish harvest activities and their effects on the bull trout, inclusive of the time period during which the 2008 Agreement was implemented, the proposed action is not expected to (1) reduce the current distribution of the bull trout in the action area, (2) reduce the current abundance of the bull trout in the action area, or (3) impact local or core area bull trout populations as effects are only expected for a small number of individuals.

Production Activities

Effect analyses for the bull trout and its critical habitat associated with production/hatchery programs covered under the 2018 Agreement in the Columbia and Snake River basins can be found in the individual consultation packages by production program (see Appendix A; this information is incorporated herein by reference). In general, while individual bull trout were likely to be adversely affected (including mortality), production program effects were not expected to significantly impact breeding, feeding, or sheltering behaviors or result in the loss of any local populations of the bull trout. These effects are likely to occur across the range of the species in a significant portion of the Columbia River Basin, however, overlap of programs among local populations is limited, and in aggregate, core area populations or recovery units are not expected to be impacted in a significant manner, as the action is not expected to (1) reduce the current distribution of the bull trout in the action area, (2) reduce the current abundance of the bull trout in the action area, and (3) not destabilize affected bull trout populations. These findings are consistent with best available information on the results of the 2008 Agreement with respect to fish production activities and their effects on the bull trout.

Disturbance to bull trout will primarily occur in proximity to existing hatchery and adult collection facilities and where released salmon and steelhead overwinter and/or migrate to

the ocean. The effects on bull trout in spawning and rearing (SR) habitat are likely to be minor, because with the exception of a few facilities, most operational aspects of the production programs are located below primary bull trout SR habitat in the action area. The effects on FMO habitats will be generally localized near facility locations and extend out into FMO habitat during release of salmon and steelhead.

Disturbance of bull trout may occur from hatchery operation activities (adult collection, holding, and spawning; incubation; juvenile rearing; routine on-station maintenance), fish health activities, water withdrawals, discharge of effluent, releases of juvenile spring Chinook and steelhead, installation, removal and operation of streamside incubators, and upland or in-water maintenance actions. RM&E activities that are part of the proposed action include operation of screw traps, electrofishing, spawning ground surveys, etc., that are mainly focused on evaluating hatchery success of the various programs. A brief summary of effects by pathway follows; detailed effects analyses can be found in the individual consultations referenced in Appendix A and incorporated by reference herein.

Fish Passage

Improperly designed fish passage at facilities is important to bull trout in that negative effects can be realized via delayed up- or downstream migration, the inability to reach spawning grounds, reduced fitness, and increased exposure to predation, for example. In July 2011, the NMFS published new *Anadromous Salmonid Passage Facility Design Criteria*. This document provides criteria, rationale, guidelines, and definitions for the purpose of designing proper fish passage facilities for the safe, timely, and efficient upstream and downstream passage of anadromous salmonids at impediments created by artificial structures, natural barriers (where provision of fish passage is consistent with management objectives), or altered in-stream hydraulic conditions. The fish passage facilities discussed herein include various fish ladders, exclusion barriers, trap and haul facilities, fish handling and sorting facilities, in-stream structures, and juvenile fish screens. Existing facilities and any subsequent structures (as applicable) were built to design specifications at the time of construction. Most of these facilities undergo periodic assessments to determine compliance with NMFS design criteria. If found to be out of compliance, operators would generally coordinate with NMFS to determine compliance levels (i.e., in compliance, in compliance with minor variances, or out of compliance) and to develop a strategy to prioritize appropriate/necessary modifications to meet compliance criteria, as appropriate, contingent on funding availability, program need, and biological impacts to listed and native fish. Such modifications involving a Federal action would require separate Section 7 consultations.

Broodstock Collection

All salmonid production programs included in the 2018 Agreement require the collection of returning adults for broodstock. If listed fish were captured in collection traps, they would be subject to physical handling, which can promote stress in fish and may result in post-capture mortality. Accepted standard operating procedures will be followed for handling of bull trout.

Primary contributing factors to stress and death from handling include differences in water temperatures (between the river and holding vessel), dissolved oxygen conditions, the amount of time fish are held out of the water, and physical trauma (NMFS 2016). Debris buildup at traps can also kill or injure fish if the traps are not monitored and cleared regularly. The operators of the facilities have extensive experience capturing, handling, and releasing listed species in these areas, and have demonstrated low bull trout mortality rates through past implementation of the production programs.

The ongoing operation of adult salmonid collection facilities may affect the bull trout by blocking or delaying its migration to and from spawning reaches, by altering the timing of spawning, and by modifying local bull trout distribution. Trapped individuals may also be subject to stress from confinement and handling. Although the operation of individual adult salmonid collection facilities may alter the temporal and spatial distribution of bull trout on a local scale, the level of effects relative to migration throughout the action area varies depending on the type of weir used, the operational time period for use of a weir, and the habitat in which the weir is located. If collection occurs in occupied streams during periods of migratory movements (generally upstream during the summer months and downstream during the fall time period), the likelihood of capture increases. Larger adult and subadult bull trout traveling upstream are typically captured in traps, however, smaller bull trout may move through weir panels. Most facilities are located downstream of spawning/rearing areas, and most collections end prior to the onset of bull trout spawning activities. Final migratory movements can often occur unrestricted during this later time frame, thus providing the opportunity for bull trout to make movements to their preferred spawning habitats prior to spawning. In addition, most collection facilities occur in different core areas for bull trout throughout the action area, thus impacts at one facility (normally associated with a single local population) are inconsequential relative to the larger core area or recovery unit scales.

To minimize the potential for adverse effects on the bull trout, trap facilities and weirs are maintained on a regular basis during trapping periods, and all bull trout captured in traps are counted and immediately released above the weir with minimal handling by qualified individuals.

Acclimation and Release of Hatchery Fish

Both positive and negative effects on the bull trout may be caused by the release of hatchery smolts/juveniles. Release of juvenile hatchery fish likely provides a beneficial effect to the bull trout particularly in areas that provide spawning and rearing (SR) habitat by increasing prey items for migratory adult and subadult bull trout, which are highly piscivorous. The existing practice of releasing smolts below bull trout SR habitat when they are expected to quickly out-migrate to the ocean, reduces the potential for ecological interactions with bull trout. In some instances, the benefits of additional forage in foraging, migration, and overwintering (FMO) habitats would improve conditions for the affected bull trout.

Direct competition for resources between hatchery smolts and bull trout may occur in SR habitat and within FMO habitat used as a bull trout migration corridor. Potential competition is greatest in spawning and nursery areas and near juvenile release areas with the highest in-situ fish (bull trout) density. Juvenile releases have the potential to adversely affect individual bull trout because hatchery smolts may be released into habitat occupied by rearing juvenile bull trout. If the species overlap in time and space, competition may result for space, food, and shelter. Chinook salmon parr are released into many areas as part of ongoing production programs. These fish remain in the system for about 1 year before migrating downstream as smolts. During this time, competition for resources with rearing juvenile bull trout is possible. If Chinook salmon parr residualize rather than out-migrate as smolts, a condition that is considered more likely associated with steelhead releases, they would continue to compete for resources (e.g., food, rearing space, preferred habitats) with bull trout. Such competition would continue throughout the lifetime of each residual.

Predation by hatchery fish on wild fish can occur anywhere the two stocks exist in the same space and time, and risks to wild fish are increased when hatchery fish, particularly larger smolts, are released during periods when vulnerable, newly emergent, fry of wild fish are present. The impact of direct predation by the majority of production program-related juvenile releases is expected to be minimal because the smolts are released at a time and size designed to optimize the percentage of smolts migrating out of the system and to minimize interaction with bull trout. Smolt predation of bull trout could occur if larger hatchery smolts residualize or stray into tributary habitats during their outmigration. However, given the existing practice of releasing smolts below bull trout SR habitat when they are expected to quickly out-migrate to the ocean, reduces the potential for ecological interactions with bull trout. For that reason, predation-related effects on bull trout caused by the release of hatchery smolts are expected to be low, and associated only with releases that occur within or in close proximity to SR habitat.

Regardless of immediate downstream movements by released hatchery fish, or following some period of residualization, bull trout are a highly efficient and aggressive piscivores, and it is likely that they make significant use of the available forage base offered by these hatchery releases. As noted above, releases occur below bull trout SR habitat, thus the majority of bull trout in the overlap area would be of larger size (subadults and adults) than the fish released by the hatchery programs, and would take full advantage of this localized but fleeting source of food. In addition, most releases occur in different core areas for bull trout throughout the action area, thus impacts at one release site (normally associated with a single local population) are inconsequential relative to the larger core area or recovery unit scales.

Research, Monitoring, and Evaluation

Individual bull trout may be encountered during spawning ground surveys for spawning salmonids. Such encounters are likely to cause "flight" responses by the affected bull trout. Screw traps used for research and monitoring may capture both adult and juvenile bull trout. Such capture may delay passage by the affected bull trout, and expose affected

bull trout to holding/handling stress. Snorkeling, electrofishing, and hook-and-line sampling may result in adverse effects to the bull trout ranging from startle responses due to human encounters, as well as disturbance, displacement, and trauma (including mortality) from the effects of electrical currents and associated holding needs, and handling/holding stress and post-release mortality associated with angling.

The majority of these activities take place downstream of SR habitat, are often infrequent and localized (spawning ground surveys take a few hours and may occur 2-3 times per year in the same survey reach), are done using specific and proven protocols (electro-fishing is conducted in accordance with NMFS approved standards that minimize direct and indirect impacts associated with electro-fishing, subsequent handling/holding, and release), and often occur in places and during times when the likelihood of bull trout presence is lower (spawning ground surveys take place in the fall when bull trout are likely in higher order tributaries attending to spawning needs).

Water Withdrawal

Most hatchery facilities covered under the 2018 Agreement associated with salmonid production programs withdraw surface water from adjacent streams to facilitate fish holding, spawning, incubation, and rearing. Such water withdrawals reduce the quantity of water between the diversion point and the point of return (i.e., discharge), and could contribute to elevated in-stream temperatures and reduced dissolved oxygen levels. Water withdrawals for hatchery program operations have the potential to affect individual bull trout via adverse changes in water quality or quantity, and habitat loss or degradation. Water diversion could affect bull trout with outcomes as benign as a minor migratory delay to outcomes as severe as injury or mortality. Facility water intakes have the potential to affect bull trout by reducing water levels in the river between the facility intake and outfall, resulting in the potential loss of rearing habitat and/or blockage of passage for both adults and juveniles. Improperly screened diversions may also result in fish being diverted and entrained into the facilities' water system and could result in the impingement of juvenile bull trout.

The majority of hatcheries and associated facilities occur well downstream of bull trout spawning and rearing habitat in mainstem systems that provide FMO habitat for bull trout; only a few facilities are known to be near SR habitats, and to date, no known instances of stream dewatering has occurred that would impact habitat to such a degree that bull trout could be harmed. Most facilities addressed in the Salmon River Basin divert less than 10 percent of the available free water from adjacent stream systems, although some may divert from 35-50 percent for limited period of time (e.g., Rapid River Fish Hatchery during four of the 10 months of operation). In addition, many facilities operate either exclusively on well water (e.g., Lyons Ferry Hatchery) or use both well water and stream water, thereby minimizing impacts to local stream systems.

Effluent

Effluent discharge from hatchery program facilities under the proposed action may affect individual bull trout in the action area. Although most facilities meet or exceed State and Federal water quality standards for effluent and fish health protocols, these water quality standards have not been evaluated with respect to potential effects on the bull trout. Negative effects to the bull trout and its habitat from effluent may result from increased nutrient loading within aquatic habitats subject to effluent releases, the addition of chemicals to the waterways, and the transmission of parasites and pathogens. The effects of effluent on the bull trout may depend on water temperature, the life stage of the fish present, the monthly volume of fish production, monthly pounds of feed used, efficacy of pollution abatement, and the rate of dilution.

Similar to the discussion above, the location of the majority of these facilities, in addition to the relative amount of effluent entering the riverine systems compared to that which is available during the times of operation, often results in effluent dissipation nearly immediately below the outfall. Thus, most potential effluent impacts would occur at and immediately below hatchery outfalls, limiting its influence on water quality or habitat when bull trout might be present (likely limited to winter months when facilities are located in FMO habitat).

Fish Health/Disease

Little evidence is available suggesting that horizontal transmission of disease from hatchery-produced smolts to natural fish is widespread in hatchery production affected areas or in affected free-flowing migration corridors. However, the potential exists for horizontal transmission of bacterial kidney disease (BKD), infectious hematopoietic necrosis (IHN), and other diseases associated with hatchery production to wild fish, including the bull trout. Strict adherence to IHOT guidelines and not releasing fish undergoing a disease epizootic are measures implemented to minimize possible disease transfer from hatchery fish to bull trout.

For all programs addressed under the proposed action, hatchery operators monitor the health status of hatchery-produced fish from the time they are ponded at rearing facilities, until their release. Policies established by the Pacific Northwest Fish Health Committee (PNFHC) were designed to prevent the spread of pathogens resulting from infected hatchery fish. All fish are examined annually by fish health specialists and certified for release to mitigate for potential affects to bull trout and other fish in the receiving waters. Adherence to these fish health policies limits the disease risks associated with hatchery programs. Specifically, the policies govern the transfer of fish, eggs, carcasses, and water to prevent the spread of exotic and endemic reportable pathogens. For all pathogens, both reportable and non-reportable, spread and amplification are minimized through regular monitoring (typically monthly), removal of mortalities, and disinfection of all eggs. Vaccines, if necessary, can provide additional protection from certain pathogens. If a pathogen is determined to be the cause of fish mortality, treatments (e.g., antibiotics) are used to limit further pathogen transmission and amplification.

Although bull trout have the potential to occur in the rivers near existing hatchery facilities, satellites, and release sites, the factors identified above reduce the likelihood of disease and pathogen transmission between hatchery fish and bull trout. The proportion of facility surface water withdrawal and subsequent discharge at most sites comprises only a portion of the total stream flow which reduces, via dilution, the potential for transmission of pathogens from effluent. Smolt release strategies promote distribution of hatchery fish throughout the system and rapid outmigration, which reduces the concentration of hatchery-released fish, and therefore, the potential for a diseased hatchery fish to encounter bull trout.

Operation and Maintenance

Facility operations and maintenance include adult-holding, spawning, incubation, rearing, and routine and semi-routine maintenance activities that occur above the ordinary high water mark (OHWM) at the facilities. Sediment generated by these activities would be contained within the facility through the adherence to Impact Minimization Measures (identified in the individual production program consultations, and herein incorporated by reference). In-water facility operation and maintenance activities include routine maintenance actions that occur below the OHWM, which typically occur on an annual basis or more, or at a known, and relatively predictable frequency. Semi-routine activities are those that are not as predictable, but are expected to occur on an infrequent basis (over a period of 5 to 10 years), as needed to maintain hatchery operations. Both routine and semi-routine maintenance actions that necessitate work in an active channel could affect bull trout if they were present near work sites. Examples of routine in-water maintenance activities include in-stream work such as clearing gravel or debris (e.g., wood) blockages from water intakes, outfalls, or traps after high flow events, and minor weir or ladder maintenance.

In-water maintenance activities are likely to cause short-term adverse habitat effects on water quality from increased suspended sediment and turbidity. The extent of downstream water quality degradation from turbidity is largely dependent upon substrate composition as well as flows and velocities at the time of work. In most cases, turbidity plumes will extend no more than 1,000 feet from in-water work area. During in-stream work, potential effects on bull trout may include behavioral changes resulting from elevated turbidity, displacement from habitats, and general disturbance from the presence of construction personnel or equipment. In potential rearing habitats, increased suspended sediment could reduce juvenile growth and foraging efficiency. In-water work could also modify substrates, elevate underwater noise and vibration levels, and displace or kill forage species in the in-water work area. In the case of an accidental spill, bull trout could be impacted from chemical contamination.

Based in part on monitoring results for individual actions similar to those described in the 2018 Agreement, maintenance activities are anticipated to cause some short-term adverse effects to the bull trout that are not likely to have adverse, population-level impacts. As an example, during in-stream dredging with a clamshell bucket "in the wet" to remove material from the river in front of the Sawtooth Hatchery intake, increased turbidity was

not detectable 450 feet downstream of the work site (USFWS 2015e). For the river systems described herein, similar gravel/cobble substrates with low embeddedness are predominant. While these activities are normally authorized to occur on an as-needed basis, it is unlikely that similar activities would occur at a majority of facilities during any given time period. Additionally, facilities are normally separated by significant distances, and their maintenance needs are dictated by individual facility circumstances, often related to run-off conditions. The short term nature and limited extent of adverse effects for these types of actions is only expected to affect limited areas within the Basin.

Bull Trout Critical Habitat

Harvest Activities

Impacts associated with harvest activities were determined to result in insignificant effects to bull trout critical habitat. Concurrence for this determination was provided in the associated Letter of Concurrence (TAILS ref. # 01FLSR00-2018-I-0003).

Production Activities

Broodstock Collection

In general, adult broodstock collection at traps across the action area may affect migratory habitat for bull trout PBF 2 (physical and biological features are defined and identified above in the status of critical habitat). Channel-spanning facilities preclude all forms of passage, while volitional traps may only cause passage delay. Most trapping facilities withdraw surface water from streams to run ladders and holding ponds, thus effects to PBF 7 and PBF 8 are likely. Set up and removal of temporary weirs may result in sedimentation that may affect PBF 4 and PBF 8. Weirs operated in the vicinity of SR habitat has the potential to affect PBF 6. Effects to these PBFs varies from discountable to adverse, depending on the unique situation of the facility. Effects from similar pathways are described in more depth above for the species, and are applicable here. Operations at trapping facilities are not expected to impact PBFs 1, 3, 5, and 9.

Acclimation and Release

Relative to bull trout critical habitat, the release of hatchery juveniles may affect PBF 3 from an increase in prey availability. An increase in prey abundance at and immediately downstream of release sites is considered a beneficial effect. Additional beneficial effects may include increased primary productivity (PBF 8, water quality) from marine-derived nutrients introduced from adult anadromous fish upon their return to spawning areas. Effects from similar pathways are described in more depth above for the species, and are applicable here.

Research, Monitoring, and Evaluation

For the most part, RM&E has minimal impacts to critical habitat PBFs. Set up and removal of facilities (e.g., screw traps) and human entry into channels (e.g., spawning

ground surveys) may affect riparian conditions (PBF 4) or water quality (PBF 8). Disturbance of individuals or captures in screw traps may delay movements of fish and potentially affect PBF 2 through migratory delay. Effects to PBFs 4 and 8 may rise to adverse levels, but the nature of these activities is such that most impacts would be very localized and temporary. Effects from similar pathways are described in more depth above for the species, and are applicable here.

Water Withdrawals

Water diversions at hatchery, satellite, or trapping facilities have the potential to affect PBF 1 (seeps and springs), PBF 2 (migration habitat), PBF 3 (abundant forage), PBF 4 (complex habitats), PBF 5 (in-stream temperature), PBF 7 (flows), and PBF 8 (water quality and quantity). Because surface water uses are non-consumptive, occur primarily in FMO habitat, and are proportionally small, in most cases these withdrawals do not significantly affect hyporheic connections to seeps and springs (PBF 1), migration corridors (PBF 2), habitat for forage species (PBF 3), and water quality/quantity (PBF 8).

Although surface water diversions would alter natural flows (PBF 7), and may affect specific complex habitat features (e.g., reduced pool depths, PBF 4), such effects are likely insignificant in FMO habitats with relatively short diversion reaches. Therefore, water diversions for most sites are not likely to adversely affect these critical habitat PBFs. However, at some facilities, surface water diversions during low-flow periods may exceed 40 percent of flow and could reduce available migratory habitat, thus adversely affecting migration habitat (PBF 2). During the low-flow summer periods, facility water diversion may adversely affect the hydrograph (PBF 7), instream temperatures (PBF 5), and water quality (PBF 8). Diversions may reduce stream depths, resulting in increased in-stream temperatures and solar gain, which may reduce dissolved oxygen in the diversion reach. If these situations arise in SR habitat, PBF 6 could be adversely affected. Effects from similar pathways are described in more depth above for the species, and are applicable here.

Effluent

Most facilities meet or exceed state and federal NPDES water quality standards for effluent and fish health protocols. Effluent discharges have the potential to increase nutrient loading, and therefore, decrease water quality downstream (PBF 8) of project sites. In most situations, the volume of return water is only a fraction of that available in the receiving waters; any contaminants in the effluent would be diluted when mixed with the remaining water in the creek or river, leading to insignificant changes in water quality or quantity. Because benthic macroinvertebrates sensitive to organic wastes may be replaced by more tolerant species downstream of hatchery outfalls, released effluent may affect PBF 3. The effect is likely insignificant because such benthic prey items are typically forage for juvenile bull trout that are highly unlikely to occur in FMO habitat near most of the subject facilities. Effects from similar pathways are described in more depth above for the species, and are applicable here.

Fish Health/Disease

Hatchery, satellite and trapping facilities under the proposed action have the potential to affect PBF 8 (water quality and quantity) through transmission of disease into critical habitat from hatchery effluent. Hatchery-released smolts and parr may also horizontally transfer diseases in the natural environment. Established disease management policies and protocols including the IHOT policies, PNFHPC fish health model program, and state, federal, and tribal policies are expected to reduce potential water quality effects on critical habitat. Existing protocols employed to minimize possible effects on bull trout from potential disease exposure from hatchery practices should similarly reduce any potential impacts to PBFs 3 (prey fish species). Effects from similar pathways are described in more depth above for the species, and are applicable here.

Operation and Maintenance

Routine operation and maintenance above the OHWM at facilities operated under the proposed action have limited potential to impact bull trout PBFs. Such activities would be implemented according to Impact Minimization Measures to reduce potential effects on bull trout critical habitat. Existing protocols employed to minimize potential effects to bull trout during maintenance operations within the facilities should reduce any potential impacts to bull trout PBFs (1, 2, 3, 4, 5, 6, 7, 8, and 9) to insignificant levels.

The construction of new facilities is not included under the proposed action; however, operations may require in-water maintenance of existing in-stream structures (e.g., debris removal from weirs or weir panel replacements). Further, seasonal installation and removal of infrastructure is required for some weirs and trapping facilities. In-water maintenance actions occur below the OHWM and have the potential to affect PBF 2 (migration habitat), PBF 4 (complex river channels, pool habitat for seasonal structures [e.g. weir placement and removal]), and PBF 8 (water quality). The level of effect on these PBFs (i.e., insignificant or adverse) is largely dependent upon the portion of the river channel affected by the activity and whether an in-stream migratory corridor is available around the work area. The extent and duration of in-water work is also relevant. In instances where "in the wet" turbidity would affect only a portion of the stream channel, effects on PBF 2 would be insignificant. In-water maintenance that involves sediment removal would produce turbidity plumes that could interfere with migration downstream of the activity. The turbidity plume is likely to affect only one side of the channel immediately downstream of the debris removal location, resulting in an unaffected corridor along the opposite bank.

Adverse effects on PBF 4 and 6 could occur, particularly at those sites within or in proximity to SR habitat. At these sites, if in-stream debris removal is required, the riverbed would be altered, producing a temporary sediment plume that would flow downstream and settle into the river and potentially in spawning habitat. This impact is considered significant only in areas that are in close proximity to rearing habitats. At other sites, the effect of debris removal activities on complex habitats would be insignificant.

During in-water work at all sites, short-term effects on water quality (PBF 8) from downstream sediment mobilization and potential chemical contamination from operation of equipment are may affect critical habitat for bull trout. However, impact minimization measures should reduce effects to an insignificant level. In-water maintenance actions could result in minor sedimentation that could impact prey species (PBF 3). Effects on PBF 3 would be insignificant. Effects from similar pathways are described in more depth above for the species, and are applicable here.

IV. B. Bliss Rapids Snail

As the only hatchery programs addressed by the 2018 Agreement that may affect Bliss Rapids snails are located in the Middle Snake River, and the species is limited in distribution to that same reach, the effects of the proposed action on the Bliss Rapids snail is fully documented in the Service's 2017 Hells Canyon/Salmon River Biological Opinion (TAILS # 01EIFW00-2017-F-1079), which is herein incorporated by reference; the effects analysis in that Biological Opinion are excerpted here:

> The Bliss Rapids snail inhabits both the mainstem Snake River outside the project action area and coldwater springs along the Snake River, including those that supply water to Hagerman National, Niagara Springs, and Magic Valley fish hatcheries within the action area (74 FR 47536). These hatcheries take and divert spring water for use, reducing the amount of cold spring water directly entering the Snake River and reducing spring influenced pockets of the mainstem. However, the known distribution of Bliss Rapids snails in the mainstem Snake River is downstream of Little Salmon Falls Dam (Bean 2011; 74 FR 47536), and is therefore outside the river area measurably impacted by water discharge from the project hatchery facilities. No new construction or river alteration is proposed as part of the proposed action, and therefore, river substrate composition or channel characteristics would not be impacted.
>
> Operation and routine maintenance of the water intake facilities have the potential to affect Bliss Rapids snails that inhabit these coldwater spring habitats. The timing of reproduction in the coldwater spring populations may overlap with some seasonal maintenance activities at the water intake facilities. Impacts from these activities would be similar to all life stages of snails, as eggs are laid on rock surfaces inhabited by adults.
>
> The dependence of the Bliss Rapids snail on coldwater spring outflows makes the species particularly vulnerable to changes in water quality and ground water levels. Ground water levels are declining, and it is expected that the downward trend will continue into the future. Surface diversions of spring water for irrigation and aquaculture, and the continuing decline of the groundwater aquifer are primary threats to the long-term viability of the Bliss Rapids snail (section 2.4.1).
>
> The Bliss Rapids snail occurs in Niagara Spring (below the hatchery intake) which serves as the water source for the steelhead egg incubation system, fire suppression

system and irrigation system at Niagara Springs Fish Hatchery. Because of the steepness of the slope, the natural downward movement of rock within the spring can occasionally obstruct the flow of water into the collection box. Hatchery personnel must annually inspect the spring water source and remove any rocks or vegetation that restrict the flow of water to the hatchery. No machinery or equipment would be used for these routine maintenance activities to eliminate the risk of contamination of the spring water from petroleum products. Previous assessments performed by IPC (Stephenson 2005, in litt) concluded that the Bliss Rapids snail does not inhabit the upper Niagara Springs in the vicinity of the collection box due to high water velocity, and therefore, maintenance activities at the collection structure would not directly impact the Bliss Rapids snail; however, snails located downstream of the intake would be adversely affected by increased suspended and deposited sediment during intake maintenance.

Management practices, as described in Section 2.1.3.4, include performing all excavation by hand and prohibit the use of equipment or machinery to remove vegetation from the collection box area to minimize effects to Bliss Rapids snails. Inspection of removed pipe sections and removal of rocks could potentially impact snails that may be present on these surfaces, and possible impacts to some snails cannot be completely discounted.

The Bliss Rapids snail also inhabits springs near the Hagerman National Fish Hatchery (74 FR 47536). The hatchery receives water from several springs emanating from the Eastern Snake River Aquifer, which provides many spring outflows in the Hagerman area. The water in the springs is diminishing as a result of the overall decline of the groundwater aquifer, which is one of the long-term threats to the Bliss Rapids snail. Maintenance activities on the water intake are likely to adversely snails present near or on the intake structure through crushing; burying, desiccation, and habitat loss.

Management practices including those described in Section 2.1.3.4 are in place to minimize adverse effects on the Bliss Rapids snail at Hagerman National Fish Hatchery, including monitoring hatchery effluent to ensure compliance with the NPDES permit (IDFG 2011). Magic Valley Fish Hatchery receives water from Crystal Springs, which is located on the north side of Snake River. The water is piped to the hatchery facilities on the south side. Bliss Rapids snails are also reported to occur in Crystal Springs (74 FR4 7536), and therefore, have the potential to be impacted through water drawdowns and maintenance activities for the intake facilities as described above. As with the Niagara Springs and Hagerman National fish hatcheries, management practices are in place to minimize impacts to Bliss Rapids snails, and all effluent water is monitored regularly for compliance with NPDES standards (IDFG 2011). Despite this, there exists the potential, however limited, that individual Bliss Rapid snails may be adversely affected by operation and maintenance of in-water facilities at the Hagerman National, Niagara Springs, and Magic Valley fish hatcheries.

In summary, fisheries/harvest activities have no effect on Bliss Rapids snails. While some individual snails may be killed and others disturbed as a result of maintenance activities at the spring-fed water intakes for the Hagerman National, Niagara, and Magic Valley hatcheries, any such impacts will be limited in duration and spatial extent and are not likely to cause an appreciable change in the status, distribution, or long-term persistence of the species. The adverse effects are not expected to significantly impact breeding, feeding, or sheltering behaviors of the Bliss Rapids snail or result in the loss of any local snail populations.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. 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. This analysis addresses only the potential effects of future State, tribal, and local or private actions that are reasonably certain to occur.

Bull Trout and Bull Trout Critical Habitat

Future State, Tribal or private actions that are likely to occur in the action area and may have some effect on the bull trout and its critical habitat are ongoing Tribal, commercial, and recreational fisheries that are covered under the 2018 Agreement. On that basis, the effects of these activities are properly addressed above under the *Effects of the Action* analysis and will not be considered under *Cumulative Effects*.

The ongoing and future transport of hazardous materials by recreational boat traffic, barge, rail, and highway have the potential for spills of both fuel and transported materials that may adversely affect the bull trout and its critical habitat.

State actions to improve tributary habitat, improve streamflow, and improve mainstem Columbia River water quality are ongoing and reasonably certain to occur in the future. Continued operation of Columbia River dams (e.g., Priest Rapids, Wanapum, Rocky Reach, Rock Island and Wells Dams) adversely affects bull trout migration.

Further and more specific discussion of cumulative effects analyses for the bull trout and its critical habitat associated with production/hatchery programs covered under the 2018 Agreement can be found in the individual consultation packages by production program (see Appendix A; this information is incorporated herein by reference). In general, there are numerous State, Tribal, local, and private actions that potentially affect the bull trout and its critical habitat in the action area. These activities include timber harvest, road building, grazing, water diversion, residential development, and agriculture. The Service assumes that future private and State actions will continue within the action area, and will increase as human population density rises. As the human population in the action area continues to grow, demand for agricultural, commercial, and residential development is

also likely to grow. The effects of new development caused by that demand are likely to reduce the conservation value of bull trout critical habitat within the action area.

City, State, and County governments have ongoing weed spraying programs, some with less- stringent measures to prevent water contamination. Unknown amounts of herbicides are sprayed annually (and sometimes several times a year) along road right-of-ways by State and County transportation departments. Private landholders also spray unknown chemicals in unknown amounts. Any private herbicide use could potentially combine with contaminants from other Federal and non-Federal activities, and could contribute to formation of chemical mixtures or concentrations that could kill or harm bull trout. In addition, fish stressed by elevated sediment and temperatures are more susceptible to toxic effects of herbicides. While the mechanisms for cumulative effects are clear, the actual effects cannot be quantified due to a lack of information about chemical types, quantity, and application methods used.

Illegal and inadvertent harvest of the bull trout is also considered a cumulative effect. Harvest can occur through both misidentification and deliberate catch. In Lookingglass Creek and the Imnaha River in northeast Oregon, the Oregon Department of Fish and Wildlife reported that 16 (854 angler hours) and 59 (2,401 angler hours) bull trout were captured during the 2016 Chinook salmon fishery, respectively. Idaho Department of Fish and Game (IDFG) reports that 400 bull trout were caught and released in the regional (Clearwater administrative region) waters of the Salmon and Snake rivers during the 2002 salmon and steelhead fishing seasons. Spawning bull trout are particularly vulnerable to harvest because the fish are easily observed during autumn low flow conditions. Even in areas with catch-and-release regulations, some adverse effects, including delayed mortality, can be expected.

These activities are ongoing and are likely to continue in the future. Although the Service finds it likely that the cumulative effects of these activities will have adverse effects commensurate with or greater than those of similar past activities on the bull trout and its critical habitat, it is not possible to quantify these effects at this time.

Bliss Rapids Snail

In general, cumulative effects to the Bliss Rapids snail are primarily associated with water quantity and quality associated with the Snake River Plain Aquifer. This aquifer is heavily influenced by human use through agriculture-related aquifer depletion and contamination (mainly in the form of pesticides and increased nutrient loading) caused by waste water infiltration (e.g., from flood irrigated fields or confined area feeding operations) and direct aquifer reinjection. Private aquaculture facilities make up a significant proportion of non-consumptive water use in the Middle Snake River region, and waste water contributes to nutrient loading and the addition of residual antibiotic/antiseptic compounds. Most, if not all, of these issues or programs (e.g., aquifer recharge) are derived from private, local, or State initiatives and have little to no Federal oversight. As such, aquifer management and nonpoint source pollutant issues are

likely to continue to adversely affect Bliss Rapids snail conservation within the action area.

VI. Conclusion

VI. A. Bull Trout and Critical Habitat

Bull Trout

After reviewing the current status of the bull trout, the environmental baseline for the action area (inclusive of the impacts associated with facility-specific hatchery production activities addressed under the 2018 Agreement that were the subject of separate consultations; see Appendix A), the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that implementation of the 2018 Agreement is not likely to jeopardize the continued existence of the bull trout or to destroy or adversely modify bull trout critical habitat.

The Service reached a no jeopardy conclusion for the following reasons:

Fisheries/Harvest

The majority of fisheries that will occur under the 2018 Agreement are located on the mainstem of the Columbia or Snake rivers where no bull trout core areas, which constitute the major population groupings of the species, are known to occur. While bull trout may be present in many tributaries where treaty fishing occurs, they are not abundant at the times and in the areas where this activity takes place (creel programs have not reported any captures). While harvest rates in the 2018 Agreement remain relatively unchanged from those identified in the 2008 Agreement, actual harvest rates are often below those identified (and no bull trout were reported captured during that time period with the allowable harvest rates in place). In addition, State and Tribal fishing regulations are generally more restrictive than those in place when the bull trout special rule was promulgated (1999); Tribal regulations specifically preclude bull trout retention in some of the tributary fishing areas. Combined, these factors have likely reduced fishing effort or catch opportunity for bull trout, thus minimizing the likelihood for encountering bull trout during harvest activities. No harvest or only limited incidental by-catch of the bull trout is likely to occur with implementation of the proposed action. Limited incidental by-catch of the bull trout is not likely to have significant local or core area population-level effects, much less an effect at the DPS level. In addition, the Bull Trout Recovery Plan (USFWS 2015d) notes that while some significant localized impacts remain relative to bull trout harvest, at the range-wide scale angling impacts are considered a relatively minor threat.

On the basis of these findings, the Service concludes that implementation of the fisheries/harvest component of the proposed action is not likely to appreciably reduce reproduction, numbers, and distribution of the bull trout at the local population, core area, or range-wide scales.

Production/Hatchery Programs

Certain aspects of the operation and management of hatchery programs addressed in the 2018 Agreement (see Appendix A) may adversely affect individual bull trout such that normal behavioral patterns associated with breeding, feeding, and sheltering, are significantly disrupted, or where actual mortality occurs. These adverse effects are likely to occur associated with adult collection facilities, water diversions, hatchery rearing and associated effluent/fish health issues, juvenile acclimation and release activities, monitoring and evaluation programs, and non-routine maintenance activities. Adverse effects to bull trout are predominantly the result of disturbance and handling effects. However, some short-term reductions in habitat quality may also occur. In some instances, effects from direct handling, disturbance, and reduced habitat quality/quantity may result in injury or death. The majority of adverse effects to habitat occur in mainstem riverine systems in areas used by bull trout for feeding, migrating, and overwintering (FMO) activities; temporal and spatial overlap between bull trout and activities associated with hatchery operations are minimized in these FMO habitats. Only a few production-related activities occur in areas identified for use by bull trout as spawning and rearing habitat. Regardless, no individual hatchery program was found to impact bull trout populations in a manner that would appreciably reduce the likelihood of both the survival and recovery of bull trout at the local population, core area, recovery unit, or coterminous U.S. scales.

Many of these hatchery programs have been ongoing for decades. Negative effects to bull trout caused by these long-term efforts have not, to the best of our knowledge, resulted in decreased population levels of bull trout, as the majority of risks were related to historical habitat loss/degradation, interaction with nonnative species, and fish passage/habitat connectivity. Generally, bull trout populations since the time of listing (hatchery programs were in place long before the listing decision) have remained "stable" overall range-wide with some core area populations decreasing, some stable, and some increasing. Since the listing of bull trout, there has been very little change in the general distribution of bull trout in the coterminous United States, and we are not aware that any known, occupied bull trout core areas have been extirpated.

The aggregate effect of all hatchery programs addressed in the 2018 Agreement is likely to adversely affect individual bull trout found in close proximity to the various hatchery facilities. While some overlap may occur among the various hatchery programs at local population, core area, recovery unit, or coterminous U.S. scales, the aggregate of adverse effects are not expected to appreciably reduce the likelihood of both the survival and recovery of bull trout across their range. The Service expects that the proposed action will have no measurable effect on the relative numbers of fluvial or resident individuals contributing to core area local populations throughout the Columbia River Basin.

In general, hatchery programs are operated similarly across the area addressed in the 2018 Agreement in that they adhere to national or regional standards (e.g., Integrated Hatchery Operations Team for Columbia Basin anadromous salmonid hatcheries, Anadromous Salmonid Passage Facility Design, Pacific Northwest Fish Health Protection Committee

Model Comprehensive Fish Health Protection Program, etc.) or employ best management practices that are designed specifically to minimize hatchery-related impacts to native fish and their habitat. In addition, hatchery programs have increased the amount of marine derived nutrients into otherwise nutrient poor upriver tributaries via the return of hatchery adults; release of hatchery-produced juveniles may serve to increase the availability of bull trout prey in mainstem foraging, migration, and overwintering areas; and increased returns of natural or hatchery-produced adults that spawn in the wild may provide an additional source of forage for bull trout in the form of eggs. In the area of sympatry, anadromous hatchery programs have likely aided bull trout populations by enhancing survival via the above mechanisms, and improved the outlook for long-term recovery by incrementally replicating the habitat conditions in existence prior to population declines of anadromous fish. All these factors serve to benefit bull trout and improve fitness.

Hatchery programs have been ongoing in the basin for decades, and while these programs contribute to water quality issues (e.g., effluent) and connectivity/passage issues (e.g., fish weirs and water intake structures), these effects were considered minor or very local in nature (as evaluated by the individual hatchery consultations); hatchery programs and the extent to which their operations affect bull trout or bull trout habitat are not considered in and of themselves a primary threat (USFWS 2015d). Over the term of the 2018 Agreement, we expect effects to bull trout will remain similar to that which has been observed during the 2008 Agreement, as little about hatchery operations has changed over that time frame. Beyond the 2018 Agreement, we expect the management of hatcheries to adapt to changing conditions related to improved science associated with hatchery operations (e.g., fish health and disease control), improved use and re-use of diminishing water supplies exacerbated by climate change (partial re-use aquaculture systems are currently being evaluated), and addressing infrastructure shortcomings (e.g., screening intake structures, meeting NMFS passage criteria for fish ladders and weirs). Tackling these concerns in the longer term will minimize or address local issues currently facing bull trout in light of the continued operation of these hatchery programs, as these same issues need to be addressed to ensure the hatcheries meet their primary and intended purpose of mitigating for the loss of anadromous fish stocks. It is reasonable to expect these efforts will take place across the Columbia River Basin as anadromous fish management is a high priority, and improvements for anadromous nearly always translate to improvements for bull trout (enhanced water quality, improved passage, containment of fish diseases, etc.).

These efforts and outcomes, plus the fact that individual programs do not have population level consequences (no-Jeopardy conclusions were reached for all hatchery programs having adverse effects), and the commitment by the hatchery operators (Federal, State, Tribal) to implement all identified conservation measures and all applicable Terms and Conditions, serve to substantiate our conclusion that the 2018 Agreement is compatible with the conservation needs of bull trout, and will not result in population-level effects across the range of the bull trout.

Bull Trout Critical Habitat

Hatchery program activities (such as water diversions, hatchery-rearing, associated effluent/fish health issues, juvenile releases, and semi-routine maintenance activities) are likely to have localized adverse impacts of variable duration and some localized beneficial effects (via an increase in the abundance of bull trout prey) to the proper function of a relatively small extent of the total designated critical habitat for the bull trout. Individually and in aggregate, the effects of specific hatchery facilities are not likely to appreciably impair or preclude the recovery support function of critical habitat at the rangewide critical habitat scale.

VI. B. Bliss Rapids Snail

The basis for the no jeopardy determination for the Bliss Rapids snail is presented in the Service's Hells Canyon/Salmon River Biological Opinion (Tails # 01EIFW00-2017-F-1079), which is incorporated herein by reference. Fisheries/harvest activities under the 2018 Agreement do not occur in the range of the Bliss Rapids snails. For hatchery/production programs, some individuals may be killed and others disturbed as a result of hatchery maintenance activities at the spring-fed water intakes for the Hagerman National, Niagara, and Magic Valley hatcheries; any impacts will be limited in duration and spatial extent and will not result in an appreciable change in the status, distribution, or long-term persistence of the species locally or range-wide. The adverse effects are not expected to appreciably reduce the likelihood of survival and recovery of the Bliss Rapids snail, range-wide in terms, of numbers, distribution, or reproduction of the species.

VII. Incidental Take Statement

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and section 7(a)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The November 1, 1999, listing rule for the bull trout included a special 4(d) rule under which take of the bull trout that occurs in accordance with State, National Park Service, or Native American Tribal-permitted fishing activities as constituted at the time of listing is not recognized as a prohibited taking under section 9 of the ESA. However, while low, take of bull trout (whether prohibited or not) is still likely to occur during the term of the 2018 Agreement. The ability to meaningfully document numbers of bull trout taken is not readily available (take of bull trout under the 2008 Agreement has not been identified in existing reports), but anecdotal evidence suggests that limited bull trout capture does

occur, mainly in tributary fisheries. On this basis, the Service will use a surrogate to evaluate bull trout take levels in the form of harvest rates imposed on the anadromous fisheries addressed by the 2018 Agreement. This surrogate has a rational connection to the amount of bull trout take expected from harvest activities as these harvest rates (see Tables 5.1.9 through 5.1.14 in the TAC (2017) BA, hereby incorporated by reference) serve to define and limit fishing effort for anadromous fish, which therefore also limits opportunities to incidentally harvest bull trout. These proposed harvest rates are often not achieved in the fisheries under review, thus further limiting opportunities to incidentally encounter bull trout during these harvest activities. If harvest rates or harvest efforts are above those identified in the proposed action, and thus outside of the terms of State or Tribal fishing regulations, take of bull trout is assumed to be beyond the level considered in this biological opinion; this new information would be subject to a reevaluation of effects to determine whether reinitiation of consultation is warranted.

Incidental take of the bull trout caused by specific hatchery programs has already been addressed in the ITSs accompanying the biological opinions that evaluated these hatchery programs (see Appendix A). Hatchery operations are likely to cause take, and those forms of take have already been analyzed and addressed in site-specific ITSs (see Appendix B, summarizing take that has already been exempted via these site-specific hatchery/program consultations). Individual hatchery operators are held to the terms and conditions of their site-specific ITSs. As specified in the individual consultations, take reporting will occur on an annual basis to ensure compliance with consultation-specific ITSs; the Service will evaluate these reports to determine whether reinitiation is warranted at the individual level, or at the level of the proposed action being considered within this biological opinion.

Incidental take of the Bliss Rapids snail caused by specific hatchery programs covered under the 2018 Agreement is addressed in the ITS accompanying the Service's Hells Canyon/Salmon River Biological Opinion (TAILS # 01EIFW00-2017-F-1079), which is herein incorporated by reference (see Appendix B, summarizing take that has already been exempted via this site-specific hatchery/program consultation). Because that individual consultation addresses all impacts from hatcheries included in the 2018 Agreement, and it fully encompasses those hatchery impacts throughout the range of the species, its ITS sufficiently addresses the take expected at the broader Agreement level. As specified in the individual consultation, take reporting will occur on an annual basis to ensure compliance with the specific ITS; the Service will evaluate this report to determine whether reinitiation is warranted at the individual level, or at the level of the proposed action being considered within this biological opinion.

VIII. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends that the

following conservation measures be implemented in conjunction with implementation of the 2018 Agreement:

1. In targeted salmon and steelhead fisheries and fishing areas where tribal regulations for bull trout are not specified, the Service should encourage the relevant Tribes to clarify their future intent relative to bull trout retention.

2. The Service, through the Technical Advisory Committee, should encourage all *U.S. v. Oregon* management parties to report the incidence of capture or handling of Service-listed species from data collected during normal ongoing sampling of the proposed 2018 Agreement fisheries.

3. The Service should coordinate bull trout recovery efforts with listed anadromous fish species recovery throughout their sympatric ranges to ensure actions are compatible and do not offset each other.

4. In order to increase our understanding of bull trout movements in the mainstem lower Snake and Columbia rivers and interactions between subbasin bull trout populations, the Service should work with partners to collect genetic samples (e.g., fin clips) from all un-marked bull trout that are handled in the mainstem Snake River (e.g., Lower Granite Dam adult trap) or lower reaches of tributary subbasins to establish origin. In addition, these same fish should be PIT-tagged if possible so their movements could be determined from the wide array of PIT detection sites at the mainstem Snake River and Columbia River dams and within tributary subbasins.

5. The Service should collaborate with partners on research needs associated with hatchery effluent and disease effects on bull trout. The Service should review annual fish stocking programs to ensure that stocking programs for anadromous fish are not contributing fish diseases, exotic invertebrates or other problems such as increased competition within bull trout habitat, which could interfere with bull trout recovery.

6. The Service should work with all partners (including NOAA) to evaluate how Chinook salmon and steelhead trout management objectives at individual hatchery facilities can be met with the least amount of impact to local bull trout populations. Considerations may include modifying the timing and length of weir operations during bull trout migration periods, and evaluating opportunities to reduce handling effects.

IX. Reinitiation – Closing Statement

This concludes the Service's formal intra-Service consultation on the Non-Treaty and Tribal Indian Fisheries in the Columbia River Basin outlined in the 2018 Agreement that the Service proposes to be a signatory to. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where Federal agency involvement or control over an action has been authorized by law and if (1) the amount or extent of incidental take is exceeded; (2) if new information reveals effects of this action that may affect listed species or critical habitat in a manner or to an extent not considered in this biological

opinion; (3) if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) if a new species is listed or new critical habitat designated that may be affected by the action. If consultation is reinitiated for any of the above reasons, the Service shall not make any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation of reasonable and prudent alternatives.

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Appendix A. Hatchery/Production Programs responsible for the releases identified in Tables B1-B7 in the 2018 Management Agreement. Consultations (for individual programs or batched programs) are identified.

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Snake River Fall Chinook (Permits 16607 and 16615)	Yes	Lyons Ferry Fish Hatchery, FCAP Facilities, Irrigon Fish Hatchery	Snake River Fall Chinook Batched BA	Bull Trout	Non-Jeopardy BO (ref. # 01EIFW00-2012-F-0448), May 16, 2017
Little Sheep Creek Summer Steelhead	Yes	Wallowa Fish Hatchery, Irrigon Fish Hatchery, Little Sheep Satellite Facility	NEOR/SEWA Batched BA	Bull Trout	Non-Jeopardy BO (ref. # 01EOFW00-2015-F-0154), August 22, 2016
Imnaha Spring/Summer Chinook Salmon	Yes	Lookingglass Fish Hatchery, Imnaha Satellite Facility			
Lookingglass Creek Spring Chinook Salmon	Yes	Lookingglass Fish Hatchery, Irrigon Fish Hatchery, Catherine Creek Satellite Facility			
Grande Ronde Endemic Spring Chinook Salmon	Yes	Lookingglass Fish Hatchery, Upper Grande Ronde Satellite Facility			
Grande Ronde/Catherine Creek Spring/Summer Chinook Salmon	Yes	Lookingglass Fish Hatchery, Catherine Creek Satellite Facility			
Grande Ronde/Cottonwood Summer Steelhead (Wallowa Stock)	Yes	Lyons Ferry Fish Hatchery, Cottonwood Creek Satellite Facility			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Grand Ronde/Big Canyon Summer Steelhead (Wallowa Stock)	No	Wallowa Fish Hatchery, Irrigon Fish Hatchery, Big Canyon Satellite Facility			
Tucannon River Endemic Summer Steelhead	Yes	Lyons Ferry Fish Hatchery, Tucannon River Fish Hatchery, Tucannon River Collection Facility, Curl Lake Acclimation Facility			
Tucannon River Endemic Spring Chinook	Yes	Lyons Ferry Fish Hatchery, Tucannon River Fish Hatchery, Tucannon River Collection Facility, Curl Lake Acclimation Facility			
Lyons Ferry Summer Steelhead	Yes	Lyons Ferry Fish Hatchery			
Lostine Spring/Summer Chinook Salmon	Yes	Lostine River Adult Collection Facility, Lostine River Juvenile Acclimation Facility, Lookingglass Fish Hatchery			
Little Salmon/Rapid River Spring Chinook	Yes	Rapid River Hatchery, Hells Canyon Trap, Oxbow Hatchery	Hells Canyon/Salmon River Batched BA	Bull Trout, Bliss Rapids Snail	Non-Jeopardy BO (ref. # 01EIFW00-2017-F-1079), December 8, 2017
Hells Canyon Spring Chinook	Yes	Rapid River Hatchery, Hells Canyon Trap, Oxbow Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Pahsimeroi Spring/Summer Chinook	Yes	Pahsimeroi Fish Hatchery			
South Fork Salmon River Summer Chinook	Yes	McCall Hatchery, SFSR Satellite Facility			
Johnson Creek Summer Chinook	Yes	McCall Hatchery, SFSR Satellite Facility, JohnsonCr. Trap			
South Fork Salmon River Chinook Eggbox	Yes	McCall Hatchery, SFSR Satellite Facility			
Sawtooth/Upper Salmon Spring Chinook	Yes	Sawtooth Fish Hatchery			
Upper Salmon River Steelhead Streamside Incubator	Yes	Pahsimeroi Fish Hatchery			
East Fork Salmon River Natural A-Index Steelhead	Yes	EF Salmon River Satellite Facility, Sawtooth Fish Hatchery, Hagerman National Fish Hatchery			
Hells Canyon A-Index Steelhead	Yes	Hells Canyon Trap, Pahsimeroi Trap, Sawtooth Trap, Oxbow Hatchery, Niagara Springs Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Little Salmon River A-Index Summer Steelhead	Yes	Hells Canyon Trap, Pahsimeroi Trap, Sawtooth Hatchery, Oxbow Hatchery, Niagara Springs Hatchery, Magic Valley Hatchery, Pahsimeroi Hatchery			
Pahsimeroi A-Index Summer Steelhead	No	Pahsimeroi Hatchery, Niagara Springs Hatchery			
Upper Salmon River A-Index Steelhead	No	Sawtooth Hatchery, Magic Vally Hatchery, Hagerman NFH			
Salmon River B-Index Steelhead	Yes/No	Pahsimeroi Hatchery, Yankee Fork Trap, Magic Vally Hatchery			
Kooskia Spring Chinook Salmon	Yes	Kooskia National Fish Hatchery	Clearwater River Batched BA	Bull Trout	Non-Jeopardy BO (ref. # 01EIFW00-2017-F-0819), December 15, 2017
Clearwater Hatchery Spring/Summer Chinook	Yes/No	Clearwater Fish Hatchery, Red River Trap, Crooked River Trap, Dworshak National Fish Hatchery, Kooskia National Fish Hatchery			
Nez Perce Tribal Hatchery Spring/Summer Chinook	Yes/No	Nez Perce Tribal Hatchery, Lolo Cr. Weir, Newsome Cr. Weir			
Dworshak Spring Chinook	Yes/No	Dworshak National Fish Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Clearwater River Coho Salmon	Yes	Kooskia National Fish Hatchery, Dworshak National Fish Hatchery, Lapwai Cr. Weir			
Dworshak B-Index Steelhead	Yes	Dworshak National Fish Hatchery			
South Fork Clearwater B-Index Steelhead	Yes	Clearwater Hatchery, Dworshak NFH, Kooskia NFH			
Snake River Steelhead Kelt Reconditioning	No	Nez Perce Tribal Hatchery			
Touchet Integrated Steelhead	Yes	Dayton Satellite Facility, Lyons Ferry Hatchery	Walla Walla/ Touchet River Batched BA	Bull Trout	Non-Jeopardy BO (ref. # 01EWFW00-2017-F-1145), December 22, 2017
Walla Walla/Touchet (Wallowa A) Steelhead	Yes	Dayton Satellite Facility, Lyons Ferry Hatchery			
Snake River Sockeye Salmon	Yes	Springfield Hatchery, Sawtooth Weir, Eagle Hatchery, Manchester Research Station	Individual BA	Bull Trout	Non-Jeopardy BO (ref. # 01EIFW00-2017-F-0819), December 18, 2017
Crystal Springs Spring Chinook (Yankee Fork Salmon River and Panther Creek)	Yes	Crystal Springs Hatchery, Yankee Fork Satellite Facility, Panther Creek Satelite Facility	Individual BA	Bull Trout	Non-Jeopardy BO (ref. # 01EIFW00-2018-F-0203), December 20, 2017

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Methow Spring Chinook (Chelan)	Yes	Methow Hatchery, Chewuch Acclimation Facility	Conglomerate of Individual Consultations	Bull Trout	Memorandum (ref # 01EWFW00-2017-TA-0371), January 20, 2017
Methow Spring Chinook (Douglas)	Yes	Methow Hatchery, Wells Dam			
Methow and Wenatchee Coho	Yes	Leavenworth NFH, Winthrop NFH, Cascade Hatchery, Willard NFH	Conglomerate of Individual Consultations	Bull Trout	Letter of Concurrence (ref # 01EWFW00-2015-I-0827), Aug 4, 2015; and Non-Jeopardy BO (ref # 01EWFW00-2013-F-0272-R001), July 18, 2016
Winthrop NFH Spring Chinook (BOR)	Yes	Winthrop NFH	Individual BA	Bull Trout	Non-Jeopardy BO (ref # 01EWFW00-2015-F-1041), May 13, 2016
Winthrop NFH Steelhead (BOR)	Yes	Winthrop NFH			
Similkameen Summer Chinook (Chelan)	Yes	Chief Joseph Hatchery, Wells Hatchery, Similkameen Ponds	Individual BA/TRMP		Letter of Concurrence (NMFS BA through Colville TRMP), (ref # 01EWFW00-2017-I-0417), January 31, 2017
Methow/Wells Steelhead (Douglas)	Yes	Methow Hatchery, Twisp Weir and Ponds, Wells Hatchery	Conglomerate of Individual Consultations	Bull Trout	Memorandum (ref # 01EWFW00-2018-TA-0335), December 13, 2017
Chelan Falls Summer Chinook (Chelan)	Yes	East Bank Hatchery, Chelan Falls Acclimation Facility	Upper Columbia Batched BA		Letter of Concurrence (ref# 01EWF00-2018-I-0385), December 21, 2017
Wells Summer Chinook (Douglas)	Yes	Wells Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Priest Rapids Fall Chinook (Grant)	Yes	Priest Rapids Hatchery			
Methow Summer Chinook (Douglas)	Yes	Wells Hatchery, Carlton Acclimation Facility			
Entiat Summer Chinook (BOR)	Yes	Entiat NFH	Individual BA	Bull Trout	Non-Jeopardy BO (ref # 01EWFW00-2015-F-0324), January 6, 2017
Ringold URB Fall Chinook (COE)	Yes	Ringold Springs Hatchery, Jackson Creek Trap, Priest Rapids Hatchery, Bonneville Hatchery	Individual BA		Letter of Concurrence (ref # 01EWFW00-2018-I-0365), December 18, 2017
Leavenworth NFH Spring Chinook Salmon	Yes	Leavenworth NFH	Individual BA	Bull Trout	Non-Jeopardy BO (ref. # 13260-2011-F-0048), May 13, 2011
Wenatchee Summer Chinook	Yes	East Bank Hatchery, Dryden Ponds and Dam	Wenatchee Batched Consultation	Bull Trout	Non-Jeopardy BO (ref. # 01EFW00-2013-F-0444), November 27, 2017
Wenatchee Steelhead	Yes	East Bank Hatchery, Chiwawa Hatchery/Acclimation Facility, Tumwater Dam Collection Facility			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Chiwawa Spring Chinook	Yes	East Bank Hatchery, Chiwawa Hatchery/Acclimation Facility, Tumwater Dam Collection Facility, Chiwawa Weir			
Nason Creek Spring Chinook	Yes	East Bank Hatchery, Nason Creek Hatchery/Acclimation Facility, Tumwater Dam Collection Facility			
Yakima River Summer/Fall Chinook (BPA)	Yes	Wells Hatchery, Prosser Hatchery	Conglomerate of Individual Consultations	Bull Trout	Mitchell Act Letter of Concurrence (facility operations, ref # 01E00000-2016-I-0003), August 17, 2016; Section 10 permit (M&E activities, ref # TE05166B-0), March 17, 2016
Yakima River Spring Chinook (BPA)	Yes	Cle Elum Hatchery	Individual Action	Bull Trout	Section 10 permit (M&E activities, ref # TE05166B-0) March 17, 2016
YN coho	Yes	Willard NFH	Individual BA	Bull Trout	Non-Jeopardy BO (ref. # 01EWFW00-2013-F-0272), February 2, 2014

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Round Butte Spring Chinook (PGE)	Yes	Round Butte Hatchery, Pelton Ladder	Batched BA	Bull Trout	Non-Jeopardy BO (ref. # 1-7-04-F-0045), November 2, 2004
Round Butte Steelhead (PGE)	Yes	Round Butte Hatchery, Pelton Ladder			
Lapwai NPT coho, Clearwater River ID	Yes	Eagle Creek NFH/ODFW Cascade and Bonneville	Individual BA	Bull Trout, Bald Eagle	Non-Jeopardy BO (ref. # 1-4-00-F-405), June 29, 2000
Kooskia NFH NPT coho, Clearwater River ID	Yes	Dworshak NFH, Eagle Creek NFH	Mitchell Act		Letter of Concurrence (ref # 01E00000-2016-I-0003), August 17, 2016
Lostine River NPT coho release, Oregon	Yes	ODFW Cascade and Bonneville			
Ringold Springs WDFW Steelhead, Columbia River	Yes	Ringold FH			
Carson NFH Spring Chinook, Wind River WA	Yes	Carson NFH			
Little White Salmon NFH Spring Chinook	Yes	Little White Salmon NFH			
Carson NFH Spring Chinook, Walla Walla River WA	Yes	Carson NFH, Little White Salmon NFH			
Klickitat YN Coho	Yes	Klickitat Hatchery			
Klickitat YN Spring Chinook	Yes	Klickitat Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Klickitat YN Fall URB Chinook	Yes	Little White Salmon NFH			
Klickitat YN Skamania Summer Steelhead	Yes	Klickitat Hatchery			
Prosser (YN) Fall (URB) Chinook	Yes	Prosser Hatchery			
Prosser (YN) coho	Yes	Prosser Hatchery			
Willard NFH Fall (URB) Chinook, Little White Salmon WA	Yes	Willard NFH			
Ringold Steelhead (Wells Stock)	Yes	Ringold Hatchery, Wells Hatchery			
Warm Springs NFH Spring Chinook	Yes	Warm Springs NFH	Individual BA	Bull Trout	Non-Jeopardy BO (tracking # 03-3646), July 31, 2003
Spring Creek NFH Tule Chinook	Yes	Spring Creek NFH	Batched BA		Letter of Concurrence (no ref #), June 2, 2015
Little White Salmon URB	Yes	Little White Salmon NFH			
Umatilla Steelhead	Yes	Umatilla Hatchery	Batched BA	Bull trout	Non-Jeopardy BO (ref # 13420-2008-F-0109), September 12, 2008
Umatilla Spring Chinook	Yes	Umatilla Hatchery			
Umatilla Fall Chinook	Yes	Umatilla Hatchery			
Umatilla Coho	Yes	Umatilla Hatchery			

Hatchery Program or HGMP	Proposed in 2018 Agreement (Yes/No)	Associated Facilities	Batched or Individual BA	Adverse Affect Determination by Species	ESA Response Document and Conclusion
Hood River Spring Chinook	Yes	Parkdale Fish Hatchery	Individual BA	Bull Trout	Non-Jeopardy BO (ref # 01EOFW00-2018-F-0141), December 19, 2017
Hood River Winter Steelhead	Yes	Parkdale Fish Hatchery	Individual BA	Bull Trout	

Appendix B. Incidental take, exempted by individual Biological Opinion (see Appendix A.) and summarized in the respective Incidental Take Statement, considered part of the baseline condition within the action area of the 2018 Agreement. Take is separated by species as appropriate.

Table B1. Summary of incidental take of bull trout from the December 8, 2017, Hells Canyon/Salmon Basin Hatchery Programs Biological Opinion (TAILS reference # 01EIFW00-2017-F-1079).

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
Broodstock Collection	Hells Canyon Trap	IPC	IPC	Chinook: May-June Steelhead: mid Oct to late Nov, Mar - Apr	10	1
	Dworshak NFH Trap	FWS	COE	Oct - Apr	5[a]	1[a]
	Rapid River Fish Hatchery	IDFG	IPC	Apr – mid Sep	600	5
	Lower Pahsimeroi Hatchery	IDFG	IPC	Mid Feb – Apr May-Sep Mid Oct – Nov	40	1
	SF Salmon Satellite and Weir	IDFG	LSRCP	Mid Jun – Sept	20	1
	Johnson Creek Adult Collection Weir and Trap	NPT	BPA	Jun – mid Sept	60	6
	EF Salmon River Trap	IDFG	LSRCP	Mar – May	10	1

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
	Sawtooth Fish Hatchery Weir	IDFG	LSRCP	Mar-Apr Jun-Sep	100[b]	5[b]
	Yankee Fork Steelhead adult collection (Present – angling, partial weir, tangle nets: Future – permanent weir proposed)	SBT	LSCRP	Apr-May	5	1
	Yankee Fork Chinook Adult Collection (Present temporary picket weir. Future permanent weir proposed)	SBT	BPA	Jun-Sep	300[c]	15[c]
Acclimation and Release	Rapid River hatchery	IDFG	IPC	Mar - May	Target <=5% precocious at time of release, averaged over 5 years	
	SF Salmon Satellite	IDFG	LSRCP	Mar - May	Target <=5% precocious at time of release, averaged over 5 years	
	EF Salmon River Trap	IDFG	LSRCP	Mar - May	Target <=5% precocious at time of release, averaged over 5 years	
	Sawtooth Fish Hatchery Weir	IDFG	LSCRP	Mar - May	Target <=5% precocious at time of release, averaged over 5 years	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
	Yankee Fork Streamside Incubators at Jordan Creek (summer steelhead)	SBT	LSRCP	Mid May through extent of steelhead rearing	Target <=5% precocious at time of release, averaged over 5 years	
	Streamside Incubators at Beaver and Indian Creeks (summer steelhead)	SBT	LSRCP	Mid-May - Jul	Target <=5% precocious at time of release, averaged over 5 years	
RM&E	Johnson Creek Screw Trap Operations	NPT	BPA	Year-round	60	6
	Yankee Fork juvenile salmonid production monitoring (rotary screw trap)	SBT	LSRCP	Mar-Nov	100	5
	Yankee Fork electrofishing monitoring of juvenile density and habitat use	SBT	LSRCP	Sep-Oct	705	15
Water Withdrawals/ Diversions	Rapid River Fish Hatchery	IDFG	IPC	Year-round	All bull trout in the affected reach, within constraints imposed by the following surrogate. Stream may not be dewatered between intake and return.	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
Maintenance – in-water	Oxbow Hatchery	IDFG	IPC	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Hells Canyon Trap	IPC	IPC	Jul 1 – Oct 15	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Rapid River Fish Hatchery	IDFG	IPC	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Lower Pahsimeroi Hatchery	IDFG	IPC	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Upper Pahsimeroi Hatchery	IDFG	IPC	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
					of activity or last >5 hours.	
	SF Salmon Satellite Weir	IDFG	LSRCP	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Cabin and Curtis Creeks Egg Boxes (summer Chinook)	SBT	LSCRP	Mid-Oct (Placement) Mid-May (Removal)	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	EF Salmon River Trap	IDFG	LSRCP	Summer work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Sawtooth Fish Hatchery Weir	IDFG	LSRCP	Jul – Aug December (intake cleaning)	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Yankee Fork Facilities	SBT	LSRCP	Jul - Aug	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
					>600 ft downstream of activity or last >5 hours.	

[a]This take is covered in the Biological Opinion for the Clearwater Hatchery Programs (USFWS 2017a) and is identified here for illustrative purposes only; take is not additive between the two Biological Opinions.

[b]These take limits include take resulting from Snake River sockeye broodstock collection, which occurs at the same time as Chinook salmon trapping at Sawtooh Fish Hatchery. Take associated with broodstock collection for both programs is covered in this Opinion rather than the Opinion for the Snake River Sockeye Hatchery Program (USFWS 2017b), but take is not additive between the two Opinions.

[c]This take will be covered in the Biological Opinion for the Crystal Springs Hatchery Programs and is identified here for illustrative purposes only; take is not additive between the two Biological Opinions.

[d]These are the preferred work windows. If a variance to the work windows shown above is required, coordinate with the Service.

Table B2. Summary of incidental take of Bliss Rapids snail from the December 8, 2017, Hells Canyon/Salmon Basin Hatchery Programs Biological Opinion (TAILS reference # 01EIFW00-2017-F-1079).

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit
Maintenance – in-water	Hagerman National Fish Hatchery	USFWS	LSRCP	Any time	All Bliss Rapids snails in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >300 ft downstream of water intake during maintenance activities; maintenance activities occur within immediate vicinity of intake structure(s).
	Magic Valley Fish Hatchery	IDFG	LSRCP	Any time	All Bliss Rapids snails in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >300 ft downstream of water intake during maintenance activities; maintenance activities occur within immediate vicinity of intake structure(s).
	Niagara Springs Fish Hatchery	IDFG	IPC	Any time	All Bliss Rapids snails in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >300 ft downstream of water intake during maintenance activities; maintenance activities occur within immediate vicinity of intake structure(s).

Table B3. Summary of incidental take of bull trout from the December 15, 2017, Clearwater Basin Hatchery Programs Biological Opinion (TAILS reference # 01EIFW00-2017-F-1143).

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
Broodstock Collection	Nez Perce Tribal Hatchery	NPT	BPA/LSRCP	May - Sep	2	1
	Lolo Creek Weir and Trap	NPT	BPA	May - Sep	2	1
	Dworshak NFH	USFWS NPT	USFWS/LSRCP - Spring Chinook COE – B-run Steelhead	Almost year-round for combined hatchery programs	10	2
	Kooskia NFH	IDFG	USFWS	May - Dec	5	1
	Newsome Creek Weir	NPT	BPA	May - Sep	6	1
	Crooked River Trap	IDFG	LSRCP	May – mid-Sep	60	2
	Red River Trap	IDFG	LSRCP	May - Sep	25	1
	Powell Trap and Satellite (Walton Creek)	IDFG	LSRCP	May – mid-Sep	40	2
Acclimation and Release	Red River Trap and Satellite	IDFG	LSRCP	Mar – early Apr	Target <=5% precocious at time of release, averaged over 5 years	
	Powell Satellite (Walton Creek)	IDFG	LSRCP	Mar – early Apr	Target <=5% precocious at time of release, averaged over 5 years	
	Juvenile releases into Meadow Creek and Lower and Upper Selway River	NPT IDFG USFWS NPT	BPA LSRCP USFWS/LSRCP	Mid-Jun	Target <=5% precocious at time of release, averaged over 5 years	
RM&E	Lolo Creek juvenile screw trap	NPT	BPA	Feb - Nov	5	0
	Newsome Creek juvenile screw trap	NPT	BPA	Feb - Nov	50	2

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
	SF Clearwater juvenile screw trap	NPT	BPA	Feb - Nov	100	4
	Meadow Creek juvenile screw trap	NPT	BPA	Feb – Nov	5	1
	RM&E Surveys associated with Nez Perce Tribal Hatchery program at Lolo Creek Newsome Creek, and Meadow Creek and Selway River sites	NPT	BPA	Jun - Oct	10 Per survey tributary per year	1 Per survey tributary per year
Water Withdrawals/ Diversions	Crooked River Trap	IDFG	LSRCP	May - Sep	All bull trout in the affected reach, within constraints imposed by the following surrogate. Stream may not be dewatered between intake and return.	
	Red River Trap and Satellite	IDFG	LSRCP	May - Sep	All bull trout in the affected reach, within constraints imposed by the following surrogate. Stream may not be dewatered between intake and return.	
	Powell Satellite (Walton Creek)	IDFG	LSRCP	May – Sep	All bull trout in the affected reach, within constraints imposed by the following surrogate. Stream may not be dewatered between intake and return.	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
Maintenance – in-water	Nez Perce Tribal Hatchery	NPT	BPA	Jul 1- Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Clearwater Fish Hatchery	IDFG	LSRCP	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Dworshak NFH	USFWS/NPT	USFWS/LSRCP/ USCOE	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Kooskia NFH	USFWS/NPT	USFWS	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Newsome Creek Weir (RKM 0.1) and Newsome Creek Acclimation Site (RKM 8.1)	NPT	BPA	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Limit	
					Non-Lethal	Lethal
	Crooked River Trap	IDFG	LSRCP	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Red River Trap and Satellite	IDFG	LSRCP	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	
	Powell Satellite (Walton Creek)	IDFG	LSRCP	Jul 1 – Aug 14	All bull trout in the affected reach, within constraints imposed by the following surrogate. Sediment plume not visible >600 ft downstream of activity or last >5 hours.	

Table B4. Summary of incidental take of bull trout from the December 20, 2017, Crystal Springs Hatchery Program Biological Opinion (TAILS reference # 01EIFW00-2018-F-0203).

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Incidental Take Limits*	
					Sub-lethal	Lethal
Facility Construction	Yankee Fork (Fish Salvage)	SBT	BPA	In-water work window	20	1
	Panther Creek (Fish Salvage)	SBT	TBD	In-water work window	10	1
	Yankee Fork Suspended sediment/turbidity from instream construction	SBT	BPA	In-water work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Turbidity levels meet State water quality standards or related Corps and USFS permit requirements.	
	Yankee Fork Suspended sediment/turbidity from instream construction	SBT	BPA	In-water work window	All bull trout in the affected reach, within constraints imposed by the following surrogate. Turbidity levels meet State water quality standards or related Corps and USFS permit requirements.	
Broodstock Collection	Yankee Fork Adult Chinook Collection (and RM&E) (Future permanent weir proposed)	SBT	BPA	Jun - Sep	300	15
	Panther Creek	SBT	BPA	Jun-Sep	40	1

Activity	Facility/Method	Agency Operators	Funding Source	Dates of Activity	Incidental Take Limits*	
					Sub-lethal	Lethal
	Adult Chinook Collection (and RM&E) (Present temporary picket weir. Future permanent weir proposed)					
RM&E	Yankee Fork juvenile salmonid production monitoring (rotary screw trap)	SBT	BPA	Mar-Nov	100	5
	Yankee Fork electrofishing monitoring of juvenile density and habitat use	SBT	BPA	Sep-Oct	700	15
	Panther Creek juvenile salmonid production monitoring (rotary screw trap)	SBT	BPA	Mar-Nov	100	5
	Yankee Fork electrofishing monitoring of juvenile density and habitat use	SBT	BPA	Sep-Oct	700	15

Table B5. Summary of incidental take of bull trout from the December 18, 2017, Snake River

Activity	Method	Facility or Water Body	Agency Operators	Dates of Activity	Incidental Take Limits	
					Sub-lethal	Lethal
Adult Collection/Weir Monitoring (Broodstock Collection and RM&E)	Weir	Sawtooth Hatchery (Salmon River*	IDFG	mid Jun – mid Oct	50*	3
		Redfish Lake Creek	IDFG	mid Jun – mid Oct	300	6
	Seine	Sawtooth Hatchery	IDFG	Sep (2 days)	30	3
Juvenile Outmigration Monitoring (RM&E)	Weir smolt trap	Redfish Lake Creek	IDFG**	Apr-Jun	10	2
	Angling	Redfish Lake Creek	IDFG**	Apr-Jun	5	2
	Screw Trap	Alturas Lake Creek	SBT	mid-Apr – mid-Jun	2	1
	Screw Trap	Salmon River	IDFG	Mar-Nov	80	1
	Weir	Pettit Lake Creek	SBT	mid-Apr-mid-Jun	2	1
Population Abundance Monitoring (RM&E)	Power boat – trawling	Redfish Lake, Pettit Lake	IDFG**	mid to late Aug	2	1
	Gill-netting	Pettit Lake	SBT	mid-Jan - Mar	2	1

Sockeye Hatchery Program Biological Opinion (TAILS reference # 01EIFW00-2017-F-0819).

*Use of the Sawtooth Hatchery weir for collecting sockeye salmon occurs during the same timeframe as that trapping of spring Chinook salmon. Therefore the incidental take of bull trout for the Snake River sockeye program is covered in the Biological Opinion for the Hells Canyon and Salmon River Steelhead and Spring/Summer Chinook Salmon Hatchery Programs (USFWS 2017).

**The federal action agencies are covered under the Act for all incidental take shown in Table 11 by this incidental take statement as described herein. IDFG is authorized to take bull trout during RM&E through their section 6 agreement with the Service. However, unless specifically designated as agents of the state, section 6 coverage does not extend to the federal action agencies.

Table B6. Summary of incidental take of bull trout from the May 16, 2017, Snake River Fall Chinook Hatchery Program Biological Opinion (TAILS reference # 01EIFW00-2012-F-0448).

RM&E Method	Waterbody	Investigator	Timing of Operation	Annual Incidental Take Limits	
				Sub-lethal	Lethal
Weirs	SF Clearwater*	NPT	Oct 1 – Dec 1	25	3
Screw Trap	Lower Clearwater	NPT	Oct-Jul	25	3
Screw Trap	Tucannon	WDFW	Oct-Feb and Mar-Jul	50	5
Seines, hoop nets, minnow traps	Clearwater, SF Salmon	NPT	Oct-Jul	25	3
Seines, hoop nets, minnow traps	Snake (below Hells Canyon), Grande Ronde	IFRO**	Mar - Jul	25	3
Angling	Snake, lower Clearwater	IFRO	Apr-Sep	25	3
Boat Electrofishing	Snake, lower Clearwater	IFRO	Apr-Sep	25	3

*Because of the proposed timing of operation (Oct 1 – Dec 1) and location (near the mouth) of the SF Clearwater weir, we are expecting low numbers of out-migrating, post-spawning adult bull trout to be incidentally captured. The NPT's SF Clearwater weir is not yet operational. The incidental take limits shown in this table will become effective when the weir is put into operation.

**Incidental take of bull trout from IFRO fall Chinook RM&E activities is currently covered by Service subpermit FWSIFWO -15, which expires on December 31, 2021. This permit coverage will end when this Opinion is issued, at which time the incidental take limits and terms and conditions of this Incidental Take Statement (or revised Statement resulting from reinitiation of consultation) will become effective.

Table B7. Summary of incidental take of bull trout from the August 22, 2016, Northeast Oregon and Southeast Washington Hatchery Programs Biological Opinion (TAILS reference # 01EOFW00-2015-F-0154).

Facility	Total Annual Non-lethal for all activities	Total lethal for all activities	Weir Broodstock (non-lethal)	Weir Broodstock (lethal)	Hook and Line Broodstock (non-lethal)	Hook and Line Weir Broodstock (lethal)	Acclimation, Release, and Adult Outplanting	Diversions	Effluent	Maintenance (non-lethal)	Maintenance (Lethal)	RME (smolt traps, surveys, etc) (non-lethal)	RME (smolt traps, surveys, etc) (lethal)
Tucannon	535/yr	80 total, <13/yr	300	25 total, < 5/yr	5/yr	1/yr	None, Beneficial	None	None	50/yr	≤2/yr	180/yr	25 total, ≤5/yr
Lyons Ferry	None	None	None	None	N/A	N/A	None/Beneficial	N/A	None	None	None	N/A	N/A
Curl Lake	None	None	N/A	N/A	N/A	N/A	None/Beneficial	None	None	None	None	N/A	N/A
Cottonwood	None	None	None (no BT or CH)	None (no BT or CH)	N/A	N/A	None/Beneficial	None	None	None (no BT or CH)	None (no BT or CH)	None (no BT or CH)	None (no BT or CH)
Big Canyon	15 total, <2/yr	1 total	5 total	1 total	N/A	N/A	None/Beneficial	None	None	5 total	0 total	5 total	0 total
Lostine	135/yr	6 total	95/yr	3 total	N/A	N/A	None/Beneficial	None	None	3/yr	1 total	37/yr	2 total
Lookingglass	251/yr	25 total, no more than 5/yr	80/yr	18 total	N/A	N/A	None/Beneficial	None	None	5 total	1 total	166/yr	6 total
Upper Grande Ronde	21/yr	3 total	4/yr	1 total	N/A	N/A	None/Beneficial	None	None	2/yr	0 total	15/yr	2 total
Catherine Creek	182/yr	6 total	56/yr	2 total	N/A	N/A	None/Beneficial	None	None	5/yr	1 total	121/yr	3 total
Imnaha	1089/yr*	35 total	450/yr	29 total	N/A	N/A	None/Beneficial	None	None	5/yr	0 total	634/yr	6 total
Little Sheep	12/yr	2 total	2/yr	1 total	N/A	N/A	None/Beneficial	None	None	1/yr	0 total	9/yr	1 total

*Corrected from original Biological Opinion as per 8/15/2017 email from FWS.

Table B8. Summary of incidental take of bull trout from the December 22, 2017, Walla Walla and Touchet Rivers Summer Steelhead Hatchery Programs Biological Opinion (TAILS reference # 01EWFW00-2017-F-1145).

	Broodstock Collection at Dayton Trap	Maintenance Activities at Dayton Trap and Acclimation Pond (Salvage and Handling)	Research, Monitoring, and Evaluation in the Touchet River
Physical Injury or Mortality (Harm)	2/yr	1/yr	10 total over 5 years
Disruption of Normal Behaviors (Harrassment)	200/yr	50/yr	1000 total over 5 years

Table B9. Summary of incidental take of bull trout from the Umatilla Hatchery Program Biological Opinion (reference # 13420-2008-F-109).

	Broodstock Collection at Three Mile Falls Dam
Physical Injury or Mortality (Harm)	3 total over 10 year; no more than 1 in any given year
Disruption of Normal Behaviors (Harrassment)	1/yr

Table B10. Summary of incidental take of bull trout from the Round Butte Hatchery Program Biological Opinion (reference # 1-7-04-F-0045).

	Upstream Passage (Broodstock Collection) at Pelton Trap and Round Butte Dam Trap	Downstream Passage (Operations) at Pelton Dam and Round Butte Dam	Testing and Verification/Long-term Monitoring Studies in the Metolius River
Physical Injury or Mortality (Harm)	Of those captured, 5% will be injured and 1% will be killed	Of those captured or passing through turbine intakes, 8% will be injured and 4% will be killed	Adults/subadults: 2/yr will be injured, 1/yr will be killed.10 total over 5 years Juveniles/fry: 300/yr will be injured and 150/yr will be killed
Disruption of Normal Behaviors (Harrassment)	25/yr	All bull trout passing downstream	Adults/subadults: 30/yr Juveniles/fry: 15,000/yr

Table B11. Summary of incidental take of bull trout from the Warm Springs Hatchery Program Biological Opinion (reference # 8330.00403(03), tracking number 03-3646).

Hatchery Activity or Feature	Type of Take	Number of Bull Trout	Life Stage
Fish Ladder Operations: Volitional	Injury	<20/yr	Adults
Fish Ladder Operations: Non-volitional	Capture/Handle	<20/yr	Adults
Warm Springs River Juvenile Migrant Trap	Capture/Handle	<4/yr	Juveniles
Warm Springs River Redd Surveys	Harass	<5/yr	Adults
Warm Springs River Snorkeling	Harass	<4/yr	Adults and Juveniles
Shitike Creek Weir	Capture/Handle	<100/yr	Adults
Shitike Creek Juvenile Migrant Trap	Capture/Handle	<125/yr	Juveniles
Shitike Creek Telemetry and Redd Surveys	Harass	<5/yr	Adults
Shitike Creek Abundance and Behavioral Surveys	Harass	<150/yr <10/yr	Juveniles Adults

Table B12. Summary of incidental take of bull trout from the Entiat National Fish Hatchery Biological Opinion (TAILS reference # 0lEWFW00-2015-F-0324).

Life Stage	Broodstock Collection at Lower Entiat River	
	Sub-Lethal	Lethal
Adult	2/yr	0
Subadult	3/yr	0
Total	5/yr	0

Table B13. Summary of incidental take of bull trout from the Winthrop National Fish Hatchery Biological Opinion (TAILS reference # OlEWFW00-2015-F-1041).

Life Stage	Operations and Maintenance	
	Sub-Lethal	Lethal
Adult	35/yr	2/yr
Subadult	5/yr	6/yr
Total	40/yr	43/yr

Table B14. Summary of incidental take of bull trout from the Leavenworth National Fish Hatchery Biological Opinion (reference # 13260-2011-F-0048 and 13260-2011-P-0002).

Table B14a: Summary of anticipated incidental take of the bull trout by Project Element, severity of effect, and bull trout life history stage.

Life History Stage	PE: Water Supply		PE 2: BCS and Rearing		PE 4: Structures 2 and 5
	Harm (Lethal)	Harm (Sub-lethal)	Harm (Lethal)	Harm (Sub-lethal)	Harassment
Migratory Bull Trout	0	1	0	1	16
All other Bull Trout	1	8	0	0	0
Total	1	9	0	1	16

Table B14b: Summary of incidental take to bull trout from the indirect effects of habitat degradation from PE 4, severity of effect, and life history stage.

Life History Stage	Peak and Base Flow	Temperature	Physical Barriers
	Harassment (Sub-lethal)	Harassment (Sub-lethal)	Harassment (Sub-lethal)
Migratory Bull Trout	0	0	16
All other Bull Trout	64	64	0
Total	64	64	16

In Tables B14a and B14b, "migratory bull trout" are those that seek to spawn in upper Icicle Creek; "all other bull trout" include all other adult, subadult, and juvenile bull trout.

Table B15. Summary of incidental take of bull trout from the Wenatchee River Hatchery Programs Biological Opinion (TAILS reference # 0lEWFW00-2013-F-0444).

Project Elements	Life Stage	Programs					
		Chiwawa/Nason/White Spring Chinook		Summer Chinook		Steelhead	
		Lethal	Sub-lethal	Lethal	Sub-lethal	Lethal	Sub-lethal
Broodstock Collection	Adults	1	70[a] 2 1 1				2[h]
	Sub-adults		1[b]				
	Juveniles						
Smolt Releases	Adults						
	Sub-adults						
	Juveniles			5		250	
Adult Management	Adults		5 2[c]				
	Sub-adults						
	Juveniles						
Monitoring	Adults	1[d]	55[e]				
	Sub-adults	5[f]					
	Juveniles		315[g]			1[i]	1[i]
Totals[j]:		7	451	5		251	3

[a] Number of annual encounters at Chiwawa Weir is a 5-year average (70 adults handled) which is subject to adjustment based on redd counts, 2 adults injured from hooking in each year that hook-and-line methods are used for spring Chinook salmon broodstock collection, 1 adult captured in each year that tangle-netting methods are used for spring Chinook salmon broodstock collection, and 1 adult subjected to migratory delay without handling at Chiwawa Weir, annually.

[b] One sub-adult captured in each year that tangle-netting methods are used for spring Chinook salmon broodstock collection.

[c] Two adults disturbed in each year that carcasses from adult management activities are placed in bull trout spawning areas for nutrient enhancement when adult spawners are present.

[d] This value is for smolt trapping during the entire permit period, not an annual value, or a 5-year average.

[e] This is a 5-year average of annual encounters of adults and sub-adults combined during smolt trapping.

[f] This is a 5-year average of annual mortalities of sub-adults and juveniles combined, including 20 percent delayed mortality of individuals injured during smolt trapping.

[g] This is a 5-year average.

[h] From hooking injury, in each year that hook-and-line methods are used for summer steelhead broodstock collection.
[i] Annual mortality and injury from spot electrofishing for natural production monitoring.
[j] Totals require careful interpretation given cell values have different units (see previous notes). Shading indicates this effect was analyzed in a previous consultation.

Table B16. Summary of incidental take of bull trout due to impacted habitat conditions from the Middle Columbia Coho Restoration Program Biological Opinion (TAILS reference # 0lEWFW00-2013-F-0272), over the 20 year project duration.

Life Stage	Incidental Take
Adult	145
Sub-adult	425
Juvenile	71
All life history stages	Small proportion of bull trout population*
Total	641

*Associated with the potential for ecological interactions.

Habitat Indicator	Habitat Effect Characteristics			
	Magnitude			Duration
	Area	Linear	Volume	
Sediment		600 ft		1 year *

*Duration is for 1 year per sediment generating event.

Table B17. Summary of incidental take of bull trout from the December 19, 2017, Hood River Hatchery Programs Biological Opinion (TAILS reference # 01EOFW00-2018-F-0141).

	Trap Operations (fish handling, tagging, and release)	Exposure to Effluent	Research, Monitoring, and Evaluation (including smolt trapping)
Physical Injury or Mortality (Harm)	1/yr	All bull trout within 100 feet of discharge areas in the Deschutes River associated with the Round Butte and Oak Springs Hatcheries	2/yr
Disruption of Normal Behaviors (Harrassment)	10/yr	0	25/yr