Environmental Assessment

Reducing Predation Impacts on At-Risk
Fish by California and Steller Sea Lions
In the Columbia River Basin

National Marine Fisheries Service

West Coast Region

1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232

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Cover Sheet

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Proposed Action:	Approval with certain conditions of an Application Requesting Authorization to Intentionally Take, by Lethal Methods, California and Steller Sea Lions in the Columbia River Basin Pursuant to Section 120(f) of the Marine Mammal Protection Act.
Responsible Official:	Barry A. Thom, Regional Administrator National Marine Fisheries Service West Coast Region 1201 Lloyd Blvd., Suite 1100 Portland, OR 97232
Cooperating Agency:	Bonneville Power Administration 905 N.E 11th Avenue Portland, OR 97232
For Further Information:	Robert Anderson National Marine Fisheries Service West Coast Region 1201 Lloyd Blvd., Suite 1100 Portland, OR 97232

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List of Acronyms

ACC	Animal Care Committee
AWA	Animal Welfare Act
BPA	Bonneville Power Administration
CORPS	U.S. Army Corps of Engineers
CSL	California Sea Lions
CRITFC	Columbia River Inter-Tribal Fish Commission
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
IACUC	Institutional Animal Care and Use Committee
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historical Places
ODFW	Oregon Department of Fish and Wildlife
OSP	Optimum Sustainable Population
PBR	Potential Biological Removal
SSL	Steller Sea Lions
WDFW	Washington Department of Fish and Wildlife

TABLE OF CONTENTS

List of Tables

List of Figures

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction and Background

The National Marine Fisheries Service (NMFS) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). This document considers the environmental consequences of alternative actions related to an application by certain States and Tribes to remove California sea lions (*Zalophus californianus*) and Steller sea lions (*Eumetopias jubatus*: Eastern stock) (hereafter called sea lions) in the Columbia River and certain tributaries. The purpose of the application is to reduce sea lion predation impacts on at-risk fish species listed as threatened or endangered under the Endangered Species Act (ESA) in the Columbia River Basin, and species of lamprey or sturgeon that are not listed as endangered or threatened but are listed as a species of concern.

On June 13, 2019, the Oregon Department of Fish and Wildlife, the Washington Department of Fish and Wildlife, the Idaho Department of Fish and Game; the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation; and the Willamette Committee[1] (hereafter called – "eligible entities") submitted an application pursuant to section 120(f) of the Marine Mammal Protection Act (MMPA) to NMFS requesting authorization to intentionally take, by lethal methods, sea lions that are located in the main stem of the Columbia River between river mile 112 (I-205 Bridge) and river mile 292 (McNary Dam), or in any tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead.

This action is intended to reduce or eliminate sea lion predation on the following species that are listed as threatened or endangered under the ESA: Lower Columbia River Chinook salmon (*Onchorynchus tshawytscha*), Snake River Fall-run Chinook salmon, Snake River Spring/Summer-run Chinook salmon, Upper Columbia River Spring-run Chinook salmon, Upper Willamette River Chinook salmon, Lower Columbia River steelhead, Middle Columbia River steelhead (*O. mykiss*), Snake River Basin steelhead, Upper Columbia River steelhead, Upper Willamette River steelhead, Columbia River chum salmon (*O. keta*), Lower Columbia River coho salmon (*O. kisutch*), Snake River sockeye salmon (*O. nerka*), the southern distinct population segment of eulachon (*Thaleichthys pacificus*), and species of lamprey or sturgeon that are not listed as endangered or threatened but are listed as a species of concern.

[1] MMPA section 120(f)(6)(D) Committee. The Willamette Committee fulfills the requirements for an eligible entity under section 120(f)(6)(A)(iii) of the MMPA. Pursuant to this section of the statute, the Committee members include the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Grand Ronde Community, and the Confederated Tribes of the Siletz Indians of Oregon. The Confederated Tribes of the Grand Ronde Community and the Confederated Tribes of the Siletz Indians of Oregon will coordinate and conduct lethal removal activities in the Willamette River Basin with the member co-managers, but not elsewhere in the Columbia River Basin.

The analysis contained herein will inform NMFS' decision-making regarding whether to approve or deny the eligible entities' request to intentionally take, by lethal methods, predatory sea lions in the Columbia River Basin.

1.1.1 Bonneville Power Administration

The Bonneville Power Administration (BPA) is a Federal power-marketing agency within the U.S. Department of Energy. BPA's operations are governed by several statutes, including the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (16 U.S.C. 839 §§ et seq.) (Northwest Power Act). Among other things, this Act directs BPA to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the federal hydroelectric dams in the Columbia River Basin from which BPA markets commercial power. To assist in accomplishing this, the Act requires BPA to fund fish and wildlife protection, mitigation, and enhancement actions consistent with the purposes of the Act.

BPA is a cooperating agency in the development of this EA because it is considering a request from the states of Washington, Oregon, and Idaho (states), and the Columbia River Intertribal Fish Commission (CRITFC) to provide funding for floating deck traps and transfer cages (and related equipment). CRITFC has also requested changes to its existing contract with BPA to transition from sea lion hazing activities to trapping and handling activities associated with the proposed action.

If, based on the analysis in this EA, BPA adopts the EA, BPA would issue a separate Finding of No Significant Impact, and make its decision on whether to provide the requested funding.

1.2 Sea Lion Predation

The impact of sea lion predation on at-risk fish species in the Columbia River Basin, especially at Bonneville Dam and Willamette Falls, is well known and well documented. To address the pinniped predation in the vicinity of Bonneville Dam, NMFS has issued the states five MMPA section 120 authorizations (2008, 2011, 2012, 2016 and 2019[2]). Under these authorizations, the states have removed (transferred and killed) 238 predatory California sea lions (CSL). The authorization at Bonneville Dam expires on June 28, 2021.

In addition to the aforementioned MMPA section 120 authorizations, NMFS, on November 14, 2018, issued the state of Oregon a section 120 authorization to remove predatory CSL in the vicinity of Willamette Falls. Under this authorization, the state has removed (killed) 33 CSL. The authorization at Willamette Falls expires on November 14, 2023.

At Bonneville Dam, estimated consumption of adult salmonids by CSL during the spring sampling period from 2002 to 2019 has ranged from a low 176 fish in 2019 (Table 1-1) to a high of 8,324 fish in 2015. The percentage of runs impacted by both CSL and Steller sea lions (SSL) has ranged from a low of 0.4% in 2002 to a high of 5.8% in 2016 (Table1-1), and while consumption of individual adult steelhead by CSL and SSL is low compared to salmon, the

[2] Revised MMPA Section 120 Authorization letter from Barry Thom, National Marine Fisheries Service, to Kelly Susewind, Washington Department of Fish and Wildlife; Curtis Melcher, Oregon Department of Fish and Wildlife; and Ed Schriever, Idaho Department of Fish and Game; April 17, 2019.

impact as a percentage of the run has been substantially higher (Table 1-2).

Table 1-1. Adjusted consumption estimates on adult salmonids (including adults and jacks) by CSL and SSL at Bonneville Dam during the spring sampling period from 2002 to 2019. (Tidwell et al 2020).

Year	Total Salmonid Passage	Estimated Salmonid Consumption	CSL	Estimated Salmonid Consumption	SSL	Estimated Salmonid Consumption	All Pinnipeds
2002	284,732	1,010	0.4%	0	0.0%	1,010	0.4%
2003	217,934	2,329	1.1%	0	0.0%	2,329	1.1%
2004	186,771	3,516	1.9%	7	0.0%	3,533	1.9%
2005	81,252	2,904	3.5%	16	0.0%	2,920	3.4%
2006	105,063	3,312	3.1%	85	0.1%	3,401	3.1%
2007	88,474	4,340	4.7%	15	0.0%	4,355	4.7%
2008	147,558	4,735	3.1%	192	0.1%	4,927	3.2%
2009	186,056	4,353	2.3%	607	0.3%	4,960	2.7%
2010	267,167	5,296	1.9%	1,025	0.4%	6,321	2.4%
2011	223,380	2,689	1.2%	1,282	0.6%	3,970	1.8%
2012	171,665	1,067	0.6%	1,293	0.7%	2,360	1.4%
2013	120,619	1,497	1.2%	1,431	1.2%	2,928	2.4%
2014	219,929	2,747	1.2%	1,874	0.8%	4,621	2.1%
2015	239,326	8,324	3.3%	2,535	1.0%	10,859	4.3%
2016	154,074	6,676	4.1%	2,849	1.7%	9,525	5.8%
2017	109,040	2,142	1.9%	3,242	2.8%	5,384	4.7%
2018	100,887	746	0.7%	2,368	2.3%	3,112	3.0%
2019	63,591	176	0.3%	2,022	3.1%	2,201	3.3%

Table 1-2. Consumption of summer and winter steelhead by pinnipeds at Bonneville Dam tailrace during the spring sampling period from 2007 to 2019 (Tidwell et al 2020).

Year	Bonneville Dam Steelhead Passage	Adjusted Steelhead Consumption Estimate	% Run
2007	5,188	609	10.5%
2008	4,367	391	8.2%
2009	4,829	599	11.0%
2010	9,972	413	4.0%
2011	5,279	336	6.0%
2012	5,904	400	6.3%
2013	3,394	218	6.0%
2014	5,696	128	2.2%
2015	5,217	237	4.3%
2016	5,262	302	5.4%
2017	3,241	322	9.0%
2018	3,808	295	7.2%
2019	2,172	208	8.7%

Although CSL have been the primary focus of management efforts to date, the presence of SSL has been increasing over time. At Bonneville Dam, predation in 2017, 2018, and 2019 on salmonids by SSL exceeded that of CSL (Figure 1-1 and Figure 1-2).

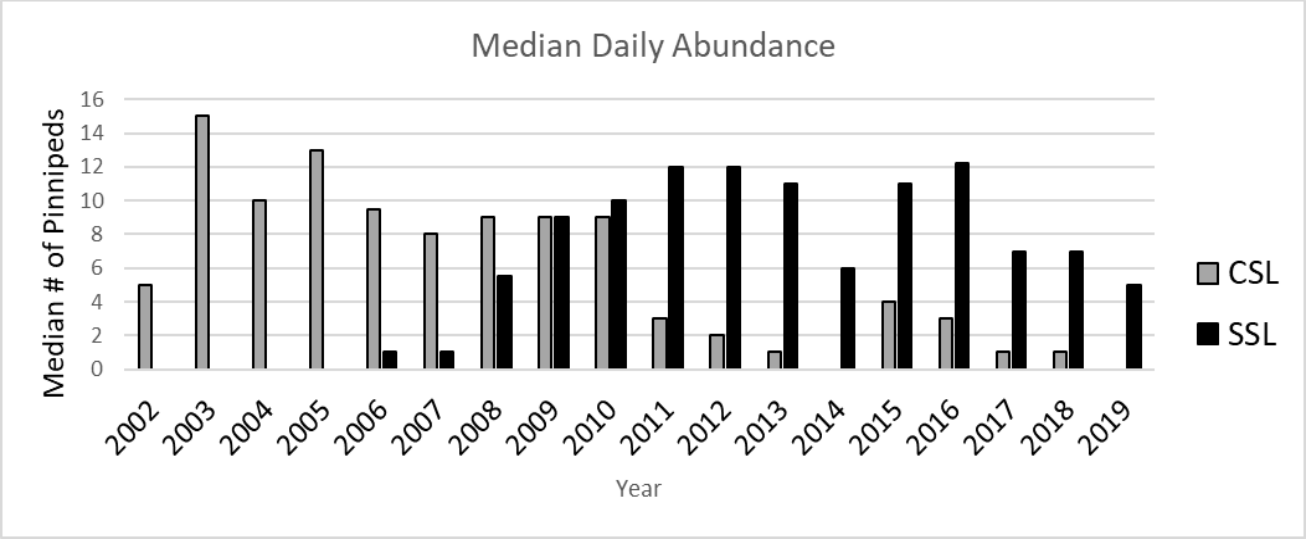

Figure 1-1. Annual median daily abundance of Steller sea lions (SSL) and California sea lions (CSL) at Bonneville Dam during the spring sampling period from 2002 to 2019 (Tidwell et al 2020).

While the highest abundance of sea lions tends to be during the spring, the abundance and residency of SSL during the fall and winter months has increased and SSL are now present for 10 to 11 months of the year at Bonneville Dam (Figure 1-3).

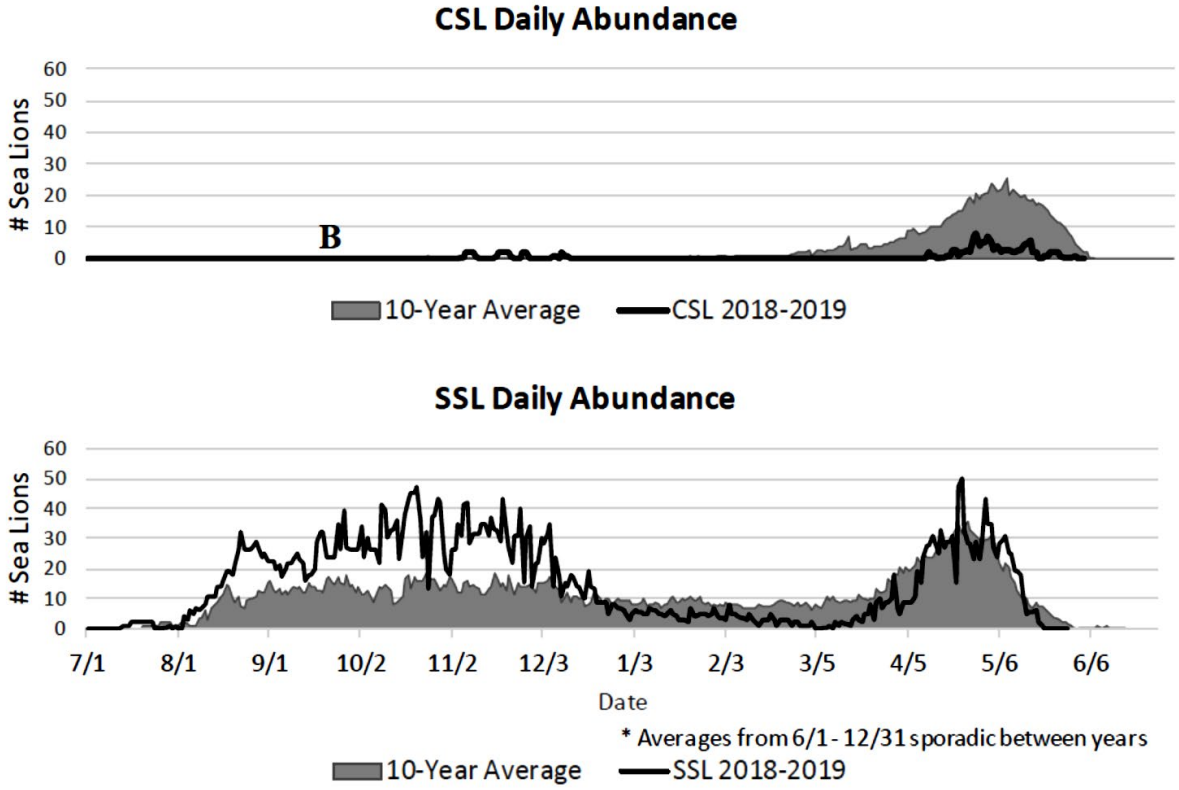

Figure 2-2. Maximum daily count of pinnipeds (SSL and CSL) at Bonneville Dam from 1 July 2018 through 30 June 2019 compared to the 10-year maximum daily average (Tidwell et al 2020).

Estimated salmonid predation by CSL at Willamette Falls (2014-2019) has ranged from a low 1,703 fish to a high of 4,149 fish, with percentage of runs impacted by CSL predation ranging from a low of 3% in 2014 and 2019 to a high of 25% in 2017 (Table 1-3).

Table 1-3. Estimated salmonid predation by California sea lions at Willamette Falls, 2014-2019 (ODFW 2019).

Estimated Predation						
Run/Year	2014	2015	2016	2017	2018	2019
Winter Steelhead	780	557	915	270	503	280
Unmarked Chinook	496	899	650	399	466	253
Summer Steelhead	712	172	768	181	516	109
Marked Chinook	1,703	4,149	2,252	1,824	1950	478
Percent Predation Relative to Potential Escapement						
	2014	2015	2016	2017	2018	2019
Winter Steelhead	13%	11%	14%	25%	22%	11%
Unmarked Chinook	7%	9%	9%	6%	9%	5%
Summer Steelhead	3%	4%	3%	8%	6%	3%
Marked Chinook	7%	9%	9%	6%	9%	5%

Sea lion Predation Summary

In general, within the Columbia River Basin, the interaction between CSL and-or SSL and at-risk fish species is currently occurring over an 11 month period. The specific timing of the interaction varies depending on the location, species, and year.

Minimum estimates of CSL have ranged from 67-195 at Bonneville Dam and 27-41 at Willamette Falls during the last 5 years. The minimum estimates of SSL abundance has ranged from 54-69 at Bonneville Dam and 1-11 at Willamette Falls during the last 5 years.

The number of sea lions within the geographic scope of the June 13, 2019, application that are not accounted for at Bonneville Dam and Willamette Falls is likely less than 50. Thus, the estimated minimum number of sea lions within the geographical scope of the June 13, 2019, application is 144-286 CSL and 105-130 SSL.

The data collected at Bonneville Dam and Willamette Falls have established the severity of the predation impact that sea lions can have on at-risk fish species at these pinch points (Table 1-1, Table 1-2, and Table 1-3). It is important to note that estimates of predation at these two locations are minimum estimates because they apply only to daylight predation at the surface of the water within a quarter to half-mile area of the river, respectively. Many more predation events occur at night or further downriver that the observers cannot see and thus do not record. For example, a recent study by Rub et al. (2019) suggests that the overall impact of pinniped predation on spring-run Chinook salmon occurring throughout the river is much higher than originally thought. Rub et al. (2019) estimated that non-harvest mortality of spring-run Chinook salmon varied from 20-44% between the mouth of the Columbia River and Bonneville Dam. Rub et al. (2019) attributed the majority of this mortality to pinniped predation. Using these

estimates and the CSL abundance data, Rub et al. calculated that the odds of survival for spring-run Chinook salmon decrease by 32% (95% CI: 6%-51% decrease) for every additional 467 sea lions present within the Columbia River.

1.3 Marine Mammal Protection Act Section 120

Section 120 (MMPA; 16 U.S.C. 1389, *et seq*.) allows the Secretary of Commerce, acting through the Assistant Administrator for Fisheries, and the West Coast Regional Administrator of NMFS, to authorize the intentional lethal taking of individually identifiable pinnipeds that are having a significant negative impact on the decline or recovery of salmonid species which have been listed as threatened or endangered species under the ESA, are approaching threatened species or endangered species status (as those terms are defined in that Act), or migrate through the Ballard Locks at Seattle, Washington.

Section 120(b)(1) establishes the criteria whereby a state may apply to the Secretary requesting authorization for the intentional lethal taking of individually identifiable pinnipeds which are having a significant negative impact on the decline or recovery of salmonid species. Section 120(b)(2) requires that any such application shall include a means of identifying the individual pinniped or pinnipeds, and shall include a detailed description of the problem interaction and expected benefits of the taking.

Section 120(c)(1) requires the Secretary to determine whether an application has produced sufficient evidence to warrant establishing a Pinniped-Fishery Interaction Task Force (Task Force).

1.4 Marine Mammal Protection Act Section 120(f)

Public Law 115-329, the Endangered Salmon Predation Prevention Act of 2018, amended Public Law 103-238, the MMPA Amendments of 1994, by replacing section 120(f) of the MMPA with a new subsection (f). Section 120(f) of the MMPA authorizes the intentional lethal taking of sea lions, for the purpose of protecting species of salmon, steelhead, or eulachon that are listed as endangered species or threatened species under the ESA, and for species of lamprey or sturgeon that are not so listed as endangered or threatened but are listed as a species of concern; in the mainstem of the Columbia River from river mile 112 (I-205 bridge) to river mile 292 (McNary Dam), or in any tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead is deemed to be having a significant negative impact, within the meaning of subsection (b)(1). The 2018 Amendments also included additional eligible entities[3] not identified in section 120(b)(1), that may apply for authorization to intentionally take, by lethal methods, sea lions present within the geographic area established in section 120(f).

[3] The Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation; and the section 120(f)(6)(D) Committee. The 120(f)(6)(D) Committee fulfills the requirements for an eligible entity under section 120(f)(6)(A)(iii) of the MMPA. Pursuant to this section of the statute, the Committee members include the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Grand Ronde Community, and the Confederated Tribes of the Siletz Indians of Oregon.

For the purposes of an application submitted under section 120(f) of the MMPA, sea lions present within the geographic area established in section 120(f) are deemed to be individually identifiable and to be having a significant negative impact, within the meaning of section 120(b)(1), as defined by section 120(f)(7) and (8) (MMPA; 16 U.S.C. 1389(f)(7) and (8)). As such, and even though an application submitted under section 120(f) is still required to provide a detailed description of the problem interaction and the expected benefits of the taking, an eligible entity is not required to include in their application a means of identifying the individual sea lion or sea lions, or demonstrate that the sea lion predation impacts are having a significant negative impact on the decline or recovery of the above-mentioned at-risk fish species, within the meaning of section 120(b)(1).

Section 120(f)(2)(C) requires the Secretary to establish procedures to coordinate issuance of permits [authorizations] under this subsection, including application procedures and timelines, delegation and revocation of permits to and between eligible entities, monitoring, periodic review, and geographic, seasonal take, and species-specific considerations.

Pursuant to section 120(f)(2)(C), on June 4, 2019, NMFS, WCR, issued a Decision Memorandum establishing application requirements and program implementation procedures for prospective and approved authorizations issued to an eligible entity under section 120(f). The June 4, 2019, Decision Memorandum fulfilled the statutory requirement that the Secretary establish procedures to coordinate issuance of permits [authorizations] pursuant to section 120(f). Taken together, NMFS will continue to rely on existing timelines, procedures, considerations, and information requirements in sections 120(b), 120(c), 120(e), and 120(i), to assist the Task Force with its deliberations and recommendation, and for the Secretary to make a decision to approve or deny an application.

Section 120(f)(1) prohibits NMFS from authorizing the lethal removal of pinnipeds listed under the ESA or those that are designated under the MMPA as depleted or a strategic stock. Prospective authorizations apply only to sea lions that are not listed under the ESA, or designated as a depleted or strategic stock under the MMPA. California sea lions and SSL are not listed under the ESA, nor are they designated as a depleted or strategic stock under the MMPA.

Pursuant to section 120(f), an eligible entity may request authorization to lethally remove sea lions, and the Regional Administrator is required to: (1) review the application to determine whether the applicant has produced sufficient evidence to warrant establishing a Task Force to address the situation described in the application; (2) publish a notice in the *Federal Register* requesting public comment on the application, if sufficient evidence has been produced; (3) establish and convene a Task Force; (4) consider any recommendations made by the Task Force in making a determination whether to approve or deny the application; and (5) if approved, immediately take steps to implement the intentional lethal taking, which shall be performed by agencies or qualified individuals described in section 120(c)(4), or by individuals employed by the eligible entities described in section 120(f)(6).

Section 120(c)(2) requires the Task Force be composed of the following: (1) employees of the Department of Commerce, (2) scientists who are knowledgeable about the pinniped interaction, (3) representatives of affected conservation and fishing community organizations, (4) Indian

Treaty tribes, (5) the states, and (6) such other organizations as NMFS deems appropriate. The Task Force reviews the application, and public comments and, as required by section 120(c), recommends to NMFS whether to approve or deny the application. The Task Force is also required to submit with its recommendation a description of the specific pinniped individual or individuals; the proposed location, time, and method of such taking; criteria for evaluating the success of the action; the duration of the intentional lethal taking authority; and a suggestion for non-lethal alternatives, if available and practicable, including a recommended course of action.

On June 13, 2019, the eligible entities submitted an application the NMFS requesting authority to intentionally take, by lethal methods, sea lions in accordance with section 120(f) of the MMPA. In their application, the eligible entities contend that the loss of at-risk fish species in the Columbia River Basin to sea lion predation is impacting the recovery of these at-risk fish species because it is an unmanaged source of mortality, while other sources of in-river mortality are actively managed and are stable or decreasing (e.g., through harvest reductions, fish passage and habitat improvements, and hatchery reform).

On June 18, 2019, NMFS determined that the eligible entities application provided sufficient evidence to warrant establishing a Task Force.

Public Comments

NMFS published the eligible entities MMPA section 120(f) application in the *Federal Register* on August 29, 2019, and accepted comments from the public for 60 days. *See* 84 FR 45730. We received 22,225 public comments, most of which were generic letters supporting (181) or opposing (21,756) the removal of CSL and SSL in the Columbia River Basin. Two hundred eighty-eight (288) comment letters stated no clear preference supporting or opposing the eligible entities application. Of the 22,225 comments submitted, we received three comment letters with substantive comments, from the Animal Welfare Institute, a joint comment letter from the Humane Society of the United States, the Humane Society Legislative Fund, and the Whale and Dolphin Conservation, and the Marine Mammal Commission (Commission). NMFS developed a Response to Comments document and made that document available on our website along with all of the relevant decision documents.

Task Force

In response to the eligible entities application and the requirements of the MMPA, on May 12, 2020 through May 14, 2020, NMFS convened the Task Force to evaluate the eligible entities application and to recommend whether NMFS should approve or deny the intentional lethal taking. Task Force meetings were open to the public. Three members of the public provided input. The Task Force considered criteria contained in section 120(d) and additional questions posed by NMFS in determining whether to recommend to NMFS to approve or deny of the eligible entities' application. The Task Force met for three days and provided its final report and recommendations to NMFS on July 14, 2020. The majority of Task Force members present at the meeting (16 of 22) recommended approving the eligible entities application requesting authorization for lethal removal with certain terms and conditions, two (2) Task Force members recommended denying the eligible entities application, one (1) Task Force member abstained, and three (3) Task Force members were intermittently absent and did not provide a

recommendation. The Task Force submitted its report and recommendations to NMFS on July 14, 2020, and it is incorporated herein by reference.

1.5 Proposed Action

NMFS proposes to partially approve the eligible entities' June 13, 2019, application requesting authorization under section 120(f) of the MMPA to intentionally take, by lethal methods, sea lions in the Columbia River Basin, under certain conditions, as recommended by the Task Force, and in accordance with the MMPA. NMFS' approval would include conditions recommended by the Task Force, e.g., non-lethal activities, annual limits. Therefore, under the proposed action NMFS would adopt the Task Force recommendations and approve the eligible entities' application; this approval would modify the eligible entities request. If approved, NMFS would issue a permit to the eligible entities to authorizing them to remove (place in captivity or kill) sea lions in the main stem of the Columbia River between river mile 112 (I-205 bridge) and river mile 292 (McNary Dam), or in any tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead. These conditions are described in more detail in Section 2, under Alternative 2 and Alternative 3. The proposed action also includes any funding, permitting, or support by NMFS of active lethal and non-lethal activities, e.g., trapping, capture, etc., of sea lions in the Columbia River under section 120(f) and 109(h) of the MMPA[4]. BPA proposes to provide funding to the states and CRITFC for a sea lion barge and transfer cages (and related equipment), and to fund CRITFC's for trapping and handling activities associated with the proposed action.

1.6 Purpose and Need for the Proposed Action

Sea lion predation on at-risk fish species in the Columbia River Basin is well documented (section 1.1.1). To reduce this predation, the eligible entities applied to intentionally take, by lethal methods, sea lions pursuant to section 120(f) of the MMPA. The purpose of the application is to improve adult salmon and steelhead survival and recovery by reducing sea lion predation in the Columbia River Basin, consistent with the MMPA and in consideration of the Task Force recommendations. The purpose and need for NMFS's proposed action is that NMFS must approve or deny the eligible entities' application, as prescribed in the MMPA sections 120(f)(2)(B) and 120(c)(4).

BPA needs to determine whether to provide funding to the states and CRITFC for a sea lion barge and transfer cages (and related equipment), and to fund CRITFC for trapping and handling activities associated with the proposed action.

[4] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

2. ALTERNATIVES

2.1 Introduction

NMFS evaluated three alternatives, including the proposed action. These three alternatives are outlined here and further analyzed in this EA. Alternatives that were outside the scope of the purpose and need for the action or did not meet all or most of the criteria are discussed briefly as alternatives considered but not analyzed in further detail in subsection 2.3.

2.1.1 Action Area

The proposed action would be implemented in the main stem of the Columbia River between river mile 112 (I-205 bridge) and river mile 292 (McNary Dam), or in any tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead (Figure 2-1). Most (greater than 95%) of activities will take place in/on/over the water. There would be few ground-based activities, e.g., launching boats on boat ramps, loading sea lions onto vehicles, etc., associated with the proposed action.

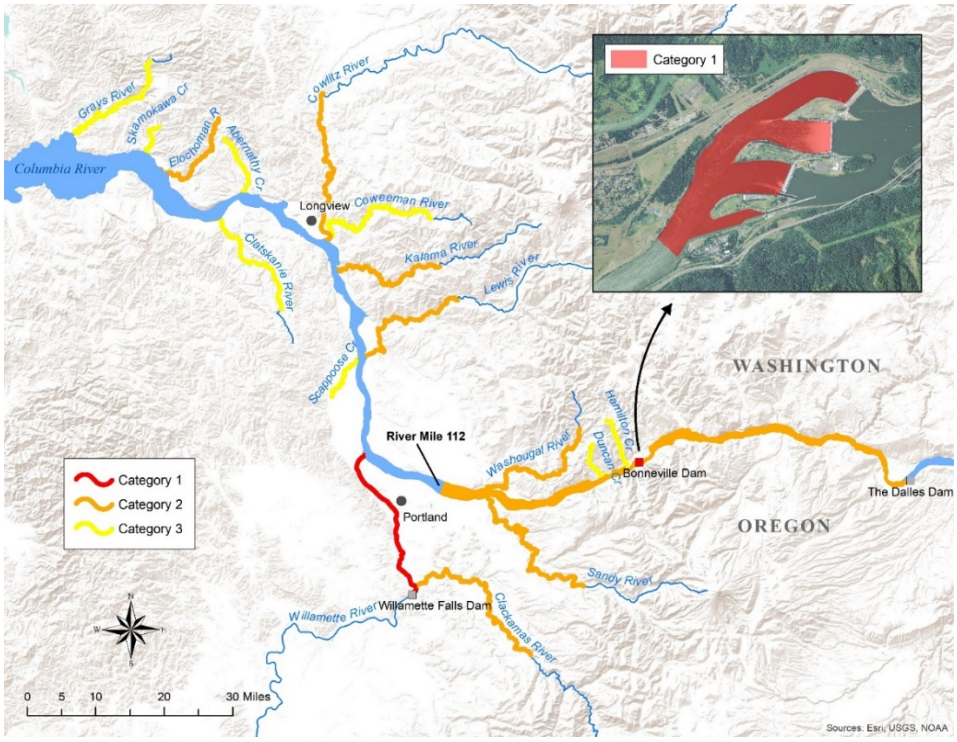

Figure 2-1. Map of proposed sea lion management areas. Category 1 includes areas that currently have high numbers of sea lions (greater than 20) that are often present for the majority of the year. Category 2 includes areas that currently have low to moderate numbers of sea lions (less than 10) that are present only periodically. Category 3 includes areas where sea lions have not been officially documented but contain spawning habitat for ESA-listed salmonids, or have intermittent sea lion presence.

2.1.2 MMPA Requirements

MMPA section 120(a)-(e) allows a state to apply for authorization of "intentional lethal taking of individually identifiable pinnipeds which are having a significant negative impact on the decline or recovery of salmonid species." In 2018, Congress amended the MMPA, adding new authority in section 120(f) for NMFS to issue a permit to an "eligible entity" for lethal removal of pinnipeds for the purpose of protecting at-risk fish species. The following discussion describes NMFS' application of this MMPA language in the context of the facts in the Columbia River Basin.

> Public Law 115-329, the Endangered Salmon Predation Prevention Act of 2018, amended Public Law 103-238, the MMPA Amendments of 1994, by replacing section 120(f): California sea lions and Pacific harbor seals; investigation and report, with a new section 120(f): Temporary Marine Mammal Removal Authority on the Waters of the Columbia River or its Tributaries.
>
> Under the new 120(f), sea lions within a defined area are deemed to be individually identifiable and having a significant negative impact on at-risk fish species. The 2018 Amendments also included additional eligible entities[5] that may apply for authorization to intentionally take, by lethal methods, sea lions present within the area established in section 120(f). Therefore, for the purposes of this application, a sea lion or sea lions present within the area established in section 120(f) are deemed to be individually identifiable and to be having a significant negative impact, as defined by section 120(f)(7) and (8) (MMPA; 16 U.S.C. 1389(f)(7) and (8)). As such, and even though an application submitted under section 120(f) is still required to provide a detailed description of the problem interaction (or future potential interaction) and the expected benefits of the taking, an eligible entity is not required to include in their application a means of identifying the individual sea lion or sea lions, or demonstrate that the sea lion predation impacts are having a significant negative impact on the decline or recovery of the above-mentioned at-risk fish species, within the meaning of section 120(b)(1).

Additionally, Public Law 115-329 amending section 120(f) where it required the Secretary, and by delegation, the NMFS to establish procedures to coordinate issuance of authorizations under section 120(f)(2)(C):

> The Secretary shall establish procedures to coordinate issuance of permits

[5] The Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation; and the section 120(f)(6)(D) Committee. The 120(f)(6)(D) Committee fulfills the requirements for an eligible entity under section 120(f)(6)(A)(iii) of the MMPA. Pursuant to this section of the statute, the Committee members include the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Grand Ronde Community, and the Confederated Tribes of the Siletz Indians of Oregon.

> under this subsection, including application procedures and timelines, delegation and revocation of permits to and between eligible entities, monitoring, periodic review, and geographic, seasonal take, and species-specific considerations.

On June 4, 2019, NMFS issued a Decision Memorandum:

> Procedures to Coordinate Issuance of Section 120, subsection (f) Permits of the Marine Mammal Protection Act establishing procedures for the issuance of authorizations pursuant to section 120(f) of the MMPA.

NMFS also considered the requirements in Section 120(d) of the MMPA in determining whether the state's application should be approved or denied. These criteria include an evaluation of four factors. These include:

> (a) Population trends, feeding habits, the location of the pinniped interaction, how and when the interaction occurs, and how many individual pinnipeds are involved;
> (b) Past efforts to nonlethally deter such pinnipeds, and whether the applicant has demonstrated that no feasible and prudent alternatives exist and that the applicant has taken all reasonable nonlethal steps without success;
> (c) The extent to which such pinnipeds are causing undue injury or impact to, or imbalance with, other species in the ecosystem, including fish populations; and
> (d) The extent to which such pinnipeds are exhibiting behavior that presents an ongoing threat to public safety.

Additionally, NMFS relied on the requirements in Section 120(f)(1) of the MMPA regarding limitations where the Secretary shall not approve the intentional lethal taking of sea lions. These limitations include:

> (a) a species or stock that is listed as a threatened or endangered species under the ESA
> (b) depleted under this Act [MMPA]
> (c) a strategic stock

2.2 Alternatives

NMFS evaluated three alternatives, including the proposed action of partially approving the 2019 application. These three alternatives are outlined here and further analyzed in this EA.

2.2.1 Alternative 1 – No Action

Under the No-Action Alternative, NMFS would deny the eligible entities request for lethal removal authority of CSL and SSL in the action area. If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations

(Bonneville Dam and Willamette Falls), and section 109(h) [6] authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. The existing section 120[7] MMPA authorizations are set to expire on June 28, 2021, for Bonneville Dam and on November 14, 2023, for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

2.2.2 Alternative 2 – Lethal and Non-Lethal Removal of Sea Lions

Under Alternative 2, NMFS would grant the eligible entities' request for lethal removal authority[8] of CSL and SSL with the conditions proposed in the application. The eligible entities' would kill sea lions captured in a trap via lethal injection or captive bolt, or would transfer healthy sea lions to zoos or aquaria, if available. Where trapping of sea lions is not feasible due to environmental or behavioral constraints, sea lions may be darted to facilitate capture and removal. The methods and protocols for darting and removal of free-ranging sea lions would be developed and approved by NMFS and an Institutional Animal Care and Use Committee (IACUC) prior to implementation. Annually, NMFS and the IACUC would evaluate the darting, capture, and removal of free-ranging sea lions, the methods and protocols, and determine if they need to be modified or discontinued.

This alternative would allow between 144-286 CSL and 105-130 SSL to be removed (killed or transferred) over the 5-year authorization.

The current population estimate for California sea lions is 257,606 (Carretta et al. 2019). For CSL, the potential biological removal (PBR) level is 14,011 animals annually (Carretta et al. 2019). The removal of up to 286 animals from the CSL population would have no effect on the overall range-wide abundance, distribution, and productivity of the CSL population because the number of animals removed is extremely small compared to the current number of animals that can be removed from the population (PBR) without affecting its status with respect to its optimal sustainable population (OSP[9]).

[6] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

[7] The states of Oregon, Washington, and Idaho have an existing MMPA section 120 authorization to remove California sea lions at Bonneville Dam, and the state of Oregon has an existing MMPA section 120 authorization to remove California sea lions at Willamette Falls.

[8] Under this alternative, NMFS may fund, permit, engage in, or otherwise support active lethal actions to manage CSL predation at Willamette Falls.

[9] OSP is defined by the MMPA section 3(9) …with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element. (16 U.S.C. 1362(3)(9)). NMFS' regulations (50 CFR 216.3) clarify the definition of OSP as a population size which falls within a range from the population level of a given species or stock that is the largest supportable within the ecosystem (K) to Maximum Net Productivity Level (MNPL). MNPL is defined as is population size expected to produce the greatest

The current population estimate for SSL is 52,139 non-pups and 19,423 pups (Muto et al. 2019). For SSL, PBR is 2,498 animals annually (Muto et al. 2019). The removal of up to 130 animals from the SSL population would have no effect on the overall range-wide abundance, distribution, and productivity of the SSL population because the number of animals removed is extremely small compared to the current number of animals that can be removed from the population (PBR) without affecting its status with respect to OSP[10].

2.2.2.1 Capture, Handling, and Disposal of Sea Lions

Under Alternative 2, sea lions would be captured using two methods: floating deck traps and-or darting of free ranging animals.

The capture, transport, holding, and euthanasia protocols would be subject to the review and approval of the IACUC. The removal program would be implemented such that areas of highest sea lion occupancy are prioritized for removal sea lions. However, this prioritization is not intended to prevent eligible entities from removing animals in mid and lower priority areas before the problem is fully addressed in higher priority areas. This approach is intended to address the areas of highest conservation concern first, while reducing the largest source populations of animals that can disperse to other locations, but retain the flexibility to proactively remove sea lions that appear to be habituating to a location outside these high priority areas.

The primary capture sites would be within the vicinity of Bonneville Dam and Willamette Falls (areas identified as Category 1). At these sites, the eligible entities would use 2-8 traps per site. The traps at Bonneville Dam would be maintained during the spring and fall (up to three months during each season), though this period may be modified/extended based on animal behavior and available resources. The traps near Willamette Falls would be maintained year-round and animals may be captured and removed at any time.

Secondarily, capture of sea lions in areas identified as Category 2 would be dependent on animal behavior and staffing availability, but may occur at any time of year when animals are present. Animals at these sites would be captured using 1-2 traps, if conditions are favorable, or by live capture of free ranging animals using established wildlife darting techniques.

Third, capture of sea lions in areas identified as Category 3 would be dependent on animal behavior such that trapping at the above sites (areas identified as Category 2) is no longer successful, or should animals begin to habituate at these locations. The eligible entities would use the most efficient method of those described above to capture animals at these sites.

net annual increment (increase) in population numbers resulting from additions due to reproduction less losses due to natural mortality.

[10] Because the counts of eastern Steller sea lions have steadily increased over a 30+ year period, Muto *et al*. (2017) conclude that the stock is likely within its OSP; however, no official determination of its status relative to OSP has been made.

Floating Deck Traps

Floating traps have been the primary tool used by ODFW and WDFW to capture CSL for lethal removal at Bonneville Dam and Willamette Falls[11]. The states currently have four authorized floating traps near Bonneville Dam, and two authorized floating traps[12] near Willamette Falls. Therefore, at Bonneville Dam and Willamette Falls the eligible entities may add additional traps, but if they were to, they would add 2 to 4 traps at Bonneville Dam for a total of up to eight traps, and one trap at Willamette Falls for a total of up to three traps.

In areas identified as Category 1, the eligible entities would capture and remove sea lions by trapping, by live capture of free ranging sea lions using established wildlife darting techniques, or both. Total number of new traps proposed at Bonneville Dam would be 1 to 4. The eligible entities do not have plans to add additional traps at Willamette Falls, but if they were to, they would add one more trap at this location. This trap would be built on the existing walkway. Therefore, there would be no additional over-water infrastructure in the Willamette River.

In areas identified as Category 2 and Category 3, the eligible entities would capture and remove sea lions by trapping, by live capture of free ranging sea lions using established wildlife darting techniques, or both. Total number of new traps proposed in areas identified as Category 2 and Category 3 would be 1 to 2.

Basic Trapping/Transfer Equipment Description

Float Deck. The foundation of the trap is a floating deck of metal or wood. The trap deck generally floats 1-2 feet above the waterline, providing ready access to the flat surface used by sea lions as a resting area. Some early trap versions consisted of steel deck plates mounted atop a single large (battleship) buoy. The buoy provided ample flotation and was moored to the bottom by chains and submerged weights, usually concrete blocks. More recent trap deck systems consist of a sturdy wood deck mounted over commercially available black plastic float blocks used in the construction of marina docks where boats are moored. In this case, the sea lion trap deck surface is not much different than an enlarged section of a commercial grade dock. This type of trap float may also be moored to the bottom or it may be lashed to an adjacent dock or other nearby surface already being used by sea lions as a resting location. The size of the trap deck has varied, but recent deployments have used a 16x16 or 20x20 foot base float.

Trap Walls. The four trap walls, usually 7-8 feet in height, have primarily consisted of heavy

[11] All equipment and methods currently in use have been reviewed and approved by the Columbia River Predatory California Sea Lion Removal Project Institutional Animal Care and Use Committee (IACUC) established to oversee these activities with respect to the federal Animal Welfare Act of 1966 (7 U.S.C. 2131).

[12] The state operates the floating traps under their MMPA section 109(h) authority.

duty wire chain-link mesh. Recently, the more commonly available and less expensive chain-link fencing material has been mounted to sturdy wall frames made of heavy galvanized pipe, the type typically used in commercial fence construction. In either case, the trap walls are attached to heavier cylindrical upright corner posts using typical chain link fence clamping devices. The base plates of the four heavy corner posts are lag bolted to the deck surface. The chain-link trap walls are typically installed on custom built float but can also be installed on an existing dock or deck where a sea lion regularly hauls out to rest. This approach may be used to capture animals that have already habituated to haul out at a location and where a custom trap is not needed.

Trap Doors. Each trap has two doors (also mesh or chain link construction), one large vertically sliding door in the front wall, and one small door in the rear wall. The small door at the rear (usually about 4x4 feet) is kept closed (tied shut) while the trap is set. The large front door is held open (up) by different methods (pull-pin, electromagnet) as best fits each specific capture operation), allowing sea lions to enter and rest on the trap floor. In general, the trap door design includes safeguards to avoid accidental closure of the trap while animals are present.

Handling Barge and Cages. A sea lion handling barge is used to facilitate transfer of animals from the trap to a land based facility. These barges are generally 10x30 feet with a wooden deck surface mounted over a frame and pontoons that provide adequate floatation. The deck of each barge is fitted with one or two transfer cages and, when needed, a squeeze cage. Transfer cages are usually about 4x4x6-7 feet and have an aluminum frame with wooden slat sides and top, vertically sliding doors at each end, and is used to hold animals moved from the trap onto the barge, weigh them (if a platform scale is used under the cage), and move them into the squeeze cage. The steel or aluminum squeeze cage is custom built (various sizes and construction materials) and is designed to lower its sides of spaced bars down on top of a prone sea lion to restrain the animal for a variety of purposes (measuring, tagging, marking, biological sampling, etc.).

Basic Trapping Operation

Trap Placement. Trapping projects may involve the use of a single trap at one location, the use of multiple traps at separate locations within a project area, or the use of a trap array with multiple traps arranged together side by side. Traps may be moored to the bottom with weights or anchors or they may be secured to adjacent structures or shore. Traps that are secured to one another must still be moored with lines to the bottom or to other structures. Caution is used to avoid having loose lines or chains in exposed places where sea lions may become entangled, and any potentially hazardous lines or anchors would be clearly marked to prevent collisions or injury by boats or vessels. Traps are marked with lights when deployed in navigable waters. Barriers may be erected to prevent animals from hauling out in the narrow spaces between traps that are moored together if two or more traps are used.

Trap Preparation and Operation. When stored for long periods between dedicated trapping operations, both trap doors are shut and secured. During trapping seasons, when trapping is not expected to occur within about 24 hours, the small rear door is tied closed with line and the front

door is secured in the open position with heavy chain and a keyed padlock. In anticipation of trapping animals sometime in the coming 24-hour period, traps equipped with electromagnetic door releases are unlocked and set in the open position. Traps that use a remote release electromagnetic door closing system may be equipped with a sensing device that detects and reports (via a cell phone text message) if the trap door has closed unintentionally. If such an event occurs then traps would be checked as soon as possible following receipt of closed door message.

Trapping operations may take place any time of the day or night, depending primarily on the behavior of the animals in a particular area and when they choose to use the trap float as a resting area. Night vision and remote camera equipment is used to observe the trap prior to closing. To capture the sea lions resting inside the trap, the front vertically sliding door is dropped to the trap deck surface. This may be accomplished in several ways, including remotely with an electronic release or rushing the door in a small boat to manually release the door. Traps equipped with an electromagnet mounted on the top of the door holding the door open (up) use a remote triggering device (similar to a garage door opener) to interrupt the electrical circuit which deactivates the magnet allowing the door to fall vertically, closing under its own weight.

Handling Trapped Sea Lions. The handling methods would vary depending on location, number of animals, species, and animal behavior. In general animals would be transferred to an on land facility for euthanasia, though in limited instances they may instead be euthanized on trap then transferred to land.

Transfer to on land facility. As soon as possible following the closing of the trap door, the trap is approached by boat and the door of the transfer cage (on the handling barge) is aligned with the small door on the back of the trap. Once the barge is secured to the trap, the small door in the rear wall of the trap is opened, followed by the opening of the vertically sliding door of the transfer cage mated up with the back of the trap. Other doors in the transfer cages on the barge may be opened at this time to facilitate the movement of sea lions forward. Usually up to 4-6 sea lions can be moved onto the barge at once. If an animal is too large or otherwise poses a safety risk to staff it may be immobilized using anesthetic to facilitate transfer. If more animals were trapped than can be transferred, the remaining animals would either be released, held temporarily until they can be transferred, or immobilized using anesthesia then euthanized on the trap.

Euthanasia on trap. In some cases, animals may be euthanized on trap following the IACUC approved protocols. For example, SSL in excess of 1,500 pounds pose a safety risk to staff and therefore may be immobilized using anesthesia in the trap and euthanized under anesthesia.

Basic Darting Description

Darting. Where trapping of animals is not feasible due to environmental or behavioral constraints animals may be darted to facilitate capture. The animal would be darted using standard wildlife darting equipment. When an animal is in the water or is likely to enter the water following darting it would only be darted if the capture crew members believe the setting or

situation allows a reasonable probability of recovery of the anesthetized animal for handling and processing. This latter scenario is most likely to occur if an animal is foraging in smaller tributary rivers and does not haul out. If animals do enter the water upon darting or are already in the water at the time of darting it would be followed and seine or tangle nets, hoop or gaff would be used to recover the anesthetized animal. Animals would be administered approved drugs remotely to cause sedation and euthanasia by chemical overdose. Drugs would be administered by a veterinarian and the deployed dart would include an acoustic or radio transmitter to aid in tracking and recovering the animal, and recovery of the dart once deployed. Darts would include appropriate agency contact information and warnings in the event the dart or animal is located by a member of the public. Anesthetized or deceased animals, may be secured to the vessel via straps or a pole noose system for transfer to land for processing. Anesthetized animals may be euthanized boat side following IACUC approved procedures. Any darting operation would be evaluated by the IACUC post occurrence to determine whether the methodology should be modified or discontinued.

Moving or transporting sea lions on land. Animals are transferred to a transport truck either by lifting the entire transfer cage with an animal inside onto a truck by crane or transferring individual animals from the barge transfer cage to a second truck mounted cage at a boat launch or access site. To reduce stress during transport, visual barriers are placed around the sides of the transfer cage to limit the animal's view. The top of the cage remains open without a barrier to allow an adequate flow of air through the cage.

Collection of biological samples. Following euthanasia, the eligible entities on a case-by-case basis would collect biological samples for research purposes.

Disposal of Sea Lion Carcasses

Disposal: Following euthanasia, the eligible entities would dispose of sea lion carcasses in accordance with applicable laws. If requested by a tribe that is party to this application and approved by NMFS, carcasses may be provided to the requesting tribe for educational and cultural use. If a sea lion carcass is not requested for educational and cultural use, the eligible entities would dispose of the sea lion carcasses in accordance with applicable laws.

2.2.3 Alternative 3 –Lethal and Non-Lethal Removal of Sea Lions and Modified Task Force Recommendations (Proposed Action)

Alternative 3 is NMFS' preferred alternative and proposed action. Under Alternative 3, NMFS would partially grant the eligible entities' request for lethal removal authority, the same as Alternative 2, except for the inclusion of conditions based on recommendations from the Task Force. BPA proposes to provide funding to the states and CRITFC for a sea lion barge and transfer cages (and related equipment), and to fund CRITFC trapping and handling activities associated with the proposed action.

Under Alternative 3, NMFS would partially grant the eligible entities' request, with modifications, for lethal removal authority[13] of CSL and SSL. The eligible entities' would kill sea lions captured in a trap via lethal injection or captive bolt, and would involve the transfer of healthy sea lions to zoos or aquaria, if available. Where trapping of sea lions is not feasible due to environmental or behavioral constraints, sea lions may be darted to facilitate capture and removal. The methods and protocols for darting and removal of free-ranging sea lions shall be developed and approved by NMFS and the IACUC prior to implementation. Annually, the IACUC shall evaluate the darting, capture, and removal of free-ranging sea lions, the methods and protocols, and determine if they need to be modified or discontinued.

This alternative would allow up 540 CSL and 176 SSL (Task Force recommendation) to be removed over a 5-year period. The current population estimate for CSL is 257,606 (Carretta et al. 2019). For CSL, PBR is 14,011 animals annually (Carretta et al. 2019). The removal of up to 540 animals from the CSL population would have no effect on the overall range-wide abundance, distribution, and productivity of the CSL population because the number of animals removed is extremely small compared to the current number of animals that can be removed from the population (PBR) without affecting its status with respect to its OSP[14].

The current population estimate for SSL is 52,139 non-pups and 19,423 pups (Muto et al. 2019). For SSL, PBR is 2,498 animals annually (Muto et al. 2019). The removal of up to 176 animals from the SSL population would have no effect on the overall range-wide abundance, distribution, and productivity of the SSL population because the number of animals removed is extremely small compared to the current number of animals that can be removed from the population (PBR) without affecting its status with respect to OSP[15].

NMFS Adoption of Task Force Recommendations

At the May 12-14, 2020, Task Force meeting, NMFS requested that the Task Force respond to the following questions when preparing its recommendations. The following is a summary of the Task Force recommendations, the level of support for each recommendation by the Task Force as permit terms and conditions, and NMFS' response regarding whether to adopt the

[13] Under this alternative, NMFS may fund, permit, engage in, or otherwise support active lethal actions to manage CSL predation at Willamette Falls.

[14] OSP is defined by the MMPA section 3(9) …with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element. (16 U.S.C. 1362(3)(9)). NMFS' regulations (50 CFR 216.3) clarify the definition of OSP as a population size which falls within a range from the population level of a given species or stock that is the largest supportable within the ecosystem (K) to Maximum Net Productivity Level (MNPL). MNPL is defined as is population size expected to produce the greatest net annual increment (increase) in population numbers resulting from additions due to reproduction less losses due to natural mortality.

[15] Because the counts of eastern Steller sea lions have steadily increased over a 30+ year period, Muto *et al*. (2017) conclude that the stock is likely within its OSP; however, no official determination of its status relative to OSP has been made.

recommendations as part of the proposed permit. NMFS proposes to adopt 24 of the 26 Task Force recommendations either as mandatory terms and conditions or as recommendations. NMFS does not propose adopting Task Force recommendation 5a, but proposes to modify the recommendation to align with the range of SSL identified in the application regarding the problem interaction and expected benefits. NMFS also does not propose adopting Task Force recommendation 6c, as explained below . NMFS would adopt Task Force recommendations 1b, 2a, 6b, 7a, 7c, 8b, 9a, 10a, 10b, 10c, and 11b as recommendations but not mandatory permit conditions. All remaining recommendations would be adopted as terms and conditions.

1. What, if any, non-lethal measures does the Task Force recommend in areas identified as Category 1 and Category 2 to displace and-or minimize sea lion predation in salmon/steelhead "hot spots?"

Recommendations:

1a. Allow authorized lethal removal of CSL and SSL without non-lethal measures requirements in Category 1 and 2 areas (16 yes, 2 no, 1 abstain)

NMFS' response: Adopted; mandatory.

1b. Encourage staff to consider using non-lethal measures that may be appropriate for application at these sites (17 yes, 0 no, 2 abstain)

NMFS' response: Adopted, recommendation.

2. What, if any, non-lethal measures does the Task Force recommend in areas identified as Category 3[16] to preclude the establishment of sea lions?

Recommendations:

2a. Maintain the flexibility of the applicants to consider the use of non-lethal methods including reducing the use of manmade haul outs in Category 3 where practical (18 yes, 1 no, 0 abstain)

NMFS' response: Adopted; recommendation.

2b. Allow authorized lethal removal of CSL and SSL without non-lethal measures requirements in Category 3 areas (17 yes, 2 no, 0 abstain)

NMFS' response: Adopted; mandatory.

[16] Category 3 includes areas where sea lions have not been officially documented but contain spawning habitat for salmon and steelhead, or have documented presence that managers are monitoring but do not deem a conservation risk at present.

3. What methods and operating procedures does the Task Force recommend regarding the capture, removal, etc., of sea lions in areas identified as Category 2 and Category 3?

Recommendations:

3a. Support current or proposed methods and criteria in the application for capture and removal of sea lions (17 yes, 2 no, 0 abstain)

NMFS' response: Adopted; mandatory.

3b. Consider maintaining flexibility for applicants to apply other methods for capture and removal that have been approved by IACUC and NMFS (17 yes, 2 no, 0 abstain)

NMFS' response: Adopted; mandatory.

4. What criteria does the Task Force recommend regarding the use of wildlife darting techniques, for in-water retrieval, capture and handling of sea lions?

Recommendations:

4a. Applicants to consider improving proposed methods in the application regarding the use of wildlife darting techniques and methods for in water retrieval, capture, and handling of sea lions (17 yes, 0 no, 2 abstain)

NMFS' response: Adopted; mandatory.

5. What criteria and-or metrics does the Task Force recommend regarding the proposed locations, timing, numbers, limitations, methods, and duration of sea lion takings?

Recommendations:

5a. Limit the number of SSL removal to 300 over a five-year period. (17 yes, 2 no, 0 abstain)

NMFS' response: NMFS did not adopt Task Force recommendation 5a as is, but modified the recommendation from 300 SSL to 176 SSL to align with the range of SSL identified in the June 13, 2019, application regarding the problem interaction and expected benefits (mandatory).

5b. Limit the number of CSL removal to 540 over a five-year period. (16 yes, 3 no, 0 abstain)

NMFS' response: Adopted; mandatory.

5c. No restriction on the timing of take. (17 yes, 0 no, 2 abstain)

NMFS' response: Adopted; mandatory.

6. What methods, criteria and-or metrics does the Task Force recommend for evaluating the expected benefits of the taking of sea lions on at-risk fish stocks?
Recommendations:

6a. The monitoring requirements in the NOAA Fisheries procedures document, in addition to any recommendations from the Task Force that are adopted, an eligible entity that is authorized to remove sea lions under section 120(f) shall develop and implement a monitoring plan to evaluate: (1) the impacts of sea lion predation on at-risk fish stocks, and (2) the effectiveness of permanent removal of predatory sea lions as a method to reduce mortality on at-risk fish stocks. Furthermore, an eligible entity shall: a) monitor and report on the number of sea lions observed in the action area; b) report the number of sea lions removed in the action area; c) monitor and report on the number of prey observed (see footnote[17]) to have been taken by sea lions in the action area; d) monitor and report on key population parameters for at-risk fish stocks so that the effectiveness of permanent removal of predatory sea lions as a method to reduce or eliminate mortality on at-risk fish stocks can be evaluated as required in section 120(c)(5). (19 yes, 0 no, 0 abstain)

NMFS' response: Adopted (mandatory), even though, the monitoring requirements in the June 4, 2019, memorandum— Procedures to Coordinate Issuance of Section 120, subsection (f) Permits of the Marine Mammal Protection Act, are a requirement of any authorization issued pursuant to section 120(f) of the MMPA.

6b. In addition, we recommend necropsies be performed on each sea lion as it is not already incorporated in the document but is standard operating procedures to collect biological data (15 yes, 4 no, 0 abstain)

NMFS' response: Adopted; recommendation. NMFS proposes to not make this recommendation mandatory, as the eligible entities, under their existing MMPA section 120 authorizations, already perform necropsies on a subset of animals to collect biological data, and the eligible entities will continue to do so under any new permit. Furthermore, requiring the eligible entities to perform necropsies on 716 sea lions is likely beyond their capabilities, as necropsies are time-intensive and expensive.

[17] When predation impacts cannot be observed, an eligible entity shall use a bioenergetics model or equivalent method.

6c. In addition, we recommend that applicants to consider maintaining a minimum population of temporarily marked animals to understand turn over, replacement, etc. (3 yes, 16 no, 0 abstain)

NMFS' response: NMFS did not adopt Task Force recommendation 6c. A majority of Task Force members did not support this recommendation, and NMFS agrees that it would not further the purposes of MMPA section 120(f).

7. What type of pinniped-predation data does the Task Force recommend be collected in areas identified as Category 1 to evaluate the problem interaction?

Recommendations:

7a. Support NMFS efforts to monitor California, Oregon, and Washington SSL population size and trends to evaluate whether male removals are impacting population status (6 yes, 12 no, 1 abstain)

NMFS' response: Adopted; recommendation. Although a majority of Task Force members did not vote for this recommendation as a permit term and condition, NMFS is adopting it because some Task Force members, including those that did not support the recommendation as mandatory, thought it was a recommendation that would help achieve the goal of reducing/eliminating sea lion predation on at-risk fish stocks in the Columbia River Basin.

7b. The monitoring requirements in the NOAA Fisheries procedures document, in addition to any recommendations from the Task Force that are adopted, an eligible entity that is authorized to remove sea lions under section 120(f) shall develop and implement a monitoring plan to evaluate: (1) the impacts of sea lion predation on at-risk fish stocks, and (2) the effectiveness of permanent removal of predatory sea lions as a method to reduce mortality on at-risk fish stocks. Furthermore, an eligible entity shall: a) monitor and report on the number of sea lions observed in the action area; b) report the number of sea lions removed in the action area; c) monitor and report on the number of prey observed (see footnote 16) to have been taken by sea lions in the action area; d) monitor and report on key population parameters for at-risk fish stocks so that the effectiveness of permanent removal of predatory sea lions as a method to reduce or eliminate mortality on at-risk fish stocks can be evaluated as required in section 120(c)(5). (19 yes, 0 no, 0 abstain)

NMFS' response: Adopted (mandatory), even though, the monitoring requirements in the June 4, 2019, memorandum— Procedures to Coordinate Issuance of Section 120,

subsection (f) Permits of the Marine Mammal Protection Act, are a requirement of any authorization issued pursuant to section 120(f) of the MMPA.

7c. Suggestion to create a platform or a way to collect public input and observations on the problem interactions in Categories 2 and 3 (17 yes, 0 no, 2 abstain)

NMFS' response: Adopted; recommendation. NMFS proposes not to make this recommendation mandatory as the Task Force did not provide any specifics regarding public participation to provide input on problem interactions. Therefore, we think it is best for the eligible entities to develop a platform with the type of information they think will help provide useful information regarding observations of problem interactions.

8. What type of pinniped-predation data does the Task Force recommend be collected in areas identified as Category 2 and Category 3 to evaluate the problem interaction?

Recommendations:

8a. The monitoring requirements in the NOAA Fisheries procedures document, in addition to any recommendations from the Task Force that are adopted, an eligible entity that is authorized to remove sea lions under section 120(f) shall develop and implement a monitoring plan to evaluate: (1) the impacts of sea lion predation on at-risk fish stocks, and (2) the effectiveness of permanent removal of predatory sea lions as a method to reduce mortality on at-risk fish stocks. Furthermore, an eligible entity shall: a) monitor and report on the number of sea lions observed in the action area; b) report the number of sea lions removed in the action area; c) monitor and report on the number of prey observed (see footnote 16) to have been taken by sea lions in the action area; d) monitor and report on key population parameters for at-risk fish stocks so that the effectiveness of permanent removal of predatory sea lions as a method to reduce or eliminate mortality on at-risk fish stocks can be evaluated as required in section 120(c)(5). (19 yes, 0 no, 0 abstain)

NMFS' response: Adopted (mandatory), even though, the monitoring requirements in the June 4, 2019, memorandum—Procedures to Coordinate Issuance of Section 120, subsection (f) Permits of the Marine Mammal Protection Act, are a requirement of any authorization issued pursuant to section 120(f) of the MMPA.

8b. Suggestion to create a platform or a way to collect public input and observations on the problem interactions in Categories 2 and 3 (17 yes, 0 no, 2 abstain)

NMFS' response: Adopted; recommendation. NMFS proposes not to make this recommendation mandatory as the Task Force did not provide any specifics regarding public

participation to provide input on problem interactions. Therefore, we think it is best for the eligible entities to develop a platform with the type of information they think will help provide useful information regarding observations of problem interactions.

9. What criteria and-or metrics does the Task Force recommend be used to assess the effectiveness of the removal program (post-implementation evaluation)?

Recommendations:

9a. Conduct management strategy evaluation on performance of bioenergetic model (7 yes, 4 no, 8 abstain)

NMFS' response: Adopted; recommendation. NMFS proposes not to make this recommendation mandatory as the Task Force did not provide any specifics regarding a definition of a management strategy or the parameters needed to conduct such an evaluation. Furthermore, the eligible entities do update and re-parametrize the bioenergetics model as a part of their quality control and quality assurance practices.

9b. Conduct annual reporting of the run sizes and predation to access whether the program has resulted in improvements in extinction probability or run sizes (5 yes, 13 no, 1 abstain)

NMFS' response: Adopted; recommendation. Although a majority of Task Force members did not vote for this recommendation as a permit term and condition, NMFS is adopting it because some Task Force members, including those that did not support the recommendation as mandatory, thought it was a recommendation that would help achieve the goal of reducing/eliminating sea lion predation on at-risk fish stocks in the Columbia River Basin.

9c. The monitoring requirements in the NOAA Fisheries procedures document, in addition to any recommendations from the Task Force that are adopted, an eligible entity that is authorized to remove sea lions under section 120(f) shall develop and implement a monitoring plan to evaluate: (1) the impacts of sea lion predation on at-risk fish stocks, and (2) the effectiveness of permanent removal of predatory sea lions as a method to reduce mortality on at-risk fish stocks. Furthermore, an eligible entity shall: a) monitor and report on the number of sea lions observed in the action area; b) report the number of sea lions removed in the action area; c) monitor and report on the number of prey observed (see footnote 16) to have been taken by sea lions in the action area; d) monitor and report on key population parameters for at-risk fish stocks so that the effectiveness of permanent removal of predatory sea lions as a method to reduce or eliminate

mortality on at-risk fish stocks can be evaluated as required in section 120(c)(5). (19 yes, 0 no, 0 abstain)

NMFS' response: Adopted (mandatory), even though, the monitoring requirements in the June 4, 2019, memorandum— Procedures to Coordinate Issuance of Section 120, subsection (f) Permits of the Marine Mammal Protection Act, are a requirement of any authorization issued pursuant to section 120(f) of the MMPA.

10. What methods, criteria and-or metrics does the Task Force recommend regarding the development and implementation of a long-term management plan by the eligible entities to preclude naïve sea lions from becoming habituated predators in the 120(f) geographic area?

Recommendations:

10a. Consider setting up a program or another vehicle in coordination with NMFS that would support/help secure the funds needed for monitoring to evaluate success of the program (9 yes, 5 no, 5 abstain)

NMFS' response: Adopted; recommendation. NMFS proposes not to make this recommendation mandatory, as requiring the eligible entities and NMFS to appropriate funds outside of the legislative process would likely be beyond their authorities.

10b. Recommend looking at how many recruits we have after habituated animals are removed to understand effectiveness (6 yes, 10 no, 3 abstain)

NMFS' response: Adopted; recommendation. Although a majority of Task Force members did not vote for this recommendation as a permit term and condition, NMFS is adopting it because some Task Force members, including those that did not support the recommendation as mandatory, thought it was a recommendation that would help achieve the goal of reducing/eliminating sea lion predation on at-risk fish stocks in the Columbia River Basin.

10c. Recommend that haul outs in the Categories 1, 2, and 3 areas are limited to the extent possible (7 yes, 11 no, 1 abstain)

NMFS' response: Adopted; recommendation. Although a majority of Task Force members did not vote for this recommendation as a permit term and condition, NMFS is adopting it because some Task Force members, including those that did not support the recommendation as mandatory, thought it was a recommendation that would help achieve the goal of reducing/eliminating sea lion predation on at-risk fish stocks in the Columbia River Basin, just not something that the applicants should be required to do.

11. What actions does the Task Force recommend be implemented by the eligible entities to reduce the social transmission between habituated sea lions and naïve sea lions to minimize/eliminate future recruitment of naïve sea lions into the 120(f) geographic area?

Recommendations:

11a. It seems the most effective method is to get in early and be proactive with lethal removal to disrupt recruitment and habituation (16 yes, 2 no, 1 abstain)

NMFS' response: Adopted, mandatory.

11b. Recommend that haul outs in the Categories 1, 2, and 3 areas are limited to the extent possible (6 yes, 12 no, 1 abstain)

NMFS' response: Adopted; recommendation. Although a majority of Task Force members did not vote for this recommendation as a permit term and condition, NMFS is adopting it because some Task Force members, including those that did not support the recommendation as mandatory, thought it was a recommendation that would help achieve the goal of reducing/eliminating sea lion predation on at-risk fish stocks in the Columbia River Basin.

2.3 Alternatives Considered but Not Analyzed in Detail

Actions to Address the Decline or Recovery of Salmonids: Flood-Control/Hydropower, Harvest, Hatchery, and/or Habitat.

Public comments raised the concept of addressing other sources of salmon and steelhead mortality, such as changes in the flood-control/hydropower, habitat degradation, or fisheries harvest systems, as important to salmon and steelhead recovery. Information on components of a regional salmon and steelhead recovery framework were included in the June 13, 2019, application and were provided to the Task Force to provide a comprehensive context in which to consider sea lion predation. This EA does not analyze alternatives that include changes to flood-control/hydropower, habitat degradation, or fisheries harvest systems because actions to address the decline or recovery of salmon and steelhead, beyond the pinniped—fishery interaction, have been and continue to be addressed as directed by ESA recovery plans, for example harvest modifications and reductions, habitat restoration, modification to flood-control/hydropower dams and operations, and improvements in hatchery practices.

Moreover, while NMFS recognizes that other sources contribute to the mortality of ESA-listed salmon and steelhead in the Columbia River Basin (as discussed in Section 5, Cumulative Effects), it is clear from the statutory language that section 120(f) applies to sea lion predation on salmon and steelhead and does not require NMFS to take any affirmative steps to address other sources of salmon and steelhead mortality (e.g., flood-control/hydropower or fishery harvest). The eligible entities presented NMFS with a specific proposal, which is lethal removal of sea

lions that are having a significant negative impact[18] on the decline or recovery of at-risk fish species in the Columbia River Basin. Section 120(f) requires NMFS to consider the eligible entities' efforts to address fish mortality resulting from sea lion predation, not mortality from all sources. Consequently, NMFS determined that this alternative was outside the scope of the section 120(f) process, the purpose and need for the proposed action, and NMFS' and the eligible entities' authority, and therefore is not being analyzed in detail.

[18] As defined in section 120(f)(8) of the MMPA.

3. AFFECTED ENVIRONMENT

This section describes those resources which NMFS identified that may be affected by the proposed action and its alternatives, to the extent necessary to understand potential impacts. A description for each resource follows and provides the context for understanding potential effects of each alternative. Table 3-1 is a list of resources that NMFS identified that may be affected by the proposed action.

Table 3-1. Potentially affected environment resources identified in initial scoping for the proposed action.

	Affected Environment Resources
	Marine Mammals
	ESA-Listed Fishes – Salmonids and Eulachon and Designated Critical Habitat
	Non-Listed Fishes – Salmonids, White Sturgeon, Lamprey
	Fish Habitat
	Recreation
	Cultural Resources
	Law Enforcement

3.1 Introduction and Environmental Setting

Major tributaries to the Columbia River include the Snake, Willamette, Salmon, Flathead, and Yakima Rivers; smaller rivers include the Owyhee, Grande Ronde, Clearwater, Spokane, Methow, Cowlitz, and the John Day Rivers. The Snake River is the largest tributary at more than 1,000 miles long; its headwaters originate in Yellowstone National Park, Wyoming. The second largest tributary is the Willamette River in Oregon. The average annual discharge at the mouth of the Columbia River is 265,000 cubic feet per second (Kammerer 1990). A saltwater wedge extends 23 miles upstream of the mouth, with tidal influences extending to Bonneville Dam at river mile 146.5.

Land Use. Predominant human uses include logging, agriculture, ranching, hydroelectric power generation, mining, fishing, a variety of recreational activities, and urban uses. The decline of salmon runs in the Columbia River is attributed to loss of habitat, blocked migratory corridors, altered river flows, pollution, overharvest, and competition from hatchery fish. Critical ecological connectivity (mainstem to tributaries and riparian floodplains) has been disconnected by dams and associated activities such as floodplain deforestation and urbanization. The most productive floodplains of the watershed are either flooded by hydropower dams or dewatered by irrigation diversions. Portions of the basin are also subject to impacts from cattle grazing and irrigation withdrawals. In the Willamette River, riparian vegetation was greatly reduced by land conversion. By 1990, only 37 % of the riparian area within 120 meters was forested, 30% was agricultural fields and 16 % was urban or suburban lands.

Roughly 6% of the annual flow from the Columbia River is diverted for the irrigation of 7.3 million acres of croplands within the basin. The vast majority of these agricultural lands are located along the lower Columbia River, the Willamette, Hood, and Snake rivers, and the Columbia Plateau (Hinck et al. 2004).

Agriculture and ranching increased steadily within the Columbia River Basin from the mid to late 1800. By the early 1900s, agricultural opportunities began increasing at a much more rapid pace with the creation of more irrigation canals and the passage of the Reclamation Act of 1902 (NRC 2004). Today, agriculture represents the largest water user within the basin (>90%). Agricultural impacts to water quality within the basin are second to large-scale influences of hydromodification projects for both power generation and irrigation. Water quality impacts from agricultural activities include alteration of the natural temperature regime, insecticide and herbicide contamination, and increased suspended sediments.

Urban and Industrial Development. The largest urban area in the basin is the greater Portland metropolitan area. Portland's population exceeds 500,000, and the next largest cities Salem and Eugene, OR have over 100,000 people (Hinck et al. 2004). Overall, the basin's population density is one-third the national average, and while the basin covers about 8% of United States land, only about 1.2% of the United States population lives within the basin (Hinck et al. 2004).

Discharges from sewage treatment plants, paper manufacturing, and chemical and metal production represent the top three permitted sources of contaminants within the lower basin according to discharge volumes and concentrations (Rosetta and Borys 1996). Rosetta and Borys (1996) review of 1993 data indicate that 52% of the point source waste water discharge volume is from sewage treatment plants, 39% from paper and allied products, 5% from chemical and allied products, and 3% from primary metals. However, the paper and allied products industry are the primary sources of the suspended sediment load (71%). Additionally, 26% of the point source waste water discharge volume comes from sewage treatment plants and 1% is from the chemical and allied products industry. Nonpoint source discharges (urban stormwater runoff) account for significant pollutant loading to the lower basin, including most organics and over half of the metals. Although rural nonpoint sources contributions were not calculated, Rosetta and Borys (1996) surmised that in some areas and for some contaminants, rural areas may contribute a large portion of the nonpoint source discharge. This is particularly true for pesticide contamination in the upper river basin where agriculture is the predominant land use. Water quality has been reduced by phosphorus loads and decreased water clarity, primarily along the lower and middle sections of the Columbia River Estuary. Although sediment quality is generally very good, benthic indices have not been established within the estuary. Fish tissue contaminant loads (PCBs, DDT, DDD, DDE, and mercury) are high and present a persistent and long lasting effect on estuary biology. Health advisories have been recently issued for people eating fish in the area that contain high levels of dioxins, PCBs, and pesticides. Morace (2012) reported waste water treatment plant samples containing anthropogenic organic compounds, pharmaceuticals, polybrominated diphenyl ether (PBDEs [brominated flame-retardants]), organochlorine or legacy compounds, currently used pesticides, mercury, and estrogenicity.

Habitat Modification. The mainstem habitats of the lower Columbia and Willamette rivers have been reduced primarily to a single channel. As a result, floodplain area is reduced, off-channel habitat features have been eliminated or disconnected from the main channel, and the amount of large woody debris in the mainstem has been reduced. Remaining areas are affected by flow fluctuations associated with reservoir management for power generation, flood control,

and irrigation. Overbank flow events, important to habitat diversity, have become rare as a result of controlling peak flows and associated revetments. Portions of the basin are also subject to impacts from cattle grazing and irrigation withdrawals. Consequently, estuary dynamics have changed substantially.

About 77 percent of swamps, 57 percent of marshes, and over 20 percent of tree cover have been lost to development and industry. The Willamette Basin Valley has been dramatically changed by modern settlement. The complexity of the mainstem river and extent of riparian forest have both been reduced by 80 percent (PNERC 2002). About 75 percent of what was formerly prairie and 60 percent of what was wetland have been converted to agricultural purposes. These actions, combined with urban development, bank stabilization, and in-river and nearshore gravel mining, have resulted in a loss of floodplain connectivity and off-channel habitat (PNERC 2002).

Hydromodification Projects. More than 400 dams exist in the basin, ranging from mega dams that store large amounts of water to small diversion dams for irrigation. Every major tributary of the Columbia River except the Salmon River is totally or partially regulated by dams and diversions. More than 150 dams are major hydroelectric projects, with 18 dams located on mainstem Columbia River and its major tributary, the Snake River. The Federal Columbia River Power System encompasses the operations of 14 major dams and reservoirs on the Columbia and Snake Rivers. These Federal projects are a major source of power in the region, and provide flood control, navigation, recreation, fish and wildlife, municipal and industrial water supply, and irrigation benefits.

Development of the Pacific Northwest regional hydroelectric power system, dating to the early 20th century, has had profound effects on the ecosystems of the Columbia River Basin (ISG 1996). These effects have been especially adverse to the survival of anadromous salmonids. The construction of the Federal power system modified migratory habitat of adult and juvenile salmonids, and in many cases presented a complete barrier to habitat access. Both upstream and downstream migrating fish are impeded by the dams, and a substantial number of juvenile salmonids are killed and injured during downstream migrations. Physical injuries and deaths occur as juveniles pass through turbines, bypasses, and spillways. Indirect effects of passage through all routes may include disorientation, stress, delays in passage, exposure to high concentrations of dissolved gases, warm water, and increased predation. Dams have also flooded historical spawning and rearing habitat with the creation of massive water storage reservoirs. More than 55 percent of the Columbia River Basin that was accessible to salmon and steelhead before 1939 has been blocked by large dams (NWPPC 1986).

The mainstem habitats of the lower Columbia and Willamette Rivers have been reduced primarily to a single channel. As a result, floodplain area has been reduced, off-channel habitat features have been eliminated or disconnected from the main channel, and the amount of large woody debris in the mainstem has been reduced. Remaining areas are affected by flow fluctuations associated with reservoir management for power generation, flood control and irrigation. Overbank flow events, important to habitat diversity, have become rare as a result of controlling peak flows and associated revetments. Consequently, estuary dynamics have changed substantially.

Artificial Propagation. There are several artificial propagation programs for salmon production within the Columbia River basin, many of which were instituted under Federal law to ameliorate the effects of lost natural salmon production within the basin from the dams. The hatcheries are operated by Federal, state, and tribal managers. For more than 100 years, hatcheries in the Pacific Northwest have been used to produce fish for harvest and replace natural production lost to dam construction, and have only minimally been used to protect and rebuild naturally produced salmonid population (*e.g.*, Redfish Lake sockeye salmon). In 1987, 95 percent of the coho salmon, 70 percent of the spring Chinook salmon, 80 percent of the summer Chinook salmon, 50 percent of the fall Chinook salmon, and 70 percent of the steelhead returning to the Columbia River Basin originated in hatcheries (CBFWA 1990).

The impact of artificial propagation on the total production of Pacific salmon and steelhead has been extensive (Hard et al. 1992). Hatchery practices, among other factors, are a contributing factor to the 90 percent reduction in natural coho salmon runs in the lower Columbia River over the past 30 years (Flagg et al. 1995). Past hatchery and stocking practices have resulted in the transplantation of salmon and steelhead from nonnative basins, and the impacts of these practices are largely unknown. Adverse effects of these practices likely included loss of genetic variability within and among populations (Busack 1990 as cited in Hard et al. 1992, Riggs 1990, Reisenbichler 1997), disease transfer, increased competition for food, habitat, or mates, increased predation, altered migration, and displacement of natural fish (Steward and Bjornn 1990, Fresh 1997). Species with extended freshwater residence are likely to face higher risk of domestication, predation, or altered migration than are species that spend only a brief time in fresh water (Hard et al. 1992). Nonetheless, artificial propagation also may contribute to the conservation of listed salmon and steelhead although it is unclear whether or how much artificial propagation during the recovery process would compromise the distinctiveness of natural population (Hard et al. 1992).

Commercial, Recreational, and Subsistence Fishing. During the mid-1800s, an estimated 10 to 16 million adult salmon and steelhead of all species entered the Columbia River each year. Large harvests of returning adult salmon during the late 1800s (20 to 40 million pounds of annually) significantly reduced population productivity (Mann et al. 2005). The largest known harvest of Chinook salmon occurred in 1883 when Columbia River canneries processed 43 million pounds of salmon (Lichatowich 1999). Commercial landings declined steadily from the 1920s to a low in 1993, when just over 1 million pounds were harvested (Mann et al. 2005).

Harvested and spawning adults reached 2.8 million in the early 2000s, of which almost half are hatchery produced (Mann et al. 2005). Most of the fish caught in the river are steelhead and spring/summer Chinook salmon, while ocean harvest consists largely of coho and fall Chinook salmon. Most ocean catches are made north of Cape Falcon, Oregon. Over the past five years, the number of spring and fall salmon commercially harvested in tribal fisheries has averaged between 25,000 and 110,000 fish (Mann 2004 in Mann et al. 2005). Recreational catch in both ocean and in-river fisheries varies from 140,000 to 150,000 individuals (Mann et al. 2005).

3.2 Marine Mammals

Three stocks of marine mammals (pinnipeds) travel up the Columbia River: CSL (*Zalophus californianus californianus*) (U.S. stock), SSL (*Eumetopias jubatus*) (eastern U.S. stock), and harbor seal (*Phoca vitulina richardsi*) (Oregon/Washington coastal stock). These stocks are known to occur and forage in the action area during the time when at-risk fish stocks are present in the action area and could be affected by the action alternatives.

The most recent NOAA Stock Assessment Reports for the US stock of CSL (Carretta et al., 2019) and the Eastern stock of SSL (Muto et al., 2019) provide a detailed analysis of the stock status. The following is a brief summary on life history, status, distribution, and abundance from the reports.

3.2.1 California Sea Lion (United States Stock)

U.S. stock of CSL – the current population estimate for CSL is 257,606 (Figure 3-1), and the stock is within its OSP[19] range (Carretta et al. 2019). For CSL, PBR is 14,011 animals annually (Carretta et al. 2019). This stock is not listed as "threatened" or "endangered" under the ESA, nor as "depleted" or "strategic" under the MMPA.

[19] Maximum net productivity level (MNPL) has been expressed as a range of values (between .50 and .70 of K) (K = carrying capacity) determined on a theoretical basis by estimating what stock size, in relation to the original stock size, will produce the maximum net increase in population. OSP is a population size that is at or greater than its MNPL, which is the population size that produces the maximum net productivity (e.g., greatest net change in the population). OSP = a population size ≥ MNPL (>K*.60).

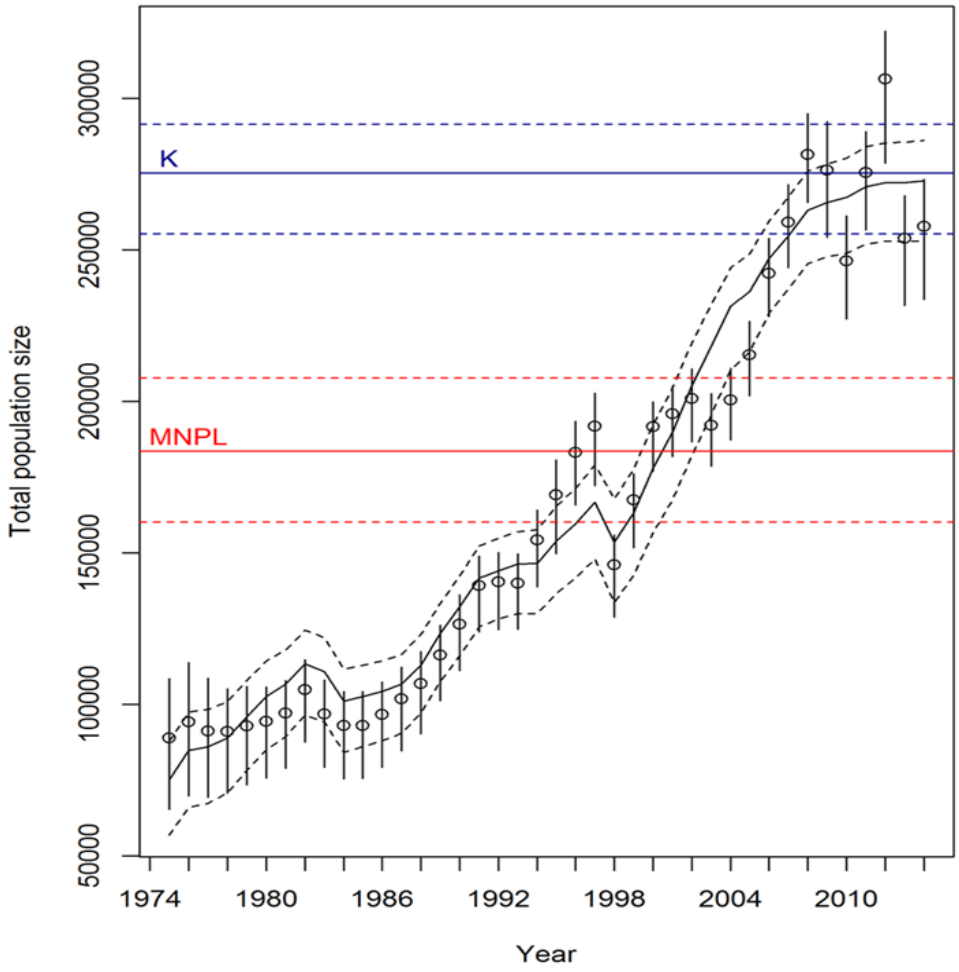

Figure 3-1 (Laake et al. 2018). Fitted logistic growth curve (solid line) and 95% bootstrap intervals (dashed line) for reconstructed CSL annual population sizes in the United States, 1975–2014. Vertical lines are 95% bootstrap confidence intervals for reconstructed annual population sizes. Also presented is the estimated carrying capacity (K; solid blue line) with 95% confidence intervals (dashed blue line) and maximum net productivity level (MNPL; red solid line) with 95% confidence intervals (dashed red line).

California sea lions breed on islands located in southern California, western Baja California, and the Gulf of California. Mitochondrial DNA analysis identified five genetically distinct geographic populations: (1) Pacific Temperate, (2) Pacific Subtropical, (3) Southern Gulf of California, (4) Central Gulf of California and (5) Northern Gulf of California (Schramm *et al*. 2009 as cited in Carretta et al. 2019). The Pacific Temperate population includes rookeries within U.S. waters and the Coronados Islands just south of U.S./Mexico border. Animals from the PacificTemperate population range into Canadian andBaja California waters. Males from western BajaCalifornia rookeries may spend most of the year in the United States (Carretta et al. 2019).

The breeding range of CSL in the U.S. is centered on the California Channel Islands, but pupping has been reported farther north on the Farallon Islands and at Año Nuevo, California (Keith et al. 1984). Sexual maturity occurs at 4 to 5 years although breeding success for male animals depends on a number of factors most notably size (Heath 2002). Mature males (8+ years) defend breeding territories on the rookeries (a place where seals and sea lions give birth and mate) between May and August. Females return to the rookeries to give birth and most pups are born in June. Males breed with females that give birth and then come into estrus in their territory. Most males are unsuccessful at establishing breeding territory on the rookeries due to heavy competition between dominant animals and retreat to sea or to nearby "bachelor" beaches to await breeding opportunities (Heath 2002).

Following the breeding season males migrate northward and are commonly reported in Oregon and Washington beginning in mid- to late August, and in British Columbia and Alaska as the season progresses. Females are rarely observed north of the California-Oregon border. CSL have a bimodal peak in abundance at Oregon haul-outs with peak numbers encountered during the migration periods in May and September (Scordino 2006). Some CSL remain in northern waters year round and do not return to their breeding rookeries.

California sea lions feed on a variety of fish and cephalopods (squid, octopus) based upon season, location, and prey availability. In the breeding range, food habit studies report that primary prey is whiting, anchovy, squid, and rockfish (Antonelis et al. 1984; Fiscus 1979; Fiscus and Baines 1966; Scheffer and Neff 1948). In Puget Sound, CSL feed principally on Pacific whiting, spiny dogfish, Pacific herring, and Pacific cod (Schmitt et al. 1995). Based on analysis of intestinal samples the CSL diet in the Columbia River estuary includes smelt, salmonids, rockfish, lamprey, and herring (Brown et al. 1995).

Like other marine mammals, CSL are susceptible to a variety of environmental contaminants that bioaccumulate upward through marine food webs to high-level predators. These substances include organochlorines (e.g., polychlorinated biphenyls [PCBs], dioxins, dichloro-diphenyl-trichloroethane (DDT) and its derivatives, various other pesticides and herbicides), polybrominated dephenyl ethers (PBDEs), heavy metals (e.g., mercury, copper, selenium, zinc), and may have harmful zoonotic organisms (O'Shea 1999, O'Hara and O'Shea 2001, Barron et al. 2003). Organochlorines and PBDEs enter marine ecosystems through atmospheric transport, runoff, and point source pollution; they persist in the environment for very long periods and accumulate in fatty tissues. High levels of organochlorines and PBDEs can potentially interfere with reproduction and immune and endocrine function and may cause cancers (e.g., Ylitalo et al. 2005), whereas elevated concentrations of metals can variously produce neurotoxic effects and harm organ function. Resulting effects from contaminants can be acute, including death, or chronic and sublethal, and can have population-level impacts when severe. As in other marine mammals, females transfer much of their fat-soluble contaminant burden to their pups during nursing (Wang et al. 2011, Kubo et al. 2014).

3.2.2 Steller Sea Lion (Eastern United States Stock)

Eastern stock of SSL – the current population estimate for SSL (Table 3-2) is 52,139 non-pups and 19,423 pups (Muto et al. 2019). Muto et al. (2017) conclude that the Eastern stock of SSL is likely within its OSP range; however, no determination of its status relative to OSP has been made. For SSL, PBR is 2,498 animals annually (Muto et al. 2019). Muto et al. 2019. This stock is not listed as "threatened" or "endangered" under the ESA, nor as "depleted" or "strategic" under the MMPA.

Table 3-2 Trends in estimated counts of eastern Steller sea lion non-pups (adults and juveniles) and pups, by region and total population, for the period 1989-2015 (Muto et al. 2019)[20].

Non-pups		Pups
Region	**Year - 2015**	**Year - 2015**
California, U.S.	3,120	936
Oregon, U.S.	5,634	1,946
Washington, U.S.	1,407	100
British Columbia, Canada	20,689	8,630
Southeast Alaska, U.S.	20,756	7,838
Total Eastern Stock	52,139	19,423
Total U.S. Eastern Stock	30,917	10,821

The breeding range of the eastern U.S. stock of SSL extends from southeast Alaska through British Columbia and Oregon to northern California. Steller sea lions are year-round residents of coastal Oregon and Washington. Large seasonal shifts in distribution have been documented for SSL in the southern portion of their range (Scordino 2006) but they are not recognized as a migratory species (Sease and York 2003). After the breeding season, male Steller sea lions are rarely seen on the Oregon coast (Scordino 2006; Mate 1975). Most males disperse into northern feeding grounds in Washington, Canada, and Alaska. Females with dependent pups appear to be limited in their dispersal distances (Raum-Suryan et al. 2002; Scordino 2006), as most individuals are seen within 300 miles of their natal rookery. Juvenile Steller sea lions disperse widely and have been observed as far as 1,600 miles from their natal rookery (Scordino 2006).

Non-breeding individuals do not return to the rookeries during the breeding season but remain at coastal haul-outs (areas where seals and sea lions move from the water to shore to rest, dry off, and heal).

[20] Total eastern stock counts are slightly greater than the sums of the regional counts due to the modeling process.

Steller sea lions are year-round residents of coastal Oregon and Washington. Large seasonal shifts in distribution have been documented for SSL in the southern portion of their range (Scordino 2006) but they are not recognized as a migratory species (Sease and York 2003). After the breeding season, male SSL are rarely seen on the Oregon coast (Scordino 2006; Mate 1975). Most males disperse into northern feeding grounds in Washington, Canada, and Alaska. Females with dependent pups appear to be limited in their dispersal distances (Raum-Suryan et al. 2002; Scordino 2006), as most individuals are seen within 300 miles of their natal rookery. Juvenile SSL disperse widely and have been observed as far as 1,600 miles from their natal rookery (Scordino 2006).

Steller sea lions are dietary generalists that feed on a variety of prey including Pacific hake, rockfish, skates, flounders, herring, salmon, smelt, shad, cod and white sturgeon.

Like other marine mammals, SSL are susceptible to a variety of environmental contaminants that bioaccumulate upward through marine food webs to high-level predators. These substances include organochlorines (e.g., polychlorinated biphenyls [PCBs], dioxins, DDT and its derivatives, various other pesticides and herbicides), polybrominated dephenyl ethers (PBDEs), heavy metals (e.g., mercury, copper, selenium, zinc), and may have harmful zoonotic organisms. Organochlorines and PBDEs enter marine ecosystems through atmospheric transport, runoff, and point source pollution; they persist in the environment for very long periods and accumulate in fatty tissues. High levels of organochlorines and PBDEs can potentially interfere with reproduction and immune and endocrine function and may cause cancers (e.g., Ylitalo et al. 2005), whereas elevated concentrations of metals can variously produce neurotoxic effects and harm organ function. Resulting effects from contaminants can be acute, including death, or chronic and sublethal, and can have population-level impacts when severe. As in other marine mammals, females transfer much of their fat-soluble contaminant burden to their pups during nursing (Wang et al. 2011, Kubo et al. 2014).

3.2.3 Harbor Seals (Oregon/Washington Coast Stock)

The most recent population estimates of 216 sites surveyed in 2013 and 272 sites surveyed in 2014 resulted in 13,140 and 20,722 seals counted in 2013 and 2014, respectively, using site averages for sites surveyed > 1/pupping season, (Table 3-3) (Pearson and Jeffries 2018).

Table 3-3. Estimated Harbor seal abundance for the Columbia River, Washington Coast, and inland stocks (2013-2016).

Region	2013 Population estimate	2014 Population estimate	2016 Population estimate
Washington Coast		15,092 (12,289-17,896)	
Columbia River		441 (359-523)	
Hood Canal	579 (472-687)	399 (325-473)	
Puget Sound	1,939 (1,579-2,299)		1,151 (938-1,365)
San Juan Islands	8,982 (7,313-10,650)		
Eastern Bays	3,409 (2,776-4,042)	4,228 (3,442-5,013)	
Strait of Juan de Fuca	4,121 (3,355-4,886)	4,123 (3,357-4,889)	
Inland stock	19,030 (15,495-22,565)		

Harbor seals inhabit coastal and estuarine waters off Baja California, north along the western coasts of the continental U.S., British Columbia, and Southeast Alaska, west through the Gulf of Alaska and Aleutian Islands, and in the Bering Sea north to Cape Newenham and the Pribilof Islands. Harbor seals do not make extensive pelagic migrations, though some long distance movement of tagged animals in Alaska (900 km) and along the U.S. west coast (up to 550 km) have been recorded (Brown and Mate 1983, Herder 1986, Womble 2012). Harbor seals have also displayed strong fidelity to haulout sites (Pitcher and Calkins 1979, Pitcher and McAllister 1981).

Harbor seals in Washington and Oregon have been separated into coastal and inland stocks because of differences in cranial morphology, pupping phenology, and genetics (Temte 1986, Lamont et al. 1996). The Washington State inland stock includes all harbor seals in U.S. waters east of a line extending north-south between Cape Flattery on the Olympic Peninsula and Bonilla Point on Vancouver Island, British Columbia, Canada.

Harbor seals are dietary generalists that feed on a variety of prey including squid, crustaceans, molluscs, and a variety of fish; including, rockfish, herring, flounder, salmon, hake, and sand lance.

Like other marine mammals, harbor seals are susceptible to a variety of environmental contaminants that bioaccumulate upward through marine food webs to high-level predators. These substances include organochlorines (e.g., polychlorinated biphenyls [PCBs], dioxins, DDT and its derivatives, various other pesticides and herbicides), polybrominated dephenyl ethers (PBDEs), heavy metals (e.g., mercury, copper, selenium, zinc), and may have harmful zoonotic organisms. Organochlorines and PBDEs enter marine ecosystems through atmospheric transport, runoff, and point source pollution; they persist in the environment for very long periods and accumulate in fatty tissues. High levels of organochlorines and PBDEs can potentially interfere with reproduction and immune and endocrine function and may cause cancers (e.g., Ylitalo et al.

2005), whereas elevated concentrations of metals can variously produce neurotoxic effects and harm organ function. Resulting effects from contaminants can be acute, including death, or chronic and sublethal, and can have population-level impacts when severe. As in other marine mammals, females transfer much of their fat-soluble contaminant burden to their pups during nursing (Wang et al. 2011, Kubo et al. 2014).

3.3 Listed Salmonids and Critical Habitat

3.3.1 Listed Salmonids

The following section provides a summary of listing and recovery plan information, status summaries and limiting factors for the species considered herein. Figure 3-2, shows salmon and steelhead returns at Bonneville Dam for the years 1938 through 2019. To calculate the abundance estimates, we calculated the geometric means or means based on the most recent spawner data available for each species considered herein.

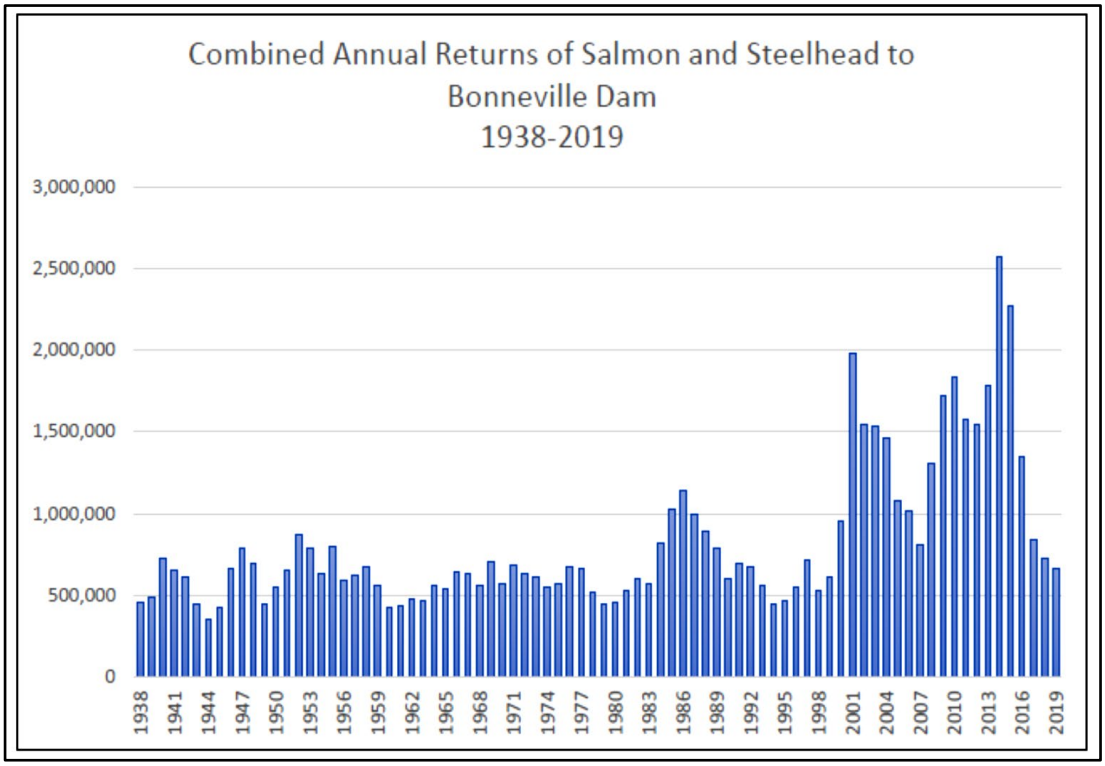

Figure 3-2. Combined Annual Salmon and Steelhead Returns (all species) to Bonneville Dam from 1938-2019[21].

[21] Columbia Basin Research, School of Aquatic and Fishery Sciences, University of Washington.

LCR Chinook Salmon

Species	Listing Classification and Date	Status Summary	Limiting Factors
Lower Columbia River Chinook salmon	Threatened 06/28/2005 (70 FR 37160)	This ESU comprises 32 independent populations. Twenty-seven populations are at very high risk, 2 populations are at high risk, one population is at moderate risk, and 2 populations are at very low risk Overall, there was little change since the last status review in the biological status of this ESU, although there are some positive trends. Increases in abundance were noted in about 70% of the fall-run populations and decreases in hatchery contribution were noted for several populations. Relative to baseline VSP levels identified in the recovery plan, there has been an overall improvement in the status of a number of fall-run populations, although most are still far from the recovery plan goals.	• Reduced access to spawning and rearing habitat • Hatchery-related effects • Harvest-related effects on fall Chinook salmon • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Contaminant
The five-year geometric means (2013-2017) for LCR Chinook salmon are 53,298 adults (29,472 natural-origin), and 23,826 hatchery-origin spawners)[22]			

[22] ODFW Corvallis Research Laboratory - Oregon Adult Salmonid Inventory and Sampling Project - ODFW Chinook - General Information Page

Snake River Fall-Run Chinook Salmon

Species	Listing Classification and Date	Status Summary	Limiting Factors
Snake River fall-run Chinook salmon	Threatened 06/28/2005 (70 FR 37160)	This ESU has one extant population. Historically, large populations of fall Chinook salmon spawned in the Snake River upstream of the Hells Canyon Dam complex. The extant population is at moderate risk for both diversity and spatial structure and abundance and productivity. The overall viability rating for this population is 'viable.' Overall, the status of Snake River fall Chinook salmon has clearly improved compared to the time of listing and compared to prior status reviews. The single extant population in the ESU is currently meeting the criteria for a rating of 'viable' developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be "highly viable with high certainty" and/or will require reintroduction of a viable population above the Hells Canyon Dam complex.	• Degraded floodplain connectivity and function • Harvest-related effects • Loss of access to historical habitat above Hells Canyon and other Snake River dams • Impacts from mainstem Columbia River and Snake River hydropower systems • Hatchery-related effects • Degraded estuarine and nearshore habitat.
The five-year geometric means (2014-2018) for SR fall-run Chinook salmon are 9,446 adults (natural-origin), 11,430 listed hatchery fish adipose clipped fish (LHAC), and 12,383 listed hatchery fish intact adipose (LHIA) adults[23]			

[23] Federal Columbia River Power System's Adaptive Management and Implementation Plan (AMIP 2018)

Snake River Spring/Summer-Run Chinook Salmon

Species	Listing Classification and Date	Status Summary	Limiting Factors
Snake River spring/summer-run Chinook salmon	Threatened 06/28/2005 (70 FR 37160)	This ESU comprises 28 extant and four extirpated populations. All expect one extant population (Chamberlin Creek) are at high risk. Natural origin abundance has increased over the levels reported in the prior review for most populations in this ESU, although the increases were not substantial enough to change viability ratings. Relatively high ocean survivals in recent years were a major factor in recent abundance patterns. While there have been improvements in abundance and productivity in several populations relative to prior reviews, those changes have not been sufficient to warrant a change in ESU status.	• Degraded freshwater habitat • Effects related to the hydropower system in the mainstem Columbia River, • Altered flows and degraded water quality • Harvest-related effects • Predation
The five-year geometric means (2014-2018) for SR spring/summer Chinook salmon are 12,798 adults (natural-origin), and 2,397 listed LHAC, and 421 LHIA adults[24]			

[24] AMIP 2018

Upper Columbia River Spring-Run Chinook Salmon

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Columbia River spring-run Chinook salmon	Endangered 06/28/2005 (70 FR 37160)	UCSRB 2007	NWFSC 2015	This ESU comprises four independent populations. Three are at high risk and one is functionally extirpated. Current estimates of natural origin spawner abundance increased relative to the levels observed in the prior review for all three extant populations, and productivities were higher for the Wenatchee and Entiat populations and unchanged for the Methow population. However, abundance and productivity remained well below the viable thresholds called for in the Upper Columbia Recovery Plan for all three populations.	• Effects related to hydropower system in the mainstem Columbia River • Degraded freshwater habitat • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Persistence of non-native (exotic) fish species • Harvest in Columbia River fisheries
The five-year geometric means (2014-2018) for UCR spring-run Chinook salmon are 2,872 adults (natural-origin), and 6,226 listed LHAC and 3,364 LHIA adults[25]					

[25] AMIP 2018

Upper Willamette River Chinook Salmon

Species	Listing Classification and Date	Status Summary	Limiting Factors
Upper Willamette River Chinook salmon	Threatened 06/28/2005 (70 FR 37160)	This ESU comprises seven populations. Five populations are at very high risk, one population is at moderate risk (Clackamas River) and one population is at low risk (McKenzie River). Consideration of data collected since the last status review in 2010 indicates the fraction of hatchery origin fish in all populations remains high (even in Clackamas and McKenzie populations). The proportion of natural origin spawners improved in the North and South Santiam basins, but is still well below identified recovery goals. Abundance levels for five of the seven populations remain well below their recovery goals. Overall, populations appear to be at either moderate or high risk, there has been likely little net change in the VSP score for the ESU since the last review, so the ESU remains at moderate risk.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats • Altered food web due to reduced inputs of microdetritus • Predation by native and non-native species, including hatchery fish • Competition related to introduced salmon and steelhead • Altered population traits due to fisheries and bycatch
The average (2015-2019) abundance of UWR Chinook salmon is 33,817 adults (3,689 natural-origin), and 31,795 hatchery-origin spawners[26]			

[26] ODFW, lower Willamette fisheries and Willamette Falls fish counts

Columbia River Chum Salmon

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Columbia River chum salmon	Threatened 06/28/2005 (70 FR 37160)	NMFS 2013	NWFSC 2015	Overall, the status of most chum salmon populations is unchanged from the baseline VSP scores estimated in the recovery plan. Three of 17 populations are at or near their recovery viability goals, although under the recovery plan scenario these populations have very low recovery goals of 0. The remaining populations generally require a higher level of viability and most require substantial improvements to reach their viability goals. Even with the improvements observed during the last five years, the majority of populations in this ESU remain at a high or very high-risk category and considerable progress remains to be made to achieve the recovery goals.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Degraded stream flow as a result of hydropower and water supply operations • Reduced water quality • Current or potential predation • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
The average (2013-2017) abundance for CR chum salmon populations is 14,073 adults (13,551 natural-origin), and 522 hatchery-origin spawners[27]					

[27] ODFW Corvallis Research Laboratory - Oregon Adult Salmonid Inventory and Sampling Project - ODFW Chinook - General Information Page

Lower Columbia River Coho Salmon

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Lower Columbia River coho salmon	Threatened 06/28/2005 (70 FR 37160)	NMFS 2013	NWFSC 2015	Of the 24 populations that make up this ESU, 21 populations are at very high risk, 1 population is at high risk, and 2 populations are at moderate risk. Populations with longer term data sets exhibit stable or slightly positive abundance trends. Some trap and haul programs appear to be operating at or near replacement, although other programs still are far from that threshold and require supplementation with additional hatchery-origin spawners. Although populations in this ESU have generally improved, especially in the 2013/14 and 2014/15 return years, recent poor ocean conditions suggest that population declines might occur in the upcoming return years.	• Degraded estuarine and near-shore marine habitat • Fish passage barriers • Degraded freshwater habitat: Hatchery-related effects • Harvest-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
The average (2013-2017) abundance for LCR coho salmon populations is 38,657 adults (29,866 natural-origin) and 8,791 hatchery-origin spawners[28]					

[28] WDFW Conservation - Coho salmon webpage

Snake River Sockeye Salmon

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River sockeye salmon	Endangered 06/28/2005 (70 FR 37160)	NMFS 2015a	NWFSC 2015	This single population ESU is at very high risk dues to small population size. There is high risk across all four basic risk measures. Although the captive brood program has been successful in providing substantial numbers of hatchery produced fish for use in supplementation efforts, substantial increases in survival rates across all life history stages must occur to re-establish sustainable natural production In terms of natural production, the Snake River Sockeye salmon ESU remains at extremely high risk although there has been substantial progress on the first phase of the proposed recovery approach – developing a hatchery based program to amplify and conserve the stock to facilitate reintroductions.	• Effects related to the hydropower system in the mainstem Columbia River • Reduced water quality and elevated temperatures in the Salmon River • Water quantity • Predation
The five-year geometric means (2014-2018) for Snake River sockeye salmon are 546 adults (natural-origin), and 4,004 LHAC adults[29]					

[29] AMIP 2018

Lower Columbia River Steelhead

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Lower Columbia River steelhead	Threatened 01/05/2006 (71 FR 834)	NMFS 2013	NWFSC 2015	This DPS comprises 23 historical populations, 17 winter-run populations and six summer-run populations. Nine populations are at very high risk, 7 populations are at high risk, 6 populations are at moderate risk, and 1 population is at low risk. The majority of winter-run steelhead populations in this DPS continue to persist at low abundances. Hatchery interactions remain a concern in select basins, but the overall situation is somewhat improved compared to prior reviews. Summer-run steelhead populations were similarly stable, but at low abundance levels. Even with modest improvements in the status of several winter-run DIPs, none of the populations appears to be at fully viable status, and similarly none of the MPGs meet the criteria for viability.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Reduced access to spawning and rearing habitat • Avian and marine mammal predation • Hatchery-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
The five-year geometric means (2014-2018) for LCR steelhead are 35,217 adults (12,920 natural-origin), and 22,297 hatchery-origin spawners[30]					

[30] AMIP 2018

Middle Columbia River Steelhead

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Middle Columbia River steelhead	Threatened 01/05/2006 (71 FR 834)	NMFS 2009b	NWFSC 2015	This DPS comprises 17 extant populations. The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project. Returns to the Yakima River basin and to the Umatilla and Walla Walla Rivers have been higher over the most recent brood cycle, while natural origin returns to the John Day River have decreased. There have been improvements in the viability ratings for some of the component populations, but the DPS is not currently meeting the viability criteria in the MCR steelhead recovery plan. In general, the majority of population level viability ratings remained unchanged from prior reviews for each major population group within the DPS.	• Degraded freshwater habitat • Mainstem Columbia River hydropower-related impacts • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Harvest-related effects • Effects of predation, competition, and disease
The five-year geometric means (2014-2018) for MCR steelhead are 6,666 adults (natural-origin), and 592 LHAC and 148 LHIA adults[31]					

[31] AMIP 2018

Snake River Basin Steelhead

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River basin steelhead	Threatened 01/05/2006 (71 FR 834)	NMFS 2017b	NWFSC 2015	This DPS comprises 24 populations. Two populations are at high risk, 15 populations are rated as maintained, 3 populations are rated between high risk and maintained, 2 populations are at moderate risk, 1 population is viable, and 1 population is highly viable. Four out of the five MPGs are not meeting the specific objectives in the draft recovery plan based on the updated status information available for this review, and the status of many individual populations remains uncertain A great deal of uncertainty still remains regarding the relative proportion of hatchery fish in natural spawning areas near major hatchery release sites within individual populations.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded freshwater habitat • Increased water temperature • Harvest-related effects, particularly for B-run steelhead • Predation • Genetic diversity effects from out-of-population hatchery releases
The five-year geometric means (2014-2018) for Snake River Basin steelhead are 18,423 adults (natural-origin), and 138,887 LHAC and 28,187 LHIA adults[32]					

[32] AMIP 2018

Upper Columbia River Steelhead

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Columbia River steelhead	Threatened 01/05/2006 (71 FR 834)	UCSRB 2007	NWFSC 2015	This DPS comprises four independent populations. Three populations are at high risk of extinction while 1 population is at moderate risk. Upper Columbia River steelhead populations have increased relative to the low levels observed in the 1990s, but natural origin abundance and productivity remain well below viability thresholds for three out of the four populations. The status of the Wenatchee River steelhead population continued to improve based on the additional year's information available for the most recent review. The abundance and productivity viability rating for the Wenatchee River exceeds the minimum threshold for 5% extinction risk. However, the overall DPS status remains unchanged from the prior review, remaining at high risk driven by low abundance and productivity relative to viability objectives and diversity concerns.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality • Hatchery-related effects • Predation and competition • Harvest-related effects
The five-year geometric means (2014-2018) for UCR steelhead are 3,988 adults (natural-origin), and 10,965 LHAC and 2,403 LHIA adults[33]					

[33] AMIP 2018

Upper Willamette River Steelhead

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Willamette River steelhead	Threatened 01/05/2006 (71 FR 834)	ODFW and NMFS 2011	NWFSC 2015	This DPS has four demographically independent populations. Three populations are at low risk and one population is at moderate risk. Declines in abundance noted in the last status review continued through the period from 2010-2015. While rates of decline appear moderate, the DPS continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The causes of these declines are not well understood, although much accessible habitat is degraded and under continued development pressure. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity and a source of competition for the DPS. While the collective risk to the persistence of the DPS has not changed significantly in recent years, continued declines and potential negative impacts from climate change may cause increased risk in the near future.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats due to impaired passage at dams • Altered food web due to changes in inputs of microdetritus • Predation by native and non-native species, including hatchery fish and pinnipeds • Competition related to introduced salmon and steelhead • Altered population traits due to interbreeding with hatchery origin fish
The 5-year average (2016-2020) abundance for UWR steelhead DPS is 3,428 adult natural-origin spawners[34]					

[34] ODFW, lower Willamette fisheries and Willamette Falls fish counts

Southern DPS Eulachon

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern DPS of eulachon	Threatened 03/18/2010 (75 FR 13012)	NMFS 2017	Gustafson et al. 2016	The Southern DPS of eulachon includes all naturally-spawned populations that occur in rivers south of the Nass River in British Columbia to the Mad River in California. Sub populations for this species include the Fraser River, Columbia River, British Columbia and the Klamath River. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River. Despite a brief period of improved returns in 2001-2003, the returns and associated commercial landings eventually declined to the low levels observed in the mid-1990s. Although eulachon abundance in monitored rivers has generally improved, especially in the 2013-2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years	• Climate-induced changes in ocean conditions. • Climate-induced changes to freshwater habitats • Bycatch of eulachon in commercial shrimp fisheries • Dams and water control structures • Water quality • Shoreline construction • Harvest • Predation
The 5-year (2015-2019) mean abundance for eulachon is 49,446,073 adults					

3.3.2 Designated Critical Habitats

The following section provides a summary of the status of critical habitats for species considered in this EA.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some, or high potential for improvement. We rated conservation value of HUC5 watersheds as high for 30 watersheds, medium for 13 watersheds, and low for four watersheds.
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Willamette River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 22 watersheds, medium for 16 watersheds, and low for 18 watersheds.
Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Columbia River chum salmon	9/02/05 70 FR 52630	Critical habitat encompasses six subbasins in Oregon and Washington containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 16 watersheds, and medium for three watersheds.
Lower Columbia River coho salmon	2/24/16 81 FR 9252	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 55 occupied watersheds, as well as the lower Columbia River and estuary rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 34 watersheds, medium for 18 watersheds, and low for three watersheds.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival (NMFS 2015a). Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Lower Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses nine subbasins in Oregon and Washington containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 28 watersheds, medium for 11 watersheds, and low for two watersheds.
Upper Willamette River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses seven subbasins in Oregon containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 25 watersheds, medium for 6 watersheds, and low for 3 watersheds.
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
		improvement. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.
Snake River basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Southern DPS of eulachon	10/20/11 76 FR 65324	Critical habitat for eulachon includes portions of 16 rivers and streams in California, Oregon, and Washington. All of these areas are designated as migration and spawning habitat for this species. In Oregon, we designated 24.2 miles of the lower Umpqua River, 12.4 miles of the lower Sandy River, and 0.2 miles of Tenmile Creek. We also designated the mainstem Columbia River from the mouth to the base of Bonneville Dam, a distance of 143.2 miles. Dams and water diversions are moderate threats to eulachon in the Columbia and Klamath rivers where hydropower generation and flood control are major activities. Degraded water quality is common in some areas occupied by southern DPS eulachon. In the Columbia and Klamath river basins, large-scale impoundment of water has increased winter water temperatures, potentially altering the water temperature during eulachon spawning periods. Numerous chemical contaminants are also present in spawning rivers, but the exact effect these compounds have on spawning and egg development is unknown. Dredging is a low to moderate threat to eulachon in the Columbia River. Dredging during eulachon spawning would be particularly detrimental.

3.3.3 Recovery Planning for ESA-Listed Salmonids

Section 4(f) of the ESA requires NMFS to develop and implement recovery plans for the conservation and survival of listed species. Recovery plans must describe specific management actions, establish objective measurable criteria for delisting, and estimate the time and cost to carry out measures needed to achieve recovery. Recovery plans have been completed for the species considered herein. To develop recovery plans, NMFS established technical recovery teams (TRT) to provide scientific input, and invited local stakeholders to develop strategies and actions. NMFS reviews locally developed recovery plans, ensures that they satisfy the ESA requirements, and makes them available for public review and comment before formally adopting them as ESA recovery plans.

Recovery plans create a context in which to place the range of actions that will be necessary to recover threatened and endangered Columbia River salmonids. In addition, Federal agencies must consult with NMFS under ESA section 7 on any action that is likely to adversely affect the listed species. Through the consultation process Federal agencies or applicants may change their proposed actions to avoid harming listed fish, or NMFS may require them to conduct their proposed action in a way that reduces or mitigates harm to listed fish. NMFS consults on a host of actions in the Columbia River including operation and maintenance of the Federal Columbia River Power System; commercial, recreational, and tribal fisheries; forest management; irrigation withdrawals; road construction; grazing; and numerous other actions that affect fish habitat and fish migration.

Federal and state agencies, tribes, landowners, watershed councils, and private organizations have undertaken a large number of actions aimed at reducing the losses of ESA-listed salmonids from a number of sources. These combined actions represent an extraordinary and unprecedented cooperative effort in the Columbia River basin to protect and recover salmon and steelhead. ESA-guided recovery plans have been developed and implemented in every watershed, including actions to: restore important habitat; improve dam passage survival; re-tool hatchery programs to assist production in wild populations; and close, reduce or reshape fisheries to limit fishery-related mortality of listed fish species and focus on selectively harvesting healthy fish species. These efforts equate to hundreds of millions of dollars invested annually and billions over the past decades.

3.4 Non-Listed Fish Species

Non-listed Salmonids

Multiple species of non-listed salmon and steelhead occur throughout the action area including, but not limited to, Willamette River summer steelhead, The MCR Chinook ESU includes spring-run populations spawning in the Klickitat, Deschutes, John Day, and Yakima Rivers. Spring-run hatchery Chinook produced at the Leavenworth National Fish Hatchery (Wenatchee River, Washington), Entiat National Fish Hatchery (Entiat River, Washington), Powell Hatchery (Clearwater River, Idaho), and Rapid River Hatchery (Little Salmon River, Idaho) are not

considered part of the Upper Columbia River spring-run or Snake River spring/summer run Chinook ESUs.

Lamprey

Three lamprey species are found within the Columbia and Snake River basins and occur within the action area: Pacific lamprey (*Lampetra tridentata*); western brook lamprey *(L. ayresi*); and river lamprey (*L. richardsoni*).

Pacific Lamprey – Pacific lamprey live in the ocean as adults where they are external parasites on marine fish. Adults are anadromous, returning to freshwater streams to spawn. In the Columbia River, there appear to be two Pacific lamprey runs, one occurring in late May to early June, and another in late July to early August (Starke and Dalen 1995). Peak passage occurs in early June (Kostow 2002). Spawning takes place primarily between February and May. Pacific lamprey populations can be highly variable, with the abundance of returning adults varying by orders of magnitude from one year to the next (Kostow 2002; Beamish and Levings 1991). This variability creates uncertainty in interpreting apparent trends and assessing viability. Average lamprey passage at Bonneville Dam was 109,000 from 1938 to 1969, but declined to an average of 39,000 from 1997 to 2002. ODFW has identified the lower Columbia/Willamette population of Pacific lamprey as at risk due to several threats, including predation by pinnipeds (ODFW 2005).

Western Brook Lamprey – The western brook lamprey is probably the second most common and widely distributed lamprey in the Columbia and Snake River basins after the Pacific lamprey (Kostow 2002). The western brook lamprey lives only in freshwater, is non-parasitic, and does not feed as an adult. Little is known about the life-history characteristics of western brook lamprey, and there are many critical uncertainties regarding their status, biology, and habitat requirements. It is likely that western brook lamprey movement is minimal, and that most individuals remain within their stream of origin (Pletcher 1963). This lack of movement has likely resulted in significant population structure, but no supporting information exists (Kostow 2002).

There is no historic or current abundance, productivity, or distribution information available for the western brook lamprey. As with Pacific lamprey, ODFW concluded that the lower Columbia/Willamette population of western brook lamprey is at risk noting that predation by pinnipeds may pose a threat to the species (ODFW 2005).

River Lamprey – River lamprey adults, like the Pacific lamprey, are anadromous and parasitic on marine fish. River lamprey migrate to the ocean for only 10 weeks, scavenging or feeding on smelt and herring. Little is known about the biology or status of river lamprey. In the Columbia River adult river lampreys are currently known only from museum collections (Kostow 2002). This lack of observation may be because the species is very rare, or that the species is difficult to find or identify in freshwater.

White Sturgeon

White sturgeon (*Acipenser transmontanus*) inhabit the coastal waters and large river systems along the Pacific coast from Baja California (Rosales-Casian and Ruz-Cruz 2005) to southern Alaska (Scott and Crossman 1973). Spawning populations are found in the Sacramento,

Columbia, Willamette, and Fraser rivers, with the Columbia River system downstream from Bonneville Dam, supporting one of the most productive sturgeon fisheries in North America (DeVore et al. 1995). White sturgeon are present in the action area year-round, and spawn in the lower Columbia River from April through July, and in the Willamette River in May (Chapman and Jones, 2010). The most recent white sturgeon population in the lower Columbia River was estimated at 237,900 fish (WDFW 2017).

3.5 Fish Habitat

Essential Fish Habitat

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

Freshwater Habitat

Freshwater habitat in the Columbia River Basin has changed markedly during the last 150 years as a result of floodplain fill, installation of revetments, urbanization, mining, logging, grazing, and farming. Changes to the ecosystem have been evident in the dramatic declines in riparian and floodplain areas, wetlands, and fish populations. There are hundreds of federal, state, local, and private dams and reservoirs in the Columbia River Basin. Most notable of the federal projects is the Federal Columbia River Power System and the Willamette Valley Project, which consists of 27 dams for flood reduction and hydroelectric power generation, in addition to various bank protection structures for flood control and hydropower production.

3.6 Recreation

This analysis focuses on the areas identified as Category 1, Category 2, and Category 3 in the application (Figure 2-1).

Areas identified as Category 1 include Willamette Falls and the river downstream as far as Lake Oswego are part of an Oregon State Heritage Area (2015 designation). The Heritage Area hosts abundant, publicly accessible recreation opportunities on or along the river: fishing, boating, birding, hiking, biking, paddling, swimming, and geocaching, invented in Beavercreek, Oregon, inside the Heritage Area (WFHAC 2018). Recreational fishing dominates the river between the

Falls and the mouth of the Clackamas River a few miles downstream during the premier salmon runs—Chinook in the spring and coho in the fall (ODFW 2020; WFHAC 2018). Sturgeon are also present in this area, and local tribes seasonally harvest Pacific lampreys during their migrations (WFHAC 2018). Other recreational fishing in the Willamette River and tributaries consists of steelhead (winter and summer runs) and rainbow and cutthroat trout (ODFW 2020).

The Willamette River Water Trail consists of various properties along the 187-mile river and at least three tributaries that provide public access to paddlers and riverside campsites (Willamette Riverkeeper n.d.). The Department of Interior officially designated the river a National Water Trail in 2012 (WFHAC 2018). Additionally, the Oregon State Legislature endorsed a Willamette River Greenway program in 1967, and today, the Greenway consists of 3,800 acres, including several state parks, along the river (Oregon Parks and Recreation Department 2020). Visitor trips in the Willamette River Greenway are in excess of 283,000 daily.

Bonneville Lock and Dam on the Columbia River, declared a National Historic Landmark in 1987, supplies the region with hydropower as well as abundant recreation and tourism opportunities. The U.S. Army Corps of Engineers, Portland District, maintains the Bonneville Lock and Dam project, including the hydropower operation and visitor centers on the Washington and Oregon sides. The Bonneville project area also includes multiple outdoor recreation sites that support fishing, wildlife viewing, boating, hiking, scenic vistas, and geocaching. Inside the visitor centers, visitors can see fish ladders through underwater windows and panoramic views from rooftop observations decks. Two islands constructed as part of the dam projected, Robins Island (OR) and Bradford Island (OR), provide publicly accessible park areas for games and sports, shore-based fishing, and birdwatching. Hamilton Island (WA) has a boat ramp, shore-based fishing, and five miles of trails. North Shore Recreation Area (WA) and Tanner Creek Fishing Area (OR) are fishing and wildlife viewing locations, and Fort Cascades National Historic Site (WA) offers an interpretative trail and excellent views of Bonneville Dam and the Columbia River. (USACE n.d.a)

Targeted recreational fish species in the Bonneville Dam area include sturgeon, salmon, steelhead, shad, and, recently, pikeminnow (USACE n.d.a). The pikeminnow bounty program, run by the Bonneville Power Administration, aims to decrease this salmon and steelhead predator and encourages heavy fishing of it during summer (Pacific States Marine Fisheries Commission 2020; NOAA 2008). Combined, the other fish seasons ensure continuous angler activity from spring through fall (NOAA 2008).

Areas identified as Category 2 locations include the main stem Columbia River between RM 112 but below The Dalles Dam (excluding Bonneville Dam); the Clackamas and Sandy Rivers, Oregon; and the Cowlitz, Kalama, Lewis, Elochoman, and Washougal Rivers in Washington. All Category 2 locations are attractive recreational fishing locations for the same reason they are attractive to sea lions – the seasonal presence of salmon and steelhead, whether originating from the wild or from hatcheries. Other targeted species present in varying degrees among the tributaries include, but are not limited to, cutthroat trout, brook trout, redband trout, redear sunfish, and native lamprey.

Along the Columbia River are many developed recreation sites which include various combinations of the following activities: camping, picnicking, boating, water skiing, fishing, swimming, hunting, hiking, biking, equestrian use and wildlife viewing (USACE n.d.b). Boating ramps or other access sites are located at least every 5 to 10 miles along the Category 2-designated Columbia River section; boat access sites are concentrated along the lower Columbia River in the vicinity of Portland and its confluence with Willamette Falls. The Columbia River Gorge National Scenic Area, a designation intended to protect the canyon where the Columbia River cuts through the Cascade Mountains, encompasses all the river rated as Category 2 and beyond some distance east and west (USDA n.d). The Columbia River Gorge facilitates a wide variety of river- and shore-based activities.

Among the areas identified as Category 2 tributaries, the Clackamas River and Sandy River in Oregon are partially designated as part of the National Wild and Scenic Rivers System, indicating they are "certain rivers with outstanding natural, cultural and recreational values in a free-flowing condition for the enjoyment of present and future generations" (16 U.S.C. 1271 et seq.; National Wild and Scenic River System n.d.a, n.d.b).

Areas identified as Category 3 include the Skamakowa, Coweeman, and Grays Rivers, and Abernathy, Duncan and Hamilton Creeks in Washington and the Scappoose and Clatskanie Rivers in Oregon. In general, the areas identified ad Category 3 creeks and rivers have much less developed recreation area. These smaller tributaries support fishing as well as paddling and shore-based hiking, to varying degrees.

3.7 Cultural Resources

Cultural resources include prehistoric and historic archaeological resources, architectural or built-environment resources, salmonid fishes, lamprey, sturgeon, places and locations important to Native Americans and other ethnic groups, and human remains. Historic properties, a type of cultural resources, are any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

The affected environment for consideration of cultural resources includes the areas identified as Category 1, Category 2, and Category 3 (Figure 2-1), and extends approximately 100-500 feet from the adjacent shorelines. The areas identified as Category 1 represent the areas where the majority of sea lion removal activity would occur, although sea lion removal may occur anywhere in the action area. The areas identified as Category 1 include the vicinity of Willamette Falls and Bonneville Dam, where CSL and SSL prey on at-risk fish species. Currently, lethal removals of CSL occur at Bonneville Dam and Willamette Falls (and elsewhere, e.g., Astoria, OR) under existing MMPA section 120 authorizations. These authorizations expire in 2021 and 2023, respectively. No tribes are a party to existing authorizations.

Because no ground disturbing activities would take place as part of the proposed action, no need is present for pre-project research or surveys to determine the presence or absence of prehistoric or historic archaeological materials. Therefore, the discussion noted herein does not provide for the identification of previously recorded archaeological resources or any newly identified

archaeological resources. This discussion, therefore, focuses on aboveground historic resources in the action area.

Section 106 of the National Historic Preservation Act

As the proposed action is a federal action, NOAA must consider its responsibilities under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, along with its implementing regulations (36 CFR 800) in addition to NEPA. Section 106 of the NHPA requires federal agencies to take into account the effects of undertakings they carry out, assist, fund, or permit (undertakings) on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. Federal agencies meet these requirements by completing the Section 106 process set forth in the implementing regulations, "Protection of Historic Properties," 36 C.F.R. part 800. The goal of the process is to identify and to consider historic properties that may be affected by an undertaking and to attempt to resolve any adverse effects through consultation. Both the NHPA and the Section 106 regulations require that federal agencies, in carrying out their Section 106 responsibilities, consult with any Indian tribe or National Historic Office that attaches traditional religious and cultural significance to historic properties that may be affected. The regulations provide both general directions regarding consultation at Section 800.2(c)(2) as well as very specific steps to be taken throughout the process. Compliance with Section 106 requires that federal agencies consider the effects of their undertakings on historic properties (e.g., cultural resources that have been included in or determined eligible for inclusion in the National Register of Historic Places).

Historic Resources

Because most of the removal activities associated with the proposed action take place in or over the water, the only aboveground historic resources presented in this assessment are those listed in the NRHP. These include the Bonneville Dam Historic District, the Fort Cascades National Historic Site, the Portland Steam Tug, the Willamette Falls Locks, and the Willamette River (Oregon City) Bridge (No. 357). By nature of the NRHP-listings, these resources are important to local, state, and/or national history.

Detailed descriptions of the historic district at Bonneville Lock and Dam and the Fort Cascades National Historic Site are provided in Section 3.12.1 of the Bonneville Dam EA (NOAA 2008) and are hereby incorporated by reference. The historic economic importance of Willamette Falls is evidenced by the fact that it has provided hydroelectric energy for over 100 years (NMFS 2018). Moreover, construction of Willamette Falls Locks in 1873 facilitated transportation of goods around the falls to locations in the Pacific Northwest region.

As reported in the Willamette River EA (NMFS 2018), Willamette Falls is also a traditional cultural property to the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of the Siletz Indians, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

Tribal Cultural Resources

Archaeological evidence of Native American activity in Washington and Oregon potentially dates to as early as 12,000 - 14,500 years ago (WDAHP n.d.; OSHPO n.d.). Prehistory in these two states is evidenced by the remains of campsites and villages, remains of activity sites, modifications of the landscapes, and artifacts (WDAHP n.d.). Prehistory typically is considered those years between the first occupations of the region to the first European contact with Native Americans (roughly the 1790's) (WDAHP n.d.).

Archaeological and historic resources dating to the past 200 years relate to a mixture of cultural groups, such as Native Americans who have resided in Oregon and Washington, as well as populations who settled in this region following the opening of the Northwest (WDAHP n.d.; OSHPO n.d.). Resources associated with more recent times often include a mixture of archaeological resources and buildings, structures, and objects, as well as natural resources used by Native Americans and other cultural groups.

Descriptions of cultural resources in the vicinity of Bonneville Dam and Willamette Falls were provided in Section 3.7 of the Environmental Assessment: Reducing the Impact on At-Risk Salmon and Steelhead by California Sea Lions in the Willamette River (Willamette Falls EA; NMFS 2018) and Section 3.12 of the Final Environmental Assessment: Reducing the Impact on At-risk Salmon and Steelhead by California Sea Lions in the Area Downstream of Bonneville Dam on the Columbia River, Oregon and Washington (Bonneville Dam EA; NMFS 2008), respectively, which are hereby incorporated by reference.

As reported in the Bonneville Dam EA (NMFS 2008), "Northwest coast Native American peoples have always depended upon salmon for food and trade." The importance of fish, e.g. salmon, to tribes who fish in the Columbia River system "cannot be overstated" (Walker 2015). The salmon fishery is not only important as a subsistence fishery among the tribes, but also as an "integral part of the tribes' cultural, economic, and spiritual well-being" (as cited in Walker 2015). As stated in the Willamette Falls EA (NMFS 2018), the Willamette Falls area "was ideal for dip-net and spear fishing, for the harvest of salmon and lamprey and other native fisheries," and it "supported the lifeways of Native Americans." Steelhead, sturgeon, and lamprey are other important fisheries among the Columbia River basin tribes, and because those, too, are targeted by sea lions, aquatic resources on which tribal people depend are further strained (Walker 2015).

Native American Tribes have historically depended on a wide variety of species for food. These traditional foods have been referred to as 'first foods' in native communities for countless generations. First foods formed the backbone of many indigenous societies by virtue of their religious, cultural, economic, and medicinal importance, in addition to their role in feeding native peoples. Treaties reserve the Columbia River tribes' access to their first foods, which include salmon, game, roots, and berries, all of which "frame the spirituality and culture of the Columbia River people" (Mitchell 2017). The history of treaty fishing rights is discussed in detail in Section 3.1.2.2 of the Bonneville Dam EA (NMFS 2008) and is hereby incorporated by reference.

Historically, tribes hunted seals and sea lions in the Columbia River, whether opportunistically or for subsistence purposes. At a minimum, tribal harvesting of seals and sea lions coincided with fishing during fish runs in the Columbia River. Columbia River tribes likely targeted seals and sea lions when they intercepted them preying on mutually desirable fish, e.g. salmon, and generally interfering with fishing activities by virtue of their congregations. (Walker 2015).

3.8 Law Enforcement

In Oregon, the Oregon State Police Fish and Wildlife Division enforce the laws and regulations that protect fish and wildlife resources. Oregon Fish and Wildlife officers are also trained and certified state troopers, giving them the flexibility to enforce traffic, criminal, and general laws, if needed. They frequently coordinate with city, county, state, and/or federal agency representatives to cooperatively enforce fish, wildlife, and environmental laws. (Oregon Fish and Wildlife Division n.d.)

The Washington Department of Fish and Wildlife (WDWF) police enforce laws and regulations related to human-wildlife conflict; game and fish; and protection of fish, wildlife, and habitats. WDFW law enforcement territory is primarily parks, forestlands, and state and federal waters. However, through memorandums of understanding, WDWF officers can assist city and county law enforcement agencies, tribal authorities, and federal agencies with their jurisdictional law enforcement. WDWF officers hold federal U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) commissions and have jurisdiction over federal violations like the Endangered Species Act. Officers coordinate law enforcement with USFWS and NMFS as well as the U.S. Coast Guard. (WDWF n.d.)

Sheriff's offices and police departments are the local law enforcement agencies with jurisdiction in areas identified as Category 1, Category 2, and Category 3 river segments. Every county has a sheriff's office, and sheriff's officers could assist during sea lion removals by managing the public and keeping safe distances around removal activities. On the Oregon side, the relevant sheriff's offices are Clatsop, Columbia, Multnomah, Clackamas, and Hood River County Sherriff's Offices. On the Washington side, the relevant sheriff's offices are Wahkiakum, Cowlitz, Lewis, Clark, and Skamania County Sherriff's Offices.

Some of the targeted river segments intersect incorporated towns, where police departments could potentially be called to assist during a sea lion removal event. Oregon municipal police departments with jurisdiction in areas identified as Category 1 areas along the Willamette River are Portland, Milwaukie, Lake Oswego, West Linn, Gladstone, and Oregon City Police Departments. The Category 1 area at Bonneville Dam is bordered by unincorporated territory on the Oregon side. On the Washington side is the town of North Bonneville, which has a municipal police department.

NOAA's Office of Law Enforcement enforces laws designed to protect marine life and habitats, including the MMPA, and works along all U.S. coasts and inland riverways (NOAA n.d.a). NOAA Fisheries shares responsibility for implementing the MMPA with the US Fish and Wildlife Service and Marine Mammal Commission (NOAA n.d.b). NOAA Fisheries is tasked specifically with protecting whales, dolphins, porpoises, seals, and sea lions, while the US Fish and Wildlife Service is responsible for protecting the remaining marine mammal categories in the U.S.

Lethal sea lion removal has been authorized at Bonneville Dam since 2008 and at Willamette Falls since 2018, so the current conditions for law enforcement include responding as necessary to assist with lethal removal events in these locations.

4. ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The following analyses address the 7 resources identified as having a potential to be impacted by the alternatives. The analyses describe expected conditions under the various alternatives when compared to the affected environment or existing conditions described in Section 3.0, Affected Environment.

The terms "effect" and "impact" are used synonymously under NEPA, consequently both terms may be used in the following analyses. Impacts include effects on the environment that are direct, indirect, or cumulative. Direct effects are caused by the action itself and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

4.2 Marine Mammals

4.2.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS denies the eligible entities request for lethal removal authority, and there would be no lethal removal of CSL and SSL in the action area.

If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) [35] authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. The existing section 120[36] MMPA authorizations are set to expire on June 28, 2021, for Bonneville Dam and on November 14, 2023, for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

With respect to CSL and SSL in the Columbia River Basin, CSL and SSL will likely continue to congregate in the action area to feed on returning adult salmon, steelhead, and eulachon The No-action Alternative would have no effect on overall abundance and productivity of the CSL and SSL populations range-wide, and the population for CSL would likely remain at OSP. Male CSL and SSL migrate south from the Columbia River as the breeding season approaches in April and May. Neither the migration timing nor the abundance of migratory male sea lions would be affected by the No-action Alternative.

[35] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

[36] The states of Oregon, Washington, and Idaho have an existing MMPA section 120 authorization to remove California sea lions at Bonneville Dam, and the state of Oregon has an existing MMPA section 120 authorization to remove California sea lions at Willamette Falls.

The presence of harbor seals under the No-action Alternative would likely remain stable or increase slightly, although their presence in the action area is rare. Harbor seals typically consume smaller prey, e.g., eulachon, although they do eat adult salmon and steelhead, and it is unlikely their abundance would fluctuate in response to fluctuating numbers of returning adult salmon and steelhead. Harbor seals are generally non-migratory but local movements are associated with factors such as prey availability and reproduction. The No-action Alternative would have no effect on overall abundance and productivity of the harbor seal population range-wide because there would be no takings, and the migration timing to the coast for pupping in April through June would not be affected by the No-action Alternative.

Therefore, Alternative 1 would not have a significant impact on marine mammals as there would be no changes to sea lion population compared to baseline impacts.

4.2.2 Alternative 2

Under Alternative 2, NMFS would grant the eligible entities request for lethal and non-lethal removal as proposed in the eligible entities' application.

This alternative would allow up to 286 CSL and 130 SSL to be removed over a 5-year period. The removal of up to 286 CSL and 130 SSL for 5 years would have no effect on the overall range-wide abundance, distribution, and productivity of the CSL and SSL populations because the number of CSL and SSL involved is extremely small compared to the current number of animals that can be removed from the population without affecting its status with respect to OSP. There is a stable number of male CSL and SSL in each sea lion population, meaning that not all males that participate in the breeding migration are successful at establishing and maintaining breeding territories on the rookeries and therefore spend the breeding season at nearby haul-outs or at sea. Individual sea lions that would be permanently removed under Alternative 2, and that may have occupied a breeding territory, would be rapidly replaced by otherwise idle males from the population. Thus, compared to the No-action Alternative, Alternative 2 would result in no change in status of the populations range-wide, although it would reduce (albeit inconsequentially) the number of individual animals from each sea lion population.

Permanent captive holding of some CSL and SSL would also be possible under Alternative 2. Captive holding would be allowed by permitted holding facilities, in compliance with the standards established under the Animal Welfare Act (AWA). The 5-year limit of 286 CSL and 130 SSL that could be removed under Alternative 2 includes animals that are captured and transferred to permanent captivity, thus the effects of this activity are considered in the discussion above.

Under Alternative 2, the abundance of CSL and SSL could be reduced by as much as 2% of PBR (14,011) for CSL in year 1, 1.5 % of PBR (2,498) for SSL in year 1, decreasing to 0% of PBR for CSL in year 5, and decreasing to 0.3% of PBR for SSL in year 5, respectively. Over time, if habituated CSL and SSL were removed, it is possible that any remaining animals would be less experienced and less effective as predators. The removal of CSL and SSL in the action area might deter other CSL and SSL from the action area, either because exposure to the lethal activities would cause newly arriving animals to avoid the area or because the removal of experienced CSL and SSL would make it less likely that they would learn to forage successfully.

Conversely, it is likely that other CSL and SSL may eventually replace the CSL and SSL that were lethally removed, so the decrease in the number of CSL and SSL may be less than the number removed.

Under Alternative 2, harbor seals would not be subject to lethal removal. Compared to the No-action Alternative, Alternative 2 would result in similar if not identical effects with no changes in the range-wide abundance, distribution, or productivity of the population. The potential for the accidental lethal taking of a harbor seal would be negligible under this alternative because the conditions for lethal removal optimize the opportunity to positively identify the species of all animals subject to lethal removal.

Therefore, while up to 286 CSL and 130 SSL may be permanently removed over a 5-year period, Alternative 2 would not have a significant impact on the CSL or SSL population as the magnitude of the impact would not have a meaningful effect on the status of either sea lion population. There would be no population effects on harbor seals.

4.2.3 Alternative 3

Under alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations.

This alternative would allow up to 540 CSL and 176 SSL to be removed over a 5-year period. The removal of up to 540 CSL and 176 SSL for 5 years would have no effect on the overall range-wide abundance, distribution, and productivity of the CSL and SSL populations because the number of CSL and SSL involved is extremely small compared to the current number of animals that can be removed from the population without affecting its status with respect to OSP. There is a stable number of male CSL and SSL in each sea lion population, meaning that not all males that participate in the breeding migration are successful at establishing and maintaining breeding territories on the rookeries and therefore spend the breeding season at nearby haul-outs or at sea. Individual sea lions that would be permanently removed under Alternative 2, and that may have occupied a breeding territory, would be rapidly replaced by otherwise idle males from the population. Thus, compared to the No-action Alternative, Alternative 2 would result in no change in status of the populations range-wide, although it would reduce (albeit inconsequentially) the number of individual animals from each population.

Permanent captive holding of some CSL and SSL would also be possible under Alternative 2. Captive holding would be allowed by permitted holding facilities, in compliance with the standards established under the AWA. The 5-year limit of 540 CSL and 176 SSL that could be removed under Alternative 2 includes animals that are captured and transferred to permanent captivity, thus the effects of this activity are considered in the discussion above.

The abundance of CSL and SSL could be reduced by as much as 3% of PBR (14,011) for CSL in year 1, 2.6 % of PBR (2,498) for SSL in year 1, decreasing to 0% of PBR in year 5 for CSL, and decreasing to 0.3% of PBR in year 5 for SSL, respectively. Over time, if habituated CSL and SSL were removed, it is possible that any remaining animals would be less experienced and less effective as predators. The removal of CSL and SSL in the action area might deter other CSL and SSL from the action area, either because exposure to the lethal activities would cause newly

arriving animals to avoid the area or because the removal of experienced CSL and SSL would make it less likely that they would learn to forage successfully. Conversely, it is likely that other CSL and SSL may eventually replace the CSL and SSL that were lethally removed, so the decrease in the number of CSL and SSL may be less than the number removed.

Under Alternative 3, harbor seals would not be subject to lethal removal. Compared to the No-action Alternative, Alternative 3 would result in similar if not identical effects with no changes in the range-wide abundance, distribution, or productivity of the population. The potential for the accidental lethal taking of a harbor seal would be negligible under this alternative because the conditions for lethal removal optimize the opportunity to positively identify all animals subject to lethal removal.

Therefore, while up to 540 CSL and 176 SSL may be permanently removed over a 5-year period, Alternative 3 would not have a significant impact on the CSL or SSL population as the magnitude of the impact would not have a meaningful effect on the status of either sea lion population. There would be no population effects on harbor seals.

4.3 ESA-Listed Salmonids and Critical Habitat

The sections below describe the potential direct and indirect effects of the three alternatives on listed salmonids in the action area. If NMFS grants the state's request for lethal removal, there would be no direct effects on listed salmonids or their critical habitat. Indirect effects include those resulting from a change in pinniped predation, which could lead to a change in survival of fish residing in or passing through the action area.

ESA-Listed Salmonids

4.3.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS denies the eligible entities request for lethal removal authority, and there would be no lethal removal of CSL and SSL in the action area.

If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. However, the number of CSL removed would likely be at a lower rate that what the eligible entities proposed. The existing section 120 MMPA authorizations are set to expire on June 28, 2021, for Bonneville Dam and on November 14, 2023, for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

With respect to CSL and SSL in the action area, animals would likely continue to congregate in the action area to feed on returning adult salmon, steelhead, and eulachon and pinniped consumption of salmon, steelhead, and eulachon would likely continue at current rates similar to those in Table 1-1. Table 1-2, Table 1-3, and Table 4-1.
Therefore, if NMFS denies the eligible entities application, the No-action Alternative will continue to have the same population-level impacts on salmon, steelhead, and eulachon as

currently exist. However, the overall magnitude of these impacts would not be significant for purposes of NEPA evaluation.

4.3.2 Alternative 2

Under Alternative 2, NMFS would grant the eligible entities request for lethal and non-lethal removal as proposed in the eligible entities application.

With respect to indirect effects under Alternative 2, there would likely be an increase in survival (and a decrease in the level of extinction risk) of the at-risk fish species consider herein compared to the No-action Alternative.

Estimated benefits of the lethal removal program

Removal of CSL and SSL within the action area is expected to benefit salmon, steelhead, sturgeon, lamprey, and eulachon by reducing predation on migratory or spawning fish. Removal of predatory sea lions in the action area would benefit the affected fish species by decreasing predation events (improving the chance for survival), improving passage conditions (opportunity), and increasing the number (abundance) of adult salmon, steelhead, and eulachon that reach their respective spawning areas. In their application[37], the eligible entities estimated that the number of animals to be removed over a 5-year period would save (fish escaping sea lion predation) 4,832 to 54,359 salmon and steelhead.

In their application, the eligible entities calculated the mean number of fish needed to meet daily or monthly resting metabolic requirements for CSL and SSL using a bioenergetic model. The expected benefit of a range of management scenarios can be estimated for a site by modeling the starting abundance of sea lions, annual residence (number of days sea lions are present and preying on fish), removal rates (the percentage of animals removed each year), recruitment rate (number of new animals that migrate into the area), and diet (the proportion of steelhead, salmon, sturgeon in the daily diet). Using this approach, the number of fish of each species (spring and fall chinook, steelhead, eulachon) can be calculated that would be consumed during a 5-year period under scenarios of 1) no management, 2) current management, and 3) implementation of removals proposed in the application.

Therefore, Alternative 2 is expected to have a positive impact on the at-risk fish species considered herein from the reduction of sea lion predation. However, the magnitude of these positive effects would be incremental and therefore not significant as defined under NEPA.

4.3.3 Alternative 3

[37] The model scenarios are for Bonneville Dam and Willamette Falls only.

Under Alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations. With respect to indirect effects under Alternative 3, there would likely be an increase in survival (and a decrease in the level of extinction risk) of the at-risk fish species consider herein compared to the No-action Alternative, and an incremental increase in survival compared to Alternative 2.

Estimated benefits of the lethal removal program

Similar to the analysis in Alternative 2, removal of CSL and SSL within the action area is expected to benefit salmon, steelhead, sturgeon, lamprey, and eulachon by reducing predation on migratory or spawning fish. Removal of predatory sea lions in the action area would benefit the affected fish species by decreasing predation events (improving the chance for survival), improving passage conditions (opportunity), and increasing the number (abundance) of adult salmon, steelhead, and eulachon that reach their respective spawning areas. Based on changes to the number of animals to be removed (Task Force recommendations 5a and 5b) over a 5-year period, the eligible entities[38] estimated that the removal program under Alternative 3 would save (fish escaping sea lion predation) 13,089 to 78,533 salmon and steelhead.

Therefore, Alternative 3 is expected to have a positive impact on the at-risk fish species considered herein from the reduction of sea lion predation. However, the magnitude of these positive effects would be incremental and therefore not significant for purposes of NEPA.

Designated Critical Habitat

Under Alternative 2, NMFS would grant the eligible entities request for lethal and non-lethal removal as proposed in the eligible entities application. Under Alternative 2 and 3, impacts to critical habitat from intermittent mooring of floating traps and minor increase sound levels (decibel – dB) associated with boat use, or any of the physical and biological features (PBFs), e.g., spawning sites, juvenile rearing areas and migration corridors, adult migration corridors, food resources, water quality and quantity, and riparian vegetation) for the at-risk fish species in the action area are expected to be negligible as large areas of the action area are highly industrialized and we expect effects to the at-risk fish species in the action area critical habitat primary constituent elements (PBFs) – specifically, freshwater migration corridors – in the immediate project area are likely to be too small to affect the conservation of the PBF freshwater migration corridors in the project area as well as the action area. Therefore, we expect the probability of effects on critical habitat PBFs for the at-risk fish species in the action area would be too small to meaningfully measure, detect or evaluate, and therefore are likely to be negligible.

Therefore, Alternatives 2 and 3 would not have a significant impact on critical habitat, as the magnitude of habitat-related impacts would be inconsequential.

4.4 Non-Listed Fish Species

[38] Email to Robert Anderson, NMFS, from Bryan Wright, ODFW, June 8, 2020.

The sections below describe the potential direct and indirect effects of the three alternative actions on fish species other than listed salmon, steelhead, and eulachon in the action area. As with listed salmon, steelhead, and eulachon, if NMFS grants the eligible entities request for lethal and non-lethal removal, there would be no direct effects on non-listed fish (non-listed steelhead, white sturgeon and lamprey). Indirect effects include those resulting from a change in sea lion predation, which could lead to a change in survival of fish residing in or passing through the action area. Effects were analyzed only for those fish species with geographic ranges that overlap the action area, and for which run timing or presence coincides with the period of sea lion presence.

4.4.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS denies the eligible entities request for lethal removal authority, and there would be no lethal removal of CSL and SSL in the action area.

If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. However, the number of CSL removed would likely be at a lower rate that what the eligible entities proposed. The existing section 120 MMPA authorizations are set to expire on June 28, 2021, for Bonneville Dam and on November 14, 2023, for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

Additionally, consumption of non-listed fish species by CSL and SSL would therefore likely remain the same, with negative effects on productivity, abundance, and genetic and life history parameters for all affected populations. Sea lion predation levels on unlisted salmon and steelhead would likely be similar to levels seen in the past (Table 4.5-4 in the 2008 Bonneville Dam EA). Sea lion predation and consumption of white sturgeon and lamprey would likely continue at levels similar to those in Table 4-1 and Table 4-2.

Table 4-1. Consumption of White Sturgeon by CSL and SSL at Bonneville Dam tailrace during the spring sampling period from 2005 to 2019 (Tidwell et al 2020).

Year	Observed Sturgeon Catch	Adjusted Sturgeon Consumption Estimate
2005	1	-
2006	265	413
2007	360	664
2008	606	1,139
2009	758	1,710
2010	1,100	2,172
2011	1,353	3,003
2012	1,342	2,498
2013	314	635
2014	79	146
2015	24	44
2016	30	90
2017	6	24
2018	46	148
2019	22	187

Table 4-2. Consumption of Pacific Lamprey by CSL and SSL at Bonneville Dam tailrace during the spring sampling period from 2002 to 2019 (Tidwell et al. 2020).

Year	Observed Pacific Lamprey Catch	Expanded Pacific Lamprey Consumption Estimate
2002	34	47
2003	283	317
2004	120	816
2005	613	810
2006	374	424
2007	119	143
2008	111	145
2009	64	102
2010	39	77
2011	16	33
2012	40	79
2013	38	66
2014	41	85
2015	108	196
2016	232	501
2017	41	191
2018	16	58
2019	4	14

Therefore, under the No-action Alternative, sea lion predation on non-listed fish species is likely to continue at rates similar to those estimated in Table 4-2. Therefore, if NMFS denies the eligible entities application, the No-action Alternative will continue to have adverse impacts on non-listed fish species, but would not have a significant impact on the subject non-listed fish species as the magnitude of the effects would be minor at the population levels.

4.4.2 Alternative 2

Under Alternative 2, NMFS would grant the eligible entities request for lethal and non-lethal removal as proposed in the state's application.

With respect to indirect effects, Alternative 2 is expected to result in small increases in abundance of non-listed salmon and steelhead, white sturgeon and lamprey relative to the No-action Alternative. Under Alternative 2, predation by CSL and SSL on non-listed salmon and steelhead, white sturgeon would be expected to decrease over time.

Therefore, Alternative 2 is expected to have a positive impact on non-listed fish species due to a reduction in sea lion predation. However, the magnitude of these impacts would be small at the population level and therefore not significant.

4.4.3 Alternative 3

Under alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations. With respect to indirect effects under Alternative 3, there would likely be an increase in survival (and a decrease in the level of extinction risk) of fish species consider herein compared to the No-action Alternative, and an incremental increase in survival compared to Alternative 2.

Thus, Alternative 3 is expected to have a positive impact on non-listed fish species due to a reduction in sea lion predation However, the magnitude of these impacts would be small at the population level and therefore not significant.

4.5 Fish Habitat

Impacts to freshwater habitats from intermittent mooring of floating traps and minor increase sound levels (decibel – dB) associated with boat use are anticipated to be negligible. There would be no CSL and SSL removal activities that will impact substrate, water quality and quantity, and riparian vegetation. Lethal and non-lethal removal activates will likely have a small, positive impacts on food resources due to fewer CSL and SSL in the action area. Therefore, the proposed action will not impact EFH (subsection 3.7) for MSA-managed species.

Therefore, the No-action Alternative, Alternatives 2 and Alternative 3 would not have a significant impact on fish habitat, as the magnitude of habitat-related impacts would be inconsequential.

4.6 Recreation

4.6.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS denies the eligible entities request for lethal removal authority, and there would be no lethal removal of CSL and SSL in the action area.

If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. However, the number of CSL removed would likely be at a lower rate that what the eligible entities proposed. The existing section 120 MMPA authorizations are set to expire on June 28, 2021, for Bonneville Dam and on November 14, 2023, for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

Therefore, there would be no impacts to recreation in the action area as a result of the No-action Alternative as there would be no changes in CSL management activities at Bonneville Dam and Willamette Falls, and thus no changes in to recreational use or opportunities in the action area.

4.6.2 Alternative 2

Under Alternative 2, there may be minimal impacts to recreation in the action area during lethal and non-lethal removal activates as there may be a boat restriction zone established by the state to keep boaters away from the haul-out traps. At Bonneville Dam, the Corps maintains a boat restriction zone for public safety. There would be no changes to recreational activities at Bonneville Dan under Alternative 2. At Willamette Falls, the state marine board established a boat restriction zone in the vicinity of the floating traps at SportCraft Marina. There would be no changes to recreational activities at Bonneville Dan under Alternative 2. The size of the boat restriction zone would likely be very small compared to the cross-sectional area of the river and would be short in duration, and would not prevent boaters from using the river. As such, any impact of a "boat restriction zone" on recreation would be minimal, as recreational boating and fishing opportunities in the action area would remain open to the public during lethal removal activities, and would be short-lived in areas identified as Category 2 and Category 3, further minimizing recreational activities.

Therefore, Alternative 2 would not have a significant impact on because any limits on recreational use would be limited in scope and duration.

4.6.3 Alternative 3

Under alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations. The effects of the removal activates under Alternative 3 would be the same as Alternative 2.

Therefore, Alternative 3 would not have a significant impact on recreation because any limits on recreational use would be limited in scope and duration.

4.7 Cultural Resources

4.7.1 Alternative 1 (No Action)

Under the No-Action Alternative, NMFS would deny the eligible entities request for lethal removal authority of CSL and SSL in the action area. If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) [39] authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. The existing section 120[40] MMPA authorizations are set to expire in 2021 for Bonneville Dam and in 2023 for Willamette Falls. Non-lethal deterrence measures (including

[39] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

[40] The states of Oregon, Washington, and Idaho have an existing MMPA section 120 authorization to remove California sea lions at Bonneville Dam, and the state of Oregon has an existing MMPA section 120 authorization to remove California sea lions at Willamette Falls.

trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

In their application, the eligible entities would dispose of sea lion carcasses in accordance with applicable laws. However, if a tribe that is party to the application requests a sea lion carcass for educational and cultural uses, and NMFS approves the request, the eligible entities would provide sea lions carcasses to the requesting tribe. Under the No-Action Alternative the tribes would not be eligible to receive sea lion carcasses killed under the existing section 120 MMPA authorizations, however, the tribes can, with authorization, acquire sea lion carcasses pursuant to the marine mammal regulations at 50 CFR 216.22 for cultural uses.

Under the No-action Alternative, CSL and SSL would likely continue to prey on listed salmon and steelhead, eulachon, non-listed salmon and steelhead, white sturgeon, and lamprey likely reducing the availability of these cultural and commercial resources for Treaty tribes in the action area.

Thus, under the No-action Alternative, there would be a small, negative impact on cultural resources, but the magnitude of this impact would not be significant.

4.7.2 Alternative 2

Under Alternative 2, NMFS would grant the eligible entities request for lethal removal and non-lethal removal as proposed in the eligible entities June13, 2019, application.

With respect to indirect effects under Alternative 2, there would likely be an increase in survival (and a decrease in the level of extinction risk) of listed salmon and steelhead, eulachon, non-listed salmonids, white sturgeon, and lamprey compared to the No-action Alternative because of the lethal or non-lethal removal of CSL and SSL. Under Alternative 2, these increases in survival of listed salmon and steelhead, eulachon, non-listed salmonids, white sturgeon, and lamprey is likely to increase the availability of theses cultural and commercial resources for Treaty tribes in the action area.

Under Alternative 2, those tribes party to the application could actively participate in lethal removal of sea lions and may request sea lion carcasses for educational and cultural uses, which are an established historical cultural resource of the tribes. Access to sea lion carcasses for cultural uses would have a positive impact on tribal customs because it would afford them the ability to perform historical cultural practices that they currently do on a more limited basis due to the availability of sea lion carcasses.

Therefore, Alternative 2 would have a small, positive impact on cultural resources in the action area, but the magnitude of the positive effects would not be significant.

4.7.3 Alternative 3

Under alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations. The effects of the removal activates under Alternative 3 would be the same as Alternative 2.

Thus, Alternative 3 would have a small, positive impact on cultural resources in the action area, but the magnitude of the positive effects would not be significant.

4.8 Law Enforcement

4.8.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS would the eligible entities request for lethal removal authority of CSL and SSL in the action area. If NMFS denies the eligible entities application, the states (not tribes) may, under their existing section 120 MMPA authorizations (Bonneville Dam and Willamette Falls), and section 109(h) [41] authority of the MMPA, continue to use lethal (CSL) and non-lethal (pinnipeds) measures to remove sea lions and seals in the action area. The existing section 120[42] MMPA authorizations are set to expire in 2021 for Bonneville Dam and in 2023 for Willamette Falls. Non-lethal deterrence measures (including trapping and relocation) under section 109(h) of the MMPA are not linked to NMFS' decision to approve or deny the eligible entities application.

Therefore, there would be no impact on law enforcement in the action area as a result of the No-action Alternative as there would be no need for law enforcement services.

4.8.2 Alternative 2

Under Alternative 2, NMFS would grant the eligible entities request for lethal removal and non-lethal removal as proposed in the eligible entities June13, 2019, application.

Under Alternative 2, any of the law enforcement agencies noted in Section 3.8 could be called to assist during lethal removal activities, including NOAA's Office of Law Enforcement, Oregon State Police Fish and Wildlife Division, WDWF police, and the sheriff's offices and municipal police departments who have jurisdiction within the action area. Law enforcement personnel, when requested, would primarily help maintain adequate buffers between members of the public and traps during removal activities in areas identified as Category 1, and to a lesser extent, areas identified as Category 2 and Category 3. Law enforcement agencies providing assistance would vary based on location, such that simultaneous activities would not divert substantial personnel from any single agency.

Therefore, Alternative 2 would not have a significant impact law enforcement services.

4.8.3 Alternative 3

Under alternative 3, NMFS would grant the eligible entities request for lethal and non-lethal removal, with conditions based on the Task Force recommendations. The effects of the removal activates under Alternative 3 would be the same as Alternative 2.

[41] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

[42] The states of Oregon, Washington, and Idaho have an existing MMPA section 120 authorization to remove California sea lions at Bonneville Dam, and the state of Oregon has an existing MMPA section 120 authorization to remove California sea lions at Willamette Falls.

Thus, Alternative 3 would not have a significant impact on law enforcement services.

5. CUMULATIVE EFFECTS

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). This analysis examines the two resources that have the potential for cumulative effects when the proposed action (Alternative 3) is added to other past, present, and reasonably foreseeable future actions: marine mammals and listed salmonids.

5.1 Climate Change

Under either Alternative 1 (No-action) or Alternative 2 and Alternative 3 (Proposed Action), no significant effects to climate change are expected. No activities e.g., boat use, would occur under either alternative that would result in changes to greenhouse gas emissions or other pollutants that are likely to significantly contribute to environmental conditions associated with climate change.

Terrestrial and Ocean Conditions and Marine Survival—Salmonid Fishes

While no activities would occur under either alternative that would result in changes to greenhouse gas emissions or other pollutants that are likely to significantly contribute to environmental conditions associated with climate change, the current anomalously warm marine and freshwater conditions have been and will continue to be unfavorable for Pacific Northwest salmon and steelhead. How long the current conditions will last is unknown, but warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014). In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest include increasing sea surface temperature (SST), increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote et al. 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0-3.7°C by the end of the century (IPCC 2014). Although long-term trends in climate change are likely to place additional stress on the conservation and recovery of the at-risk fish species considered herein, NMFS does not expect that climate change would be significant enough to have an appreciable effect on the at-risk fish species considered herein in the short term.

Ocean Conditions and Marine Survival—Marine Mammals

While no activities would occur under either alternative that would result in changes to greenhouse gas emissions or other pollutants that are likely to significantly contribute to environmental conditions associated with climate change, the influence of changes in SST on the population growth of CSL and SSL could have an impact on CSL and SSL. If SST in the California Current increases 1°C in response to climate changes, model predictions on the annual growth rate would fall to zero and if the SST increased 2°C, the annual population growth rate for CSL would decline 7% (Laake et al. 2018). If this occurred, the population could rapidly

fall below the range of OSP, potentially changing the population's status under the MMPA (Laake et al. 2018). No such analysis is available for SSL.

5.2 Marine Mammals

The current population estimate for CSL is 257,606, and the stock is within its optimal sustainable population (OSP)[43] range (Carretta et al. 2019). For CSL, PBR is 14,011 animals annually (Carretta et al. 2019). This stock is not listed as "threatened" or "endangered" under the ESA, nor as "depleted" or "strategic" under the MMPA.

The current population estimate for SSL is 52,139 non-pups and 19,423 pups (Muto et al. 2019). Muto et al. (2019) conclude that the Eastern stock of SSL is likely within its OSP range; however, no determination of its status relative to OSP has been made. For SSL, PBR is 2,498 animals annually (Muto et al. 2019). This stock is not listed as "threatened" or "endangered" under the ESA, nor as "depleted" or "strategic" under the MMPA.

For the U.S. stock of CSL the PBR is 14,011 CSL per year (Carretta et al. 2019). The most recent comprehensive estimate of fisheries-related CSL mortality is in Carretta et al. 2019. Data from fisheries observers and west coast stranding networks reported an average annual mortality in fisheries of greater than 197 (CV 0.23) for the years 2012 through 2016. An additional 485 CSL mortalities and serious injuries were documented for non-commercial fishery sources.

Under the MMPA, four section 120 authorizations have been issued to the states of Oregon, Washington, and Idaho for the lethal removal program at Bonneville Dam, resulting in a total of 238 CSL have being removed since 2008, with 15 animals being placed in captivity, 7 accidental mortalities, and 216 euthanized. Under the MMPA, a section 120 authorization was issued to the state of Oregon in 2014 for the lethal removal program at Willamette Falls, resulting in a total of 33 CSL being removed. These are minimum numbers, as they represent only those reported. Such human-caused mortalities are reasonably expected to continue into the future (Carretta et al. 2019).

If human-caused mortalities remain at levels reported through 2018 in Carretta et al 2019, (197 fisheries related mortalities, 485 non-commercial fishery sources, in addition to an average of 20 CSL removed annually at Bonneville Dam and 33 CSL removed at Willamette Falls – although under the proposed action, the states would likely not remove CSL under their 120 authorizations, and an additional 540 (405 year 1, 111 year 2, 31 year 3, 8 year 4, and 2 year 5) CSL are killed over a 5-year period under the proposed action, the cumulative total human-caused mortalities would represent a maximum potential of 8.1 percent of the estimated PBR (14,011) in year 1, and decreasing to 4.9 percent of PBR thereafter in year 5. Even though

[43] Maximum net productivity level (MNPL) has been expressed as a range of values (between .50 and .70 of K) (K = carrying capacity) determined on a theoretical basis by estimating what stock size, in relation to the original stock size, will produce the maximum net increase in population. OSP is a population size that is at or greater than its MNPL, which is the population size that produces the maximum net productivity (e.g., greatest net change in the population). OSP = a population size ≥ MNPL (>K*.60).

human-caused mortalities are likely higher than those reported, this level of impact is well below what the population can sustain.

For SSL, PBR is 2,498 animals annually (Muto et al. 2019). The most recent comprehensive estimate of fisheries-related SSL mortality is in Muto et al. 2019. Mortality related to all fisheries in 2010 through 2014 was 52 SSL. An additional 40 SSL non-fishery-related mortalities for the years 2010 through 2014. Additionally, Alaska Native harvested 56 SSL in the years 2005 through 2012 (Muto et al. 2019), with an average of 11 SSL per year.

If human-caused mortalities remain at levels reported through 2014 in Muto et al. 2019, mean annual mortalities – 52 fisheries related mortalities, 40 non-fishery-related mortalities, 11 SSL harvested annually, and an additional 176 (65 year 1, 36 year 2, 20 year 3, 11 year 4, and 6 year 5) SSL are killed over a 5-year period under the proposed action, the cumulative total human-caused mortalities would represent a maximum potential of 6.7 percent of the estimated PBR (2,498) in year 1, and decreasing to 4.7 percent of PBR thereafter in year 5.

Under Alternative 3, it is likely that CSL and SSL would continue to be present in the action area, but a reduced numbers.

There are no significant cumulative impacts associated with the No-action Alternative or Action Alternatives. Human-related mortality will remain below the PBR. Therefore, the incremental effect of the proposed action, plus those activities reasonably expected to occur in the future, cumulatively, have a small effect.

5.3 ESA-Listed and Non-ESA Listed Fish Species

Subsection 3.3 describes the status of salmon, steelhead, and eulachon, and subsection 3.4 describes the status of lamprey and sturgeon, respectively. These at-risk fish species potentially affected by the proposed action have been in an at-risk status for several years, in some cases decades. Many factors have led to their decline and are preventing their recovery (subsection 3.3). The causes of these declines are not well understood, but Federal and state agencies, tribes, landowners, watershed councils, and private organizations have undertaken a large number of actions aimed at reducing the losses of these at-risk fish from a number of sources. These combined actions represent an extraordinary and unprecedented cooperative effort in the Columbia River basin to protect and recover salmon and steelhead. For the ESA-listed species, recovery plans have been developed and implemented in every watershed, including actions to: restore important habitat; improve dam passage survival; re-tool hatchery programs to assist production in wild populations; and close, reduce or reshape fisheries to limit fishery-related mortality of listed species and focus on selectively harvesting fish species. These efforts equate to hundreds of millions of dollars invested annually and billions over the past decades.

Under Alternative 1, CSL and SSL predation within the action area is expected to remain at similar levels negatively impacting salmon, steelhead, eulachon, lamprey, and sturgeon abundance and productivity.

Under Alternatives 2 and 3, the removal of CSL and SSL within the action area is expected to benefit salmon, steelhead, eulachon, lamprey, and sturgeon by reducing predation on migratory

or spawning fish. Removal of predatory sea lions in the action area will benefit the affected fish species by decreasing predation events (improving the chance for survival), improving passage conditions (opportunity), and increasing the number (abundance) of adult salmon, steelhead, eulachon, lamprey, and sturgeon that reach their respective spawning areas. Under Alternative 2, the removal program would save (fish escaping sea lion predation) 4,832 to 54,359 salmon and steelhead over a 5-year period. Under Alternative 3, the removal program would save (fish escaping sea lion predation) 13,089 to 78,533 salmon and steelhead over a 5-year period.

Therefore, Alternatives 2 and 3 would offer a positive incremental effect on ESA-listed salmon and steelhead.

There is no single action available that would be likely to recover these ESA-listed species on its own. As identified in recovery planning documents, the recovery of these species requires incremental improvements in the array of factors that cause mortality. The proposed action would make an incremental contribution, in addition to other efforts, to decreasing all sources of mortality. Therefore, despite the negative impacts of climate change and the continued degradation of habitat from development, when taken cumulatively, the proposed action will result in a small, positive effect to the at-risk fish species considered herein.

6.0 AGENCIES AND ORGANIZATIONS CONSULTED

NMFS coordinated with various programs and offices within the agencies and entities listed below in preparation of this EA. In particular, development of the EA was greatly influenced by the work done by the Pinniped-Fishery Interaction Task Force for. Task Force members from the agencies and organizations listed below represented the broad spectrum of opinion and expertise concerning the pinniped-fishery interaction.

Pinniped-Fishery Interaction Task Force

Employees of Dept. of Commerce

- Robert Delong — NMFS, National Marine Mammal Laboratory

Scientists Knowledgeable about Pinniped-Fishery Interaction

- Tim Ragen — Retired, Marine Mammal Scientist
- Doug McMaster — Retired, Marine Mammal Scientist

Conservation Organizations

- Sharon Young — Humane Society of the United States
- Jeff Laake — The Wildlife Society
- Charles Harry — International Fund for Animal Welfare
- Amy Cutting — The Oregon Zoo
- Traci Belting — Seattle Aquarium

Fishing Organizations

- Liz Hamilton — Northwest Sport Fishing Industry Association
- Bob Rees — Northwest Guides and Anglers Association

Indian Treaty Tribes

- Carl Scheeler — Confederated Tribes of the Umatilla Indian Reservation
- Olney Patt — Confederated Tribes of the Warm Springs Reservation
- Paul Ward — Confederated Tribes and Bands of the Yakama Nation
- Jack Yearout — Nez Perce Indian Tribe

Indian Tribes

- Kelly Dirksen — Confederated Tribes of the Grand Ronde Community of Oregon
- Robert Kentta — Confederated Tribes of Siletz Indians of Oregon

States

- Shaun Clements — Oregon Department of Fish and Wildlife
- Kessina Lee — Washington Department of Fish and Wildlife
- Joe Dupont — Idaho Department of Fish and Game

Other

- Doug Hatch — Columbia River Inter-Tribal Fish Commission
- Sean Tackley — U.S. Army Corps of Engineers
- William Hurley IV — International Marine Animals Trainers Association

NMFS solicited comments from the public and provided those comments to the Task Force for their consideration. Topical briefings, from state, tribal, and Federal agency experts, were provided to the Task Force to familiarize them with data and observations collected in the Columbia River Basin, salmon and steelhead recovery planning, preparation and contents of the state's application, and the pinnipeds involved. The Task Force met for three days to discuss the available data and develop recommendations to guide NMFS in its decision to approve or deny the state's application. The Task Force meetings were open to the public and during the meeting any new information provided by the public was distributed to Task Force members for their consideration.

During the establishment of the Task Force, NMFS coordinated with the Marine Mammal Commission to identify a Commission representative to participate in the Task Force proceedings. Observers from the Commission also attended the Task Force meetings to observe the deliberations.

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8. FINDING OF NO SIGNIFICANT IMPACT (FONSI)

The Council on Environmental Quality (CEQ) regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually, as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

Response: The proposed action will cause both beneficial (fish escaping sea lion predation) and adverse impacts (permanent removal of up to 540 CSL and 176 SSL), but these impacts will not result in a significant impact on the quality of the human environment.

Under Alternative 3, the removal program would save (fish escaping sea lion predation) 13,089 to 78,533 salmon and steelhead over a 5-year period.

The proposed action will adversely affect individual CSL and SSL (target species) because as many as 540 CSL and 176 SSL may be removed, i.e., transferred to zoos or aquaria or killed, over the five-year period of this authorization. The most recent stock assessment report reveals the current population estimate for CSL is 257,606 (Carretta et al., 2019). The PBR level is 14,011 animals per year (Carretta et al., 2019). The stock is now within its OSP range and is likely at its carrying capacity. The current population estimate for SSL is 52,139 non-pups and 19,423 pups (Muto et al. 2019). For SSL, PBR is 2,498 animals annually (Muto et al. 2019). Muto et al. (2017) conclude that the stock is likely within its OSP; however, no determination of its status relative to OSP has been made.

However, the permanent removal of 540 CSL and 176 SSL will have neither a measurable effect on the overall range-wide abundance, distribution, or productivity of the respective sea lion populations. PBR is the estimated number of animals that can be removed from a marine mammal population without affecting its status with respect to OSP. Therefore, given the respective sea lion population sizes and their respective PBR levels, the number of animals potentially affected is extremely small, and the proposed action will have no effect on the range-wide abundance, distribution, or productivity of either sea lion population.

Many factors have led to the decline and are preventing the recovery of listed salmon and steelhead in the Columbia River Basin. Implementation of the proposed action will make a contribution to improving survival of returning adult salmon, steelhead, and eulachon. While as a single action it is not sufficient to recover these listed species, there is no single action available that will accomplish that goal. The proposed action will make an incremental contribution towards the recovery of the ESA-listed species and species of concern considered

herein, in addition to other efforts, and will make a substantial contribution to reducing the near-term risk of extinction by decreasing mortality from known sources.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

Response: The proposed action is not anticipated to result in adverse effects on public health or safety. All CSL and SSL intentionally killed would be euthanized by lethal injection off-site and disposed of in accordance with applicable laws. The eligible entities would conduct wildlife darting activities in accordance with the protocols established by the IACUC. Additionally, the eligible entities are required to coordinate with local authorities prior to removal activities in the action area.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

Response: The proposed action is not anticipated to result in adverse effects on unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas because lethal removal activities will not alter the physical environment or result in impacts to any unique characteristics in the action area.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

Response: The impacts of the proposed action on the human environment are well known and not the subject of controversy. It is widely acknowledged that CSL and SSL located in the Columbia River Basin prey upon at-risk fish species. The impacts of the proposed action of removing a small fraction of the CSL population and SSL population are straight-forward and well understood.

There is, however, disagreement among various constituents as to the significance of CSL and SSL predation on at-risk salmonids and whether these animals should be held responsible for declining salmon and steelhead runs or delays in recovery. These differences of opinion were the basis for a number of comments NMFS received from the public expressing support for and opposition to the proposed action.

This is not the first time these disagreements have been aired, and as indicated by the public comments, some members of the public remain opposed to any lethal removals. The proposed action is functionally identical to the previous authorizations (Ballard Locks, Washington; Bonneville Dam, Oregon and Washington; and Willamette Falls, Oregon) which were subject to judicial review and upheld.

While the disagreement among some parties continues, the effects of the proposed action on the human environment are not scientifically controversial.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The effects of the proposed action are well known and will not involve unique or unknown risk. The effect of lethal removals on CSL and SSL will be inconsequential at the population level. As explained above and in the EA, the removal of as many as 540 CSL and 176 SSL animals from their respective populations will have no effect on the overall range-wide abundance, distribution, or productivity of the CSL and SSL populations because the number of sea lions involved is extremely small compared to the current number of animals (14,011, CSL and 2,498, SSL) that can be removed from the population (PBR) on an annual basis without affecting their status with respect to OSP. It is also known that sea lion removal will result in improved salmon, steelhead, and eulachon survival, although it is not possible to determine how much of a survival improvement will occur until the lethal removal program is implemented.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The proposed action will not establish a precedent for future actions or represent a decision in principle because the proposed action is in response to the specific circumstances outlined in the eligible entities' application for lethal removal authority under MMPA section 120(f). NMFS, the Task Force, and the eligible entities will continue to monitor and evaluate the effectiveness of the actions taken under the authorization. The proposed action is specific to the action area described and is not applicable beyond the scope of the subject application received from the eligible entities. NMFS is not aware of any future applications under section 120 or 120(f) at this time.

7. Is the proposed action related to other actions, that when considered together will have individually insignificant but cumulatively significant impacts?

Response: Many factors have led to the decline and are preventing the recovery of listed salmon, steelhead, and eulachon in the Columbia River Basin. Implementation of the proposed action will make a contribution to improving survival of returning adult salmon, steelhead, and eulachon. While as a single action it is not sufficient to recover these listed species, there is no single action available that will accomplish that goal. The proposed action will make an incremental contribution towards the recovery of the ESA-listed species and species of concern considered herein, in addition to other efforts, and will make a substantial contribution to reducing the near-term risk of extinction by decreasing mortality from known sources. Furthermore, even with implementation of the preferred alternative (Alternative 3), the cumulative effects on the respective CSL and SSL, will not have a material effect on the overall range-wide abundance, distribution, and productivity of the respective CSL and SSL populations

because the number of animals removed is extremely small compared to the current number of animals that can be removed from their populations without affecting their status with respect to their respective OSP.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

Response: The proposed action is not anticipated to result in adverse effects on historic or cultural resources because lethal removal activities will not alter the physical environment or result in impacts to listed or eligible resources in the action area.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

Response: Implementation of the proposed action could result in an increase of 13,089 to 78,533 salmon and steelhead over a 5-year period of this authorization, which will likely result in an incremental increase in salmon, steelhead, as well as eulachon productivity by reducing CSL and SSL predation (beneficial effect). Because there are no effects on riparian areas, and insignificant effects substrate, or water quality associated with intermittent mooring of floating traps and boat use, no material impacts to salmon, steelhead, and eulachon critical habitat are anticipated (e.g., spawning sites, juvenile rearing areas and migration corridors, adult migration corridors, food resources, water quality and quantity, and riparian vegetation). Thus, the proposed action will not have a significant impact on critical habitat in the action area.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?

Response: The proposed action will be conducted in a manner complementary to other Federal, state, tribal, and local plans and policies addressing salmon, steelhead, and eulachon survival in the Columbia River Basin. The proposed action will be limited to those activities necessary to reduce adult salmon, steelhead, and eulachon losses due to sea lion predation and will be conducted in a manner consistent with all laws.

11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?

Response: The proposed action will adversely affect individual CSL and SSL (target species) because as many as 540 CSL and 176 SSL may be removed, i.e., transferred to zoos or aquaria or killed, over the 5-year period of this authorization. The most recent stock assessment report reveals the current population estimate for CSL is 257,606 (Carretta et al., 2019). The PBR level is 14,011 animals per year (Carretta et al., 2019). The stock is now within its OSP range and is likely at its carrying capacity. The current population estimate for SSL is 52,139 non-pups and

19,423 pups (Muto et al. 2019). For SSL, PBR is 2,498 animals annually (Muto et al. 2019). Muto *et al*. (2017) conclude that the stock is likely within its OSP; however, no determination of its status relative to OSP has been made.

Permanent removal of 540 CSL and 176 SSL will have neither a measurable effect on the overall range-wide abundance, distribution, and productivity of the respective sea lion populations. PBR is the estimated number of animals that can be removed from a marine mammal population without affecting its status with respect to OSP. Therefore, given the respective sea lion population sizes and their respective PBR levels, the number of animals potentially affected is extremely small, and the proposed action will have no effect on the range-wide abundance, distribution, or productivity of either sea lion population.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?
Response: The proposed action will not adversely affect species managed under the ESA or the MSA for the reasons outlined in response to question 1 above.

13. Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?

Response: There will be no adverse effects to EFH for MSA-managed species as there will be no material impact on water quality or substrate necessary for MSA-managed species in the action area to carry out spawning, breeding, feeding, or growth to maturity.

14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?

Response: There will be no effect on vulnerable marine or coastal ecosystems from the proposed action because the action area does not include marine or coastal habitats or deep coral ecosystems.

15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: The proposed action will have no effect on benthic productivity because the action will not occur near the benthos. Lethal removal of a small number of CSL and SSL will a negligible effect on bio-diversity in the action area. In spite of limited removals, the abundance of CSL and SSL will continue to fluctuate in response to available prey. The proposed action is not likely to eliminate CSL and SSL from the action area.

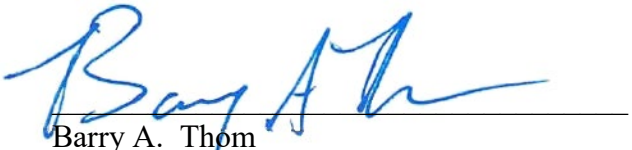
The Columbia River Basin has been described as a highly altered and degraded ecosystem and an active program has been implemented to reduce piscivorous predators, e.g., northern pike minnow, Caspian terns, double-crested cormorants, in the Columbia River River. The purpose of these programs, and the one proposed here, is to bring the predator-prey relationship back to a balance that is closer to what would occur in an unaltered environment.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: The proposed action is not expected to import, introduce, or contribute to the spread of non-indigenous species because vessels and equipment used for the project are already in use by the eligible entities in the Columbia River Basin or will be fabricated or purchased for the project.

DETERMINATION

In view of the information presented in this FONSI and the analysis contained in the EA prepared for NMFS' approval of the eligible entities' (the Oregon Department of Fish and Wildlife, the Washington Department of Fish and Wildlife, the Idaho Department of Fish and Game; the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Willamette Committee) application requesting authorization to intentionally take, by lethal methods, CSL and SSL in the action area (the main stem of the Columbia River between river mile 112 (I-205 bridge) and river mile 292 (McNary Dam), or in any tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead), pursuant to section 120(f) of the MMPA (i.e., the proposed action), it is hereby determined that the proposed action will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.



August 14, 2020
Date

Barry A. Thom
Regional Administrator
West Coast Region
National Marine Fisheries Service