Environmental Assessment

Reducing the Impact on At-Risk
Salmon and Steelhead by California Sea Lions
In the Willamette River

National Marine Fisheries Service

West Coast Region

1201 Lloyd Blvd., Suite 1100
Portland, OR 97232

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Cover Sheet

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Proposed Action:	Approval of the State of Oregon's Application Requesting Authorization to Intentionally Take, by Lethal Methods, California Sea Lions in the Vicinity of Willamette Falls Pursuant to Section 120 of the Marine Mammal Protection Act.
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List of Acronyms

ACC	Animal Care Committee
AWA	Animal Welfare Act
BRT	Biological Review Team
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
ICC	Incident Command Center
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
PCE	Primary Constituent Element
PVA	Population Viability Analysis
SSL	Steller Sea Lions
WBP	Willamette Basin Project
WDFW	Washington Department of Fish and Wildlife
WRBO	Willamette River Biological Opinion

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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 to reduce California sea lion (CSL) predation on salmonid fishes listed as threatened or endangered under the Endangered Species Act (ESA) in the Willamette River (Figure 1.1) as detailed in the state of Oregon's (state) October 6, 2017, application. The analysis will inform NMFS' decision-making regarding whether to approve or deny the state's request to intentionally take, by lethal methods, individually identifiable CSL in the Willamette River, Oregon.

Willamette Falls, located approximately 26 miles upriver from the confluence of the Willamette River and the Columbia River (Figure 1.1) and 128 miles from the ocean, is a combination natural falls and hydroelectric dam. While CSL predation on salmonids likely occurs throughout this 128 miles long distance, supporting data for the purposes of this application comes largely from the 2.5 miles long reach between the mouth of the Clackamas River and the base of Willamette Falls. Candidate CSL identified for removal would be based on data from this area, although removals themselves could occur wherever it was safe and logistically feasible to do so (e.g., Astoria, Bonneville Dam), other than the breeding grounds.

1.1.1 Pinniped Predation in the Vicinity of Willamette Falls

California sea lions hunt for and eat migrating adult salmonids as the fish move through the Willamette River and ascend Willamette Falls by migrating through the Willamette Falls Locks. Two ESA-listed species[1] – Upper Willamette River (UWR) spring-run Chinook salmon and UWR winter steelhead are affected by pinniped predation in the Willamette River. These two species have populations particularly vulnerable to predation because their run timing coincides with peak abundance of CSL in the Willamette River. Pinniped predation in the Willamette River is a recent source of increased mortality for adult salmonids and non-lethal efforts to control this source of mortality have proven ineffective.

The first known record of a CSL at Willamette Falls is from the 1950s, when a single CSL was shot below the falls, with the next subsequent record not occurring until 1980 (Beach et al. 1985). By the mid-1990s, however, there were frequent observations of CSL in the Willamette River where they were observed foraging for a number of fish including winter steelhead and spring-run Chinook salmon below Willamette Falls (ODFW 2017). The Oregon Department of Fish and Wildlife (ODFW) began a predation monitoring program at Willamette Falls in 1995

[1] The ESA defines a "species" to include any distinct population segment (DPS) of any species of vertebrate fish or wildlife, 16U USC§ 1532(16). For Pacific salmon, NMFS considers an evolutionarily significant unit, or ESU, a "species" under the ESA.

followed by a CSL branding program at Astoria in 1997 to monitor foraging behavior throughout the Columbia River basin.

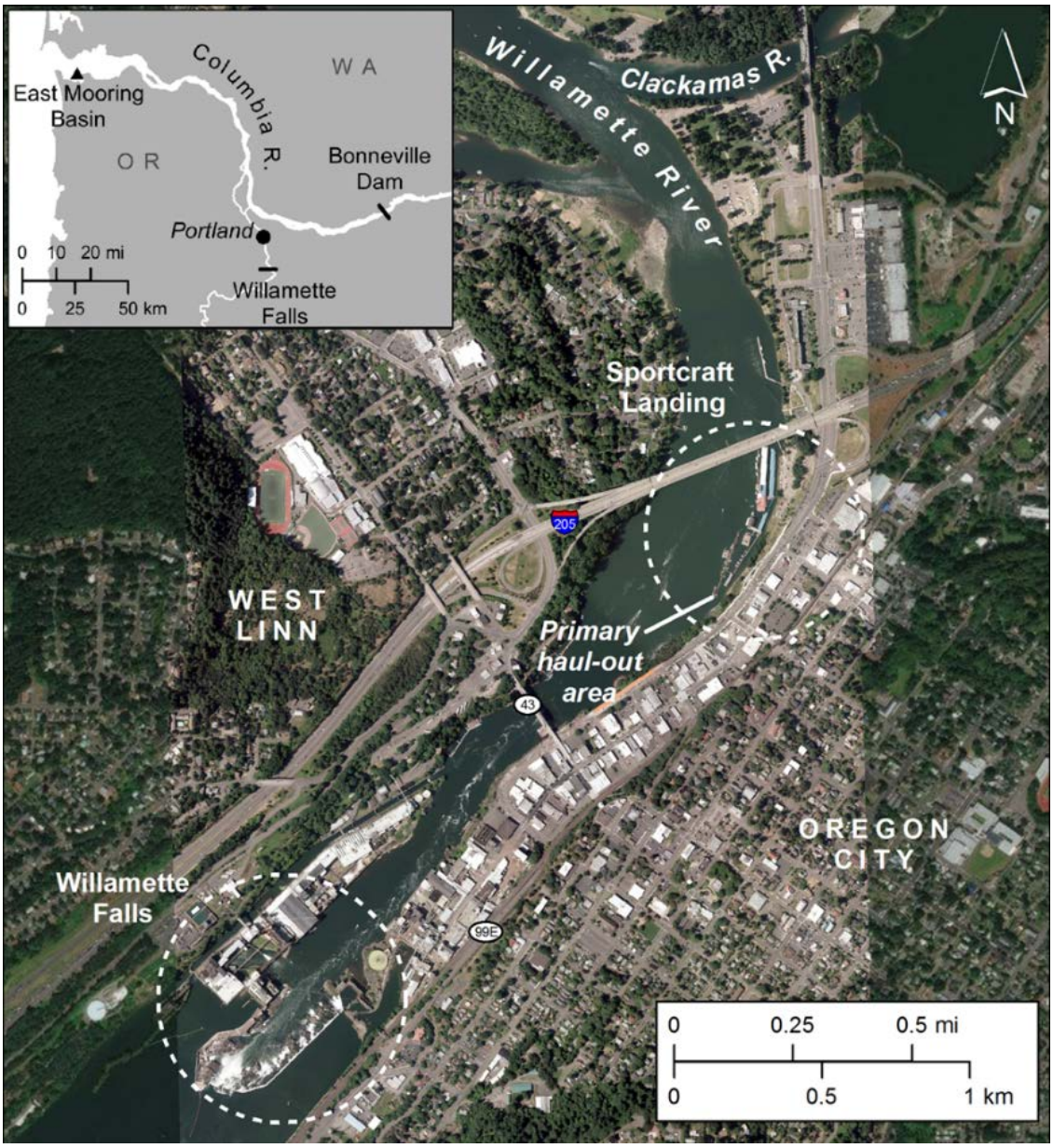

Figure 1.1. Map showing Willamette Falls to the mouth of the Clackamas River. Inset map shows location of Willamette Falls relative to Columbia River including Bonneville Dam and the haul-out area at the East Mooring Basin in Astoria.

Pinnipeds hunt for and eat a variety of fish in the Willamette River (Table 1.1). The combined data in Table 1.1 show the observed pinniped predation on prey in the vicinity of Willamette Falls, with the highest proportion of prey being salmonids. The combined data in Table 1.2 show the percent of pinniped predation on UWR spring-run Chinook salmon and UWR winter steelhead and for the years 2014-2017.

Table 1.1. Observed pinniped predation on prey in the vicinity of Willamette Falls, 2014-2017 (ODFW - Application).

	Observed Predation						Percent of Observations				
Years	2014	2015	2016	2017	Total		2014	2015	2016	2017	Total
Salmonids	959	1139	1001	753	3852		86.7	85.2	83.8	82.7	84.7
Lamprey	126	175	182	145	628		11.4	13.1	15.2	15.9	13.8
Unknown	18	21	11	12	62		1.6	1.6	0.9	1.3	1.4
Sturgeon	3	2	0	0	5		0.3	0.1	0.0	0.0	0.1
Total	1,106	1,337	1,194	910	4547		100	100	100	100	100

Table 1.2. Estimated pinniped predation on UWR spring-run Chinook salmon and UWR winter steelhead in the vicinity of Willamette Falls, 2014-2017 (ODFW - Application).

	Estimated Predation					Predation as a Percent of the Total Return			
Years	2014	2015	2016	2017		2014	2015	2016	2017
UWR Steelhead	780	577	915	270		12	11	14	25
UWR Chinook	496	899	650	399		7	9	9	6

The trend in CSL abundance in the Willamette River over this period has been steadily upward, with single-day maximum counts increasing each year as follows: 27 (2014), 32 (2015), 35 (2016), and 40 (2017).

1.1.2 Marine Mammal Protection Act Section 120

a. Marine Mammal Protection Act Section 120

In 1994, Congress amended the MMPA, adding section 120, which established a process for authorizing intentional lethal take of individually identifiable pinnipeds that have a significant negative impact on the decline or recovery of salmonid fishery stocks (16 USC § 1389).

On October 6, 2017, the state applied to the Secretary of Commerce (Secretary) for authority to lethally take, by intentional means, individually identifiable CSL in accordance with the section 120 process. In their section 120 application, the state contends that the loss of ESA-listed UWR spring-run Chinook salmon and UWR winter steelhead to CSL predation is having a significant negative impact on recovery of these two fish species because it is a significant and 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).

The Secretary, acting through the Assistant Administrator for NMFS, acting through the WCR the Regional Administrator, determined that the state's section 120 application provided

sufficient evidence to warrant establishing a Pinniped-Fishery Interaction Task Force (Task Force).

b. Public Comments

In a *Federal Register* notice published on November 9, 2017, NMFS announced receipt of the state's application and solicited public comments on the application and any additional information that should be considered. NMFS received 792 public comments, with 677 public comments expressing support for the state's request for lethal removal, 99 public comments expressing opposition to the state's requests for lethal removal, and 16 public comments were solely Task Force nominations or could not be classified as either supporting or opposing the state's request for lethal removal.

c. *Task Force*

On August 20, 2018, NMFS announced establishment of the Task Force and provided information about its first public meeting. Convened on August 20, 2018 — August 22, 2018, the Task Force reviewed the state's application, public comments on the state's application, information on the status of UWR spring-run Chinook salmon and UWR winter steelhead, and other information related to CSL predation on UWR spring-run Chinook salmon and UWR winter steelhead in the Willamette River.

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 state's application. The Task Force met for three days and provided its final report and recommendations to NMFS on October 15, 2018, with 12 of the 16 Task Force members present at the meeting (12 Task Force members voted to approve, 1 Task Force member voted to deny, 3 Task Force members abstained from voting), and 2 Task Force members were absent, recommending that NMFS approve the state's application, with modifications.

The Task Force meetings were open to the public. No public comments were submitted.

1.1.3 Proposed Action

NMFS proposes to approve the state's October 6, 2017 application requesting authorization under Section 120 of the MMPA to intentionally take, by lethal methods, individually identifiable CSL in the Willamette River, Oregon, under certain conditions, as recommended by the Task Force, in accordance with the MMPA. If approved, NMFS would issue an authorization to the state of Oregon to lethally remove certain individually identifiable California sea lions that are having a significant negative impact on UWR spring-run Chinook salmon and UWR winter steelhead in the vicinity of Willamette Falls. These conditions are described in more detail in Section 2 under Alternative 3.

1.1.4 Purpose and Need for the Proposed Action

Pinniped predation on UWR spring-run Chinook salmon and UWR winter steelhead in the Willamette River is well documented. To reduce this predation, the state applied for lethal take authority under Section 120 of the MMPA. The purpose of the proposed action is to support the state's efforts to improve adult salmon and steelhead survival and recovery by reducing pinniped predation in the vicinity of Willamette Falls, consistent with the MMPA and in consideration of the Task Force recommendations. The need for the proposed action is that NMFS must respond to the state's section 120 application, as prescribed in the MMPA, to address the severity of pinniped predation, which contributes to the decline or recovery of UWR spring-run Chinook salmon and UWR winter steelhead in the Willamette River.

1.1.5 Relationship to Endangered Species Act Recovery Plans and Policies

The proposed action and alternatives analyzed in this EA relate to other Federal, state, tribal, and local plans and policies addressing salmon and steelhead survival in the Willamette River basin.

ESA section 4(f) recovery planning has generally recognized addressing pinniped predation as important to increasing the survival of adult salmonids returning to spawn in the Willamette River. The proposed action is consistent with recovery actions identified in the recovery plan for UWR spring-run Chinook salmon and UWR winter steelhead.

Other sources of adult and juvenile salmonid mortality are addressed through ESA section 7 consultation for federal actions likely to adversely affect listed fish. Through the consultation process federal agencies or applicants may change their proposed actions to avoid harming listed fish, or NMFS may recommend that they conduct their proposed action in a way that reduces or mitigates harm to listed fish. NMFS consults on a host of actions in the Willamette River including the Willamette Basin Project (WBP), commercial, recreational, and tribal fisheries; forest management; irrigation withdrawals; road construction; grazing; and numerous other actions that affect fish habitat and fish migration. Measures required by the Willamette River Biological Opinion—WRBO (NMFS 2011), such as improved passage facilities, and habitat protection and restoration, as well as their costs, are substantial regional efforts.

While the proposed action is limited to those activities necessary to reduce adult salmonid losses due to pinniped predation (see subsection 1.3, Purpose and Need for the Proposed Action), the proposed action is considered in the context of comprehensive actions addressing all aspects of the salmonid life cycle, and other actions already being taken to recover listed salmonids (see Section 5, Cumulative Effects). Reducing pinniped predation in the Willamette River is one of several mechanisms to improve adult salmonid survival.

2. ALTERNATIVES

2.1 Introduction

NMFS evaluated three alternatives for their ability to improve adult salmonid survival by reducing pinniped predation in the vicinity of Willamette Falls. Specifically, NMFS used the criteria listed in subsection 2.1.2, Decision Criteria, and identified three alternatives that met all or most of the criteria. These three 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 vicinity of Willamette Falls, a combination natural falls and hydroelectric dam (Figure 1-1). Willamette Falls is located approximately 26 miles upriver from the confluence with the Columbia River and 128 miles from the ocean. While pinniped predation on salmonids likely occurs throughout this 128 mile long distance, supporting data for the purposes of this proposed action comes largely from the 2.5 mile long reach between Willamette Falls and the mouth of the Clackamas River. While trapping and transport of CSL would occur with the action area, most of the program activities will take place between the primary haul-out area and the boat launch near the northern end of Sportcraft Landing/Marina. CSL identified for removal would take place off-sight.

2.1.2 Decision Criteria

In developing a range of reasonable alternatives, NMFS first established the following decision criteria and then evaluated the extent to which each potential alternative would meet these decision criteria as a reasonable proposed action. The alternative decision criteria are listed below, and two "minimum threshold" criteria are identified because they represent statutory requirements of the MMPA and NEPA, which all alternatives must meet. NMFS' interpretation of MMPA requirements is further discussed in subsection 2.1.3, MMPA Requirements.

1. Has the potential to meet MMPA requirements (*minimum threshold*)
2. Meets the purpose and need for the action (*minimum threshold*)
    - Reduces pinniped predation in the vicinity of Willamette Falls
    - Improves adult salmon and steelhead survival and recovery
    - Responds to the state's MMPA section 120 application
3. Contains lethal action, non-lethal action, or combination of both
4. Includes a monitoring component
5. Does not remove more CSL than necessary to eliminate the problem interaction
6. Does not cause CSL population to fall below its optimum sustainable population (OSP) (as defined in MMPA section 3(9))
7. No removal at rookeries
8. Lethal removal by humane measures as defined by MMPA section 3
9. Lethal removal for animals where non-lethal efforts have failed

10. Carcass disposal consistent with applicable laws
11. Protects public safety

NMFS evaluated three initial alternatives to address the using these decision criteria: (1) the state's application, (2) the application as modified by the Task Force recommendations, and (3) actions to address other sources of salmonid mortality. The first two initial alternatives met all of the decision criteria and were carried forward as action alternatives. The third initial alternative (discussed subsection 2.3, Alternatives Considered but Not Analyzed in Detail) did not meet the threshold criteria; it did not fulfill the purpose and need for the action in that it did not reduce pinniped predation. While the no-action alternative does not fulfill the purpose and need, NMFS is required under NEPA to evaluate it to provide a context from which to describe the effects of the action alternatives.

2.1.3 MMPA Requirements

MMPA section 120 (b)(1) 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 fishery stocks." The following discussion describes NMFS' application of this MMPA language in the context of the facts in the Willamette River. NMFS' application has been informed by a number of factors, including: 1) public comments on the notice accepting the state's application; 2) the Task Force recommendations; 3) past experience with section 120 implementation; and 4) section 120(b)(1)'s legislative history, particularly, ambiguous Congressional intent concerning the meaning of "individually identifiable pinnipeds" and "significant negative impact." NMFS believes the state's application is reasonable in light of the statute's ambiguity and the specific facts and circumstances surrounding the proposal to lethally remove pinnipeds in the Willamette River.

In this EA, NMFS relied on the requirement in Section 120(b)(1) of the MMPA in considering whether the state's application should be approved or denied, which include:

> A state may apply to the Secretary to authorize the intentional lethal taking of individually identifiable pinnipeds which are having a significant negative impact on the decline or recovery of salmonid fishery stocks which—
>
> > (a) Have been listed as threatened species or endangered species under the Endangered Species Act of 1973 (16 U. S.C. 1531 et seq.);
> > (b) The Secretary finds are approaching threatened species or endangered species status (as those terms are defined in that Act); or
> > (c) Migrate through the Ballard Locks at Seattle, Washington.

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

> (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(e) of the MMPA regarding limitations where the Secretary shall not approve the intentional lethal taking of pinnipeds. 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 for their ability to improve adult salmonid survival by reducing pinniped predation in the Willamette River. Specifically, NMFS used the criteria listed in subsection 2.1.2, Decision Criteria, and identified three alternatives that met all or most of the criteria. 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 not approve the state's section 120 application. Under this alternative, NMFS would not fund, permit, engage in, or otherwise support active lethal actions to manage CSL predation in the Willamette River. However, the state would continue non-lethal activates, e.g., capture and marking of CSL in the vicinity of Willamette Falls and elsewhere (e.g., Astoria, OR, Bonneville Dam) under Section 109(h) of the MMPA[2]. Furthermore, the No-action Alternative does not meet the Purpose and Need for the Proposed Action (see subsection 1.1.4).

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

Under Alternative 2, NMFS would grant the state's request for lethal and non-lethal removal authority[3]. The state would kill eligible CSL via lethal injection, and non-lethal removals would involve the transfer of healthy CSL to zoos or aquaria, if available. This alternative would allow up to 1 percent of the CSL potential biological removal (PBR[4]) level to be removed each year.

[2] Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.
[3] Under this alternative, NMFS may fund, permit, engage in, or otherwise support active lethal actions to manage CSL predation at Willamette Falls.
[4] The term "potential biological removal level" (PBR) means the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The potential biological removal level is the product of the following factors: (A) The minimum population estimate of the stock, (B) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size, and (C) A recovery factor of between 0. 1 and 1. 0.

PBR is 9,200, and 1 percent of that would be 92 animals. The removal of up to 92 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 safely removed from the population (PBR) without affecting its status with respect to OSP. There is a biological surplus of male CSL in the 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.

2.2.2.1 Capture and Marking

Under Alternative 2, CSL will be trapped[5] below Willamette Falls at Sportcraft Landing/Marina, which is currently the primary haul-out area for CSL that forage for salmonids below Willamette Falls (Figure 1). The state currently has two authorized floating traps[6] at Sportcraft Landing/Marine. The state does not have plans to add additional traps, but if they were to, they would add one more trap. This trap would likely be built on the existing walkway. Therefore, there would be no creation of additional over-water infrastructure. Trapping operations may take place any time of the day or night, depending primarily on the behavior of the animals and when they choose to use the trap float as a resting area. Night vision equipment is used to observe the trap prior to closing when operations take place at night.

Each trap will have one large vertically sliding front door through which sea lions can enter and exit freely. In addition there will be at least one small vertically swinging side and/or back door. The small door(s) will be tied shut with rope whereas the main door will be held open by varying methods depending on when trapping is scheduled to occur. When trapping is not expected to occur within approximately 24 hours, the large front door is secured in the open position with a heavy chain and padlock. Within 24 hours of a trapping attempt, the front door will be unchained and held open by an electromagnet mounted on a transom over the top of the door. At all times, traps will be monitored using automated cameras and periodic in-person checks; during active trapping when the front door is unchained, traps will be monitored through more frequent in-person checks and with a satellite-linked sensor that detects and reports (via a cell phone text message) if the trap door has closed.

To capture sea lions resting inside a trap, a remote triggering device (similar to a garage door opener) is used to interrupt the electrical circuit of the electromagnet holding the door open (up) which deactivates the magnet allowing the door to fall vertically, closing under its own weight. After the trap is closed, a handling barge is used to extricate the animals from the closed trap and move them into and through transfer and squeeze cages for processing. If more animals are

[5] Trapping activities would be similar to on-going pinniped management activities in the vicinity of Willamette Falls that the state has implemented under their MMPA section 109(h) authority. Section 109(h)(1)(C) of the MMPA authorizes non-lethal removal of nuisance marine mammals by state and federal officials.

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

trapped than the barge can hold then they are left on the trap until the first batch of animals are processed. Unmarked sea lions would be moved from the transfer cages into processing cages to be marked with one or more standard pinniped marking methods including 1) attachment of livestock tags to their foreflippers, 2) shaving their fur with hair clippers, and/or 3) hot-branding, a well-established technique for long-term marking of pinnipeds (e.g., see Mellish et al. 2007). Conditions during captive holding – enclosures, food, and husbandry practices – would be in compliance with standards established under the Animal Welfare Act (AWA) and subject to review by an established Animal Care Committee (ACC). After marking, animals would be released back into the water or loaded in transfer cages to be transported by truck to the Oregon coast for release. Individually identifiable CSL deemed eligible for lethal removal would be transported to a secure facility and euthanized.

2.2.3 Alternative 3 –Lethal and Non-Lethal Removal of Individually Identifiable California Sea Lions and Modified Task Force Recommendations (Preferred Alternative)

Alternative 3 is NMFS' preferred alternative and proposed action. Under Alternative 3, NMFS would grant the state's request for lethal and non-lethal removal authority, with conditions based on recommendations from the Task Force. The state would kill eligible CSL via lethal injection, and non-lethal removals would involve the transfer of healthy CSL to zoos or aquaria, if available. Under Alternative 3, capture and marking activities would be the same as those described in subsection 2.2.2.1. This alternative would allow up to 1 percent of the CSL PBR level to be removed each year. PRB is 9,200, and 1 percent of that would be 92 animals. The removal of up to 92 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 safely removed from the population (PBR) without affecting its status with respect to OSP. There is a biological surplus of male CSL in the 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.

Task Force Recommendations

In addition to the MMPA Section 120(d) Considerations, NMFS requested that the Task Force respond to the following questions when preparing its recommendations:

Question 1:

If lethal removal is included in the recommendations, what (if any) additional criteria, in addition to the criteria proposed by the state in their application, does the Task Force recommend that would improve the effectiveness of the lethal removal program?

Responses to Question 1:

1a. Preferably, the Task Force believes that, in this case, the data collected within the scope of the application support identifying CSL that should be removed based on their presence between the mouth of the Clackamas River and Willamette Falls.

1b. Alternately, change wording in application to: "…any 2 calendar days" instead of 3.

Question 2:

If the Task Force recommends approving the state's application for lethal removal, does the Task Force recommend a limit, different than the limit proposed by the state in their application, to the number of sea lions that may be removed, and if so what is the justification for that limit?

Response to Question 2:

No Recommendations.

Question 3:

If the Task Force recommends approving the state's application for lethal removal, what limitations (if any) would the Task Force recommend on timing, location, take methods or duration of the authorization?

Response to Question 3:

No Recommendations.

Question 4:

There are various proposed pieces of legislation to amend Section 120 of the MMPA (e.g., HR 2083, S 1702, S 3119) in Congress. Of particular interest are the proposed modifications to the individually identifiable and significant negative impact criteria. Our initial assessment of the proposed legislation as it relates to these two criteria, is that measures for identifying CSL via branding, natural features, etc., and documenting predation to determine its impact on salmonid fishery stocks, would no longer be required. Instead, identification of sea lions for removal would be based on a geographic criterion, so that any sea lion within a specified geographic area, e.g., above river mile 112 on the Columbia River, or a tributary to the Columbia River that includes spawning habitat of threatened or endangered salmon or steelhead, would be deemed eligible for removal.

Therefore, we are asking the Task Force to provide us with their views regarding the proposed modifications to the individually identifiable and significant negative impact criteria, and include those considerations in your recommendations to NMFS.

Response to Question 4:

No Recommendations.

Question 5:
For purposes of post-implementation evaluation, what criteria does the Task Force recommend for evaluating whether the implementation of the lethal removal program has been successful in addressing the pinniped—fishery interaction?

Responses to Question 5:

5a. Monitor, evaluate implementation, and report on specific animals observed, when they were removed, and time at Willamette Falls.

5b. Monitor and report on the number of prey observed and estimated to have been taken.

5c. Monitor, evaluate, and report on expediency (number of days animal present before removal) of removal.

5d. Monitor and report on key population parameters for the Chinook salmon and steelhead populations so that changes in population status can be detected.

5e. Ensure that monitoring efforts include other pinnipeds that may occur in the vicinity of Willamette Falls.

5f. Update PVA analyses after 5 years of implementation to determine, to the extent possible, any changes in the estimated extinction risk to the salmonid stocks in question.

Question 6:

Regardless of the outcome of this process, what might be the most effective means to achieve a long-term resolution to the pinniped—fishery interaction?

Response to Question 6:

No Recommendations.

NMFS Adoption of Task Force Recommendations.

The NMFS proposes to adopt Task Force Recommendation 1b and Recommendations 5a through 5f. NMFS proposes not to adopt Recommendation 1a, as we determined that this recommendation was inconsistent with the lethal taking requirements in Section 120 of the MMPA.

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 fish mortality, such as changes in the flood-control/hydropower, habitat degradation, or fisheries harvest systems, as important to salmonid recovery. Information on components of a regional salmon and steelhead recovery framework were included in the state's application and were provided to the Task Force to provide a comprehensive context in which to consider pinniped predation. This EA does not analyze this alternative because actions to address the decline or recovery of salmonids, 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 improvement, 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 salmonids in the Willamette River (as discussed in Section 5, Cumulative Effects), it is clear from the statutory language that Section 120 applies to pinniped predation on listed salmonids and does not require NMFS to take any affirmative steps to address other sources of salmonid mortality (e.g., flood-control/hydropower or fishery harvest). The states presented NMFS with a specific proposal, which is lethal removal of individually identifiable pinnipeds that are having a significant negative impact on the decline or recovery of listed salmonids in the Willamette River. Section 120 requires NMFS to consider the state's effort to address salmonid mortality resulting from pinnipeds, not mortality from other sources. Consequently, NMFS determined that this alternative was outside the scope of the Section 120 process, the purpose and need for the proposed action, and NMFS' and the state's authority, and therefore is not being analyzed in detail.

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 3.1.1 is a list of resources that NMFS identified that may be affected by the proposed action.

Table 3.1.1. Potentially affected environment resources identified in initial scoping for the proposed action.

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

3.1 Introduction and Environmental Setting

Willamette Falls Locks are located in an urban/industrial setting in the city of West Linn, Clackamas County, Oregon directly across the river from Oregon City, approximately 20 miles upstream of Portland, Oregon, and approximately 26.2 river miles upstream of the confluence of the Columbia and Willamette Rivers. The Locks are located on the west bank of the Willamette River just west of Willamette Falls, a horseshoe shape natural waterfall about 1,500 feet wide and about 40 feet high on the Willamette River, said to be among the largest waterfalls by volume in the United States. Bound by the Cascade Mountain Range to the east and the Coast Range to the west, the Willamette Basin drains 11,487 square miles, 12 percent of the total area of Oregon.

The Willamette River flows 187 miles north from the confluence of the Middle and Coast Fork Willamette Rivers, to its confluence with the Columbia River at Portland. The 13th largest river by volume within the U.S., the Willamette accounts for 12 percent of the Columbia River's flow. The Willamette River is also one of the 14 American Heritage Rivers in the U.S., designated by the U.S. Environmental Protection Agency (EPA). Elevations within the watershed range from 10,495 feet at Mount Jefferson in the Cascade Range to 10 feet at the mouth on the Columbia River. Upstream of its confluence with the Columbia River, the Willamette River is fed by 13 major tributaries and the basin is regulated by 13 U.S. Army Corps of Engineers (Corps) dams, as well as other private dams, resulting in a highly regulated flow on the main stem.

Willamette Falls Locks and canal around the Willamette Falls were built by the Willamette Falls Canal and Locks Company between 1867 and 1872, opening on New Year's Day, 1873. Willamette Falls Locks were among the first multi-lift navigational locks built in the U.S. and

were operated by a number of owners before the Corps purchased them from the Portland Railway Light and Power Company in 1913 and began operating them in 1915.

3.2 Marine Mammals

Three stocks of marine mammals (pinnipeds) travel up the Columbia River to the Willamette River: California sea lions (*Zalophus californianus californianus*) (United States stock), Steller sea lions (*Eumetopias jubatus*) (eastern United States stock), and harbor seal (*Phoca vitulina richardsi*) (Oregon/Washington coastal stock). These stocks are known to occur and forage in the Willamette River during the adult run timing of ESA-listed salmon and steelhead and could be affected by the action alternatives. Information on life history, status, distribution, and abundance for these three species follows.

3.2.1 California Sea Lion (United States Stock)

California sea lions are members of the family otariidae and are found from southern Mexico to southeast Alaska. The U.S. stock is defined geographically for management purposes and is described as being comprised of animals that breed in the waters of the U.S. north of the international boundary with Mexico. The CSL is sexually dimorphic, meaning that males and females are distinct in size and color. Males may reach 1,000 pounds and 8 feet in length and females grow to 300 pounds and 6 feet in length. Their color ranges from chocolate brown in males to a lighter, golden brown in females. At around 5 years of age males develop a bony bump on top of their skull called a sagittal crest.

The breeding range of California sea lions 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. California sea lions 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 California sea lions 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). North of the breeding range, diet shifts to what is locally and seasonally abundant. In Puget Sound, CSL feed principally on Pacific whiting, spiny dogfish, Pacific herring, and Pacific cod (Schmitt et al. 1995). In Oregon coastal rivers, CSL are

known to eat salmonids and lamprey along with other non-salmonid fish (Roffe and Mate 1984). 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).

The current population estimate for the U.S. stock of CSL is 257,631 (Figure 3.2.1.) and the stock is within its optimal sustainable population (OSP)[7] range (Laake et al. 2018).

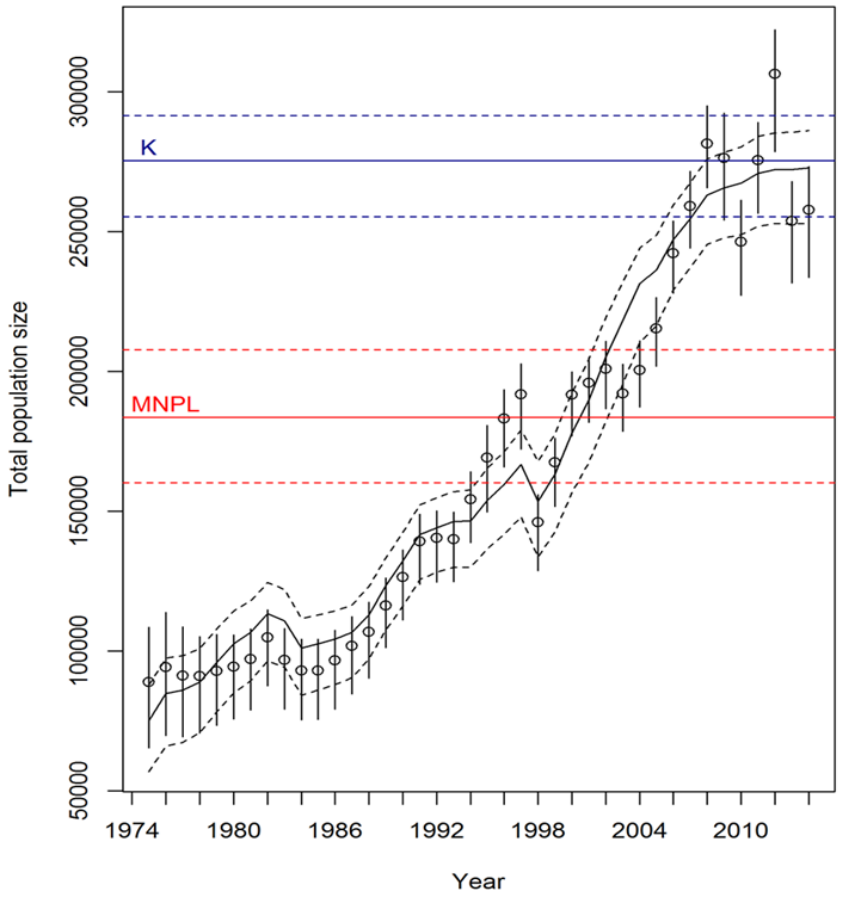

Figure 3.2.1 (Laake et al. 2018). Fitted logistic growth curve (solid line) and 95% bootstrap intervals (dashed line) for reconstructed CSL annual population sizes in the United States, 1975–2014. Vertical lines are 95% bootstrap confidence intervals for reconstructed annual population sizes. Also presented 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).

[7] 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).

3.2.2 Steller Sea Lion (Eastern United States Stock)

Steller sea lions, the largest members of the family otariidae, are found around the Pacific Rim from California to Japan. The eastern U.S. stock ranges eastward from Cape Suckling, Alaska. Stellers show marked sexual dimorphism with males averaging approximately 1,500 pounds and 10 feet in length and females averaging about 700 pounds and 8 feet in length. Adult females have a tawny to silver colored pelt. Males are characterized by dark, dense fur around the neck that appears like a mane and light tawny coloring to the rest of their body.

The breeding range of the eastern U.S. stock of Steller sea lions extends from southeast Alaska through British Columbia and Oregon to northern California. There are no rookeries in Washington. Females sexually mature between 3 to 6 years of age. Males sexually mature between 3 to 7 years of age but cannot hold a breeding territory until between 8 and 12 years of age (Pitcher and Calkins 1981). Steller sea lions congregate at breeding rookeries from late April through August, and mature males defend breeding territories on the rookeries from mid-May to mid-July. Females show strong site fidelity to their natal rookery and return there to pup (i.e., give birth) between late May and early July. Males mate with females that give birth and come into estrus on their territory. 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).

Steller sea lions are year-round residents of coastal Oregon and Washington. Large seasonal shifts in distribution have been documented for Steller sea lions 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).

Steller sea lion use of particular haul-outs changes on a seasonal basis (Scordino 2006). The seasonal changes in haul-out attendance are likely due to changes in weather patterns and availability of prey. Steller sea lions' preference of fish and squid species depends on their locality and the season (Sinclair and Zeppelin 2002). In Oregon and Washington, Steller sea lions eat offshore, schooling fish such as gadids (the cod family) and forage fish (small oily fish like herring and sardines).

The current population estimate for the eastern U.S. stock of Steller sea lions is 52,139 (Carretta et al 2017). In 2013, NMFS determined that the eastern population had recovered and no longer meets the definition of a threatened species under the ESA (78 FR 66139). As recently noted within the humpback whale ESA listing final rule (81 FR 62259, 8 September 2016), in the case of a species or stock that achieved its depleted status solely on the basis of its ESA status, such as the eastern stock of Steller sea lions, the species or stock would cease to qualify as depleted under the terms of the definition set forth in MMPA Section 3(1) if the species or stock is no

longer listed as threatened or endangered. Therefore, NMFS considers this stock not to be depleted.

3.2.3 Harbor Seals (Oregon/Washington Coast Stock)

Harbor seals, members of the family phocidae, inhabit coastal and estuarine waters and shoreline areas from Baja California to western Alaska. The Oregon/Washington Coastal stock of harbor seal is one of three management stocks for this species along the Pacific coast of the continental United States The range of the stock, defined geographically for management purposes, extends from the California/Oregon border north to the Strait of Juan de Fuca at Cape Flattery, Washington. The average weight for adult seals is about 180 pounds and males are somewhat larger than females. The basic color of the coat is gray and mottled, but highly variable from dark with light color rings or spots to light with dark markings.

Harbor seals generally are non-migratory but local movements are associated with factors such as tides, weather, season, prey availability, and reproduction (Scheffer and Slipp 1944; Bigg 1969, 1981). Numerous harbor seal haul-out sites are found on the intertidal mudflats and sandbars in the lower Columbia River estuary including nursery areas in Cathlamet Bay near Astoria (Jeffries et al. 2000). On the Oregon and Washington coast, females give birth to pups at haul-out sites on land beginning in April through mid-July (Huber et al. 2001). Females breed within weeks of giving birth and breeding activity takes place in the water.

The diet of harbor seals in the lower Columbia River is seasonally variable and diverse. In the winter, smelt are predominant, but at other times of year the diet includes anchovy, Pacific herring, salmonids, staghorn sculpin, starry flounder, and lamprey (Riemer and Brown 1997).

The most recent population estimate for the Oregon/Washington Coast stock of harbor seal is 24,732 (Carretta et al. 2015). In that report, Carretta et al. (2015) conclude that in the absence of recent abundance estimates, this stock's status relative to OSP is unknown.

3.3 Listed Salmonids and Critical Habitat

3.3.1 Upper Willamette River Spring-run Chinook Salmon

The UWR spring-run Chinook salmon ESU was listed as threatened on March 24, 1999 (64 FR 14308). When NMFS re-examined the status of these fish in 2005, 2011, and 2016, we determined that they still warranted listing as threatened (70 FR 37160; 76 FR 50448; 81 FR 33468). The UWR spring-run Chinook salmon ESU includes naturally spawned spring-run Chinook salmon originating from the Clackamas River and from the Willamette River and its tributaries above Willamette Falls, and includes seven demographically independent populations of spring-run Chinook salmon in the UWR spring-run Chinook salmon ESU: Clackamas, Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and the Middle Fork Willamette. Also, spring-run Chinook salmon from six artificial propagation programs are included in the ESU: the McKenzie River Hatchery Program (ODFW Stock #23); Marion Forks Hatchery/North Fork Santiam River Program (ODFW Stock #21); South Santiam Hatchery Program (ODFW

Stock #24) in the South Fork Santiam River and Molalla River; Willamette Hatchery Program (ODFW Stock #22); and the Clackamas Hatchery Program (ODFW Stock #19) (79 FR 20802).

Spatial Structure and Diversity

A population's spatial structure is made up of both the geographic distribution of individuals in the population and the processes that generate that distribution (McElhany et al. 2000). UWR Chinook salmon exhibit both "ocean type" (i.e., emigration to the ocean as subyearlings) and "stream type" (emigration as yearlings) life histories. Populations tend to mature at ages 4 and 5. Historically, 5-year-old fish dominated the spawning migration runs; recently, however, most fish have matured at age 4. The timing of the spawning migration is limited by Willamette Falls. Run-timing typically takes place from March through August. High flows in the spring allow access to the upper Willamette basin, whereas low flows in the summer and autumn prevent later-migrating fish from ascending the falls. Spring-run Chinook salmon in the Clackamas River are of uncertain origin, but we consider natural-origin spring-run Chinook salmon from this subbasin to be part of the listed species. Juvenile life stages (i.e., eggs, alevins, fry, and parr) inhabit freshwater/riverine areas throughout the range of the listed species. Parr usually undergo a smolt transformation in the spring at which time they migrate to the ocean. Subadults and adults forage in coastal and offshore waters of the North Pacific Ocean before returning to spawn in their natal streams.

Willamette Falls, a natural barrier before it was laddered, prevented fall-run Chinook salmon from occupying the upper Willamette River. Thus the UWR spring-run Chinook salmon were historically composed of only the spring run. The ladder allows other life history traits to occupy areas in the upper Willamette River, however none are considered part of the historical populations or the ESU.

Loss of habitat above dams and hatchery production are two factors that have had a negative influence on diversity (Good et al. 2005). Dams and other habitat alterations have reduced or eliminated tributary and mainstem areas. Introduction of fall-run Chinook and laddering the falls have increased the potential for genetic introgression between wild spring and hatchery fall Chinook.

Good et al. (2005) identified artificial propagation as a major factor affecting the variation in diversity traits of UWR Chinook salmon. Large numbers of fish from the upper Willamette River (Santiam, McKenzie, and middle fork Willamette rivers) have been introduced since the 1960s. Changes in spawning timing have been observed over the last 100 years. Regardless of origin, the existing spring run has maintained a low to moderate level of natural production (and local adaptation) for a number of generations (NMFS 2004).

Abundance and Productivity

The spring run of Chinook salmon has been counted at Willamette Falls since 1946, but "jacks" (sexually mature males that return to freshwater to spawn after only a few months in the ocean) were not differentiated from the total count until 1952. Abundance estimates of UWR Chinook salmon for the past 17 years is listed in Table 3.3.1.1.

Table 3.3.1.1. Annual fish passage counts of UWR spring-run Chinook salmon at Willamette Falls, 2000-2017.

YEAR	ADULTS	JACKS	MINIS	TOTAL
2000	37,594	1,479	5,162	39,073
2001	52,685	1,288	3,507	53,973
2002	82,111	1,025	10,376	83,136
2003	85,898	1,851	1,659	87,749
2004	95,968	757	1,289	96,725
2005	35,453	1,180	125	36,633
2006	36,851	190	443	37,041
2007	23,279	360	2,990	23,639
2008	14,151	521	9,973	14,672
2009	25,795	2,719	7,487	28,514
2010	65,293	1,766	4,567	67,059
2011	43,748	1,399	3,586	45,147
2012	35,899	1,314	3,877	37,213
2013	27,897	1,664	12,748	29,561
2014	30,071	1,598	6,840	31,669
2015	51,046	2,042	5,678	53,088
2016	30,317	2,161	3,727	32,478
2017	34,186	2,442	1,624	36,628

Limiting Factors and Threats

Primary limiting factors for UWR spring-run Chinook include habitat access, degraded physical habitat quality/quantity, and water quality. Primary threats to UWR spring-run Chinook include flood control/hydropower system operations, land use practices (e.g., road building, riparian development, etc.), harvest, hatchery operations, and predation.

Critical Habitat

Critical habitat for UWR spring-run Chinook salmon was designated on September, 2, 2005 (70 FR 52630) and encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most hydrologic unit code (HUC) 5 watersheds with primary constituent elements (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.

Status Summary

This ESU comprises seven populations. Five populations are at very high risk of extinction, one population is at moderate risk (Clackamas River) of extinction, and one population is at low risk (McKenzie River) of extinction. 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. Of these, the Calapooia River may be functionally extinct and the Molalla River remains critically low. Abundances in the North and South Santiam rivers have risen since the 2010 review, but still range only in the high hundreds of fish. The Clackamas and McKenzie populations have previously been viewed as natural population strongholds, but have both experienced declines in abundance despite having access to much of their historical spawning habitat. Overall, populations appear to be at either moderate or high risk of extinction (NWFSC 2015).

3.3.2 Upper Willamette River Winter Steelhead

The UWR winter steelhead DPS was listed as a threatened species on August 18, 1997 (62 FR 43937). When NMFS re-examined the status of this species in 2006, 2011, and 2016 we determined that it still warranted listing as threatened (71 FR 834, 76 FR 50448: 81 FR 33468). The UWR winter steelhead DPS includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and includes four demographically independent populations of steelhead: Molalla, North Santiam, South Santiam, and Calapooia. Run-timing typically takes place from November through May. No artificially propagated steelhead stocks are considered part of the listed species. The hatchery summer-run steelhead in the basin are an out-of-basin stock and not considered part of the DPS.

Spatial Structure and Diversity

A population's spatial structure is made up of both the geographic distribution of individuals in the population and the processes that generate that distribution (McElhany et al. 2000). UWR winter steelhead are late-migrating winter steelhead, entering fresh water primarily in January through April. Most return at age 4, although a small proportion return as 5-year-old fish. Juvenile life stages (i.e., eggs, alevins, fry, and parr) inhabit freshwater/riverine areas throughout the range of the listed species. Parr usually undergo a smolt transformation as 2-year-olds, at which time they migrate to the ocean. Subadults and adults forage in coastal and offshore waters of the North Pacific Ocean before returning to spawn in their natal streams.

Unlike Pacific salmon, steelhead are iteroparous—capable of spawning more than once before death. However, it is rare for steelhead to spawn more than once before dying, and almost all that do so are females (Nickelson et al. 1992). The majority of the UWR winter steelhead run return to freshwater in January through April, pass Willamette Falls from mid-February to mid-May, and spawn in March through June.

Abundance and Productivity

UWR steelhead have been counted at Willamette Falls since 1950. Abundance estimates of UWR steelhead for the past 17 years is listed in Table 3.3.2.1.

Table 3.2.2.1. Annual fish passage counts of UWR winter steelhead at Willamette Falls, 2000-2017.

YEAR	EARLY	LATE	TOTAL
2000	1,402	3,359	4,761
2001	1,773	10,752	12,525
2002	5,552	11,106	16,658
2003	2,430	6,662	9,092
2004	3,755	8,087	11,842
2005	1,340	4,623	5,963
2006	3,153	3,251	6,404
2007	2,106	3,368	5,474
2008	2,327	2,588	4,915
2009	703	2,110	2,813
2010	2,481	4,856	7,337
2011	2,771	4,670	7,441
2012	2,917	4,699	7,616
2013	1,322	3,622	4,944
2014	839	4,510	5,349
2015	1,905	2,603	4,508
2016	2,023	3,755	5,778
2017	279	543	822

Limiting Factors and Threats

Primary limiting factors for UWR winter steelhead are habitat access, degraded physical habitat quality/quantity, and water quality. The primary threats to UWR winter steelhead are human impacts, including flood control/hydropower system operations, land use practices (e.g., road building, riparian development, etc.), harvest, hatchery operations, and predation.

Critical Habitat

Critical habitat for UWR steelhead was designated on September 2, 2005 (70 FR 52630), and 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.

Status Summary

This DPS has four demographically independent populations. One population (Calapooia) is at moderate risk and three populations are at low risk of extinction. 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 of the 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. Overall, populations appear to be at either moderate or high risk of extinction (NWFSC 2015).

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.

It is important to note that nearly all other sources of in-river mortality for ESA-listed salmonids in the Willamette River are being actively managed (e.g., through harvest reductions; changes in Willamette Basin Project operations, configuration, and management of the basin water supply; habitat restoration; and hatchery reform). Fishery actions are guided by Fisheries Management and Evaluation Plans (FMEPs). Recovery actions are guided by the WRBO and Recovery Plan for UWR spring-run Chinook salmon and UWR winter steelhead (ODFW and NMFS 2011). The WRBO outlines Reasonable and Prudent Alternatives (RPA's) and timelines for the action agencies to address the impact of hydro/flood control, hatchery, and associated habitat limiting factors and threats. The Recovery Plan incorporates all the RPA measures and includes additional actions that are outside the scope of the WRBO.

Actions implemented under the guidance of these two documents include, but are not limited to, the following:

Harvest Reductions. Since UWR winter steelhead and spring-run Chinook salmon were ESA listed, harvest management has undergone substantial reforms to reduce freshwater fishery impacts - those occurring in the mainstem Columbia River and the Willamette River - on these populations. Fishery impacts on wild UWR spring-run Chinook salmon have been reduced by more than 75% compared to levels before ESA listing. The focus is now on conservation of UWR wild populations and secondarily on providing harvest opportunity where possible directed at harvestable hatchery stocks. Principles of weak stock management are now the prevailing paradigm and wild (natural-origin) UWR salmon and steelhead are no longer targets of directed fisheries. Freshwater fisheries are managed based on the needs of natural-origin stocks and managers also annually assess total harvest mortality across all fisheries (ocean and freshwater).

UWR steelhead—There is no directed harvest of adult UWR winter steelhead. The state developed a FMEP under NMFS' 4(d) Rule for the management of steelhead fisheries in the Willamette River. This management plan specifies the harvest regime for steelhead and has been approved by NMFS under the ESA. Incidental mortality of UWR steelhead in the main stem Columbia and Willamette Rivers from sport fisheries is estimated at 0-3 percent annually (ODFW and NMFS 2011) whereas UWR fisheries average 1.2% (ODFW 2001). To protect young winter steelhead (which often cannot be distinguished from rainbow trout), all trout fisheries in the four populations of the DPS are catch and release for wild trout (which includes unidentified juvenile steelhead). Prior to ESA listing, harvest of UWR wild winter steelhead was

typically greater than 20% (ODFW 2001). In the 1970s, retention of steelhead in non-tribal commercial fisheries in the Lower Columbia River was prohibited and tribal fisheries above Bonneville Dam do not impact UWR steelhead (NWFSC 2015).

UWR spring-run Chinook salmon—The state of Oregon developed a FMEP under NMFS' 4(d) Rule for the management of spring-run Chinook salmon fisheries in the lower Columbia River and Willamette River. This management plan specifies the harvest regime for spring-run Chinook salmon and has been approved by NMFS under the ESA. Total mortality of naturally-produced UWR spring-run Chinook that are incidentally encountered in freshwater commercial and sport fisheries are capped at ≤15%. However, annual mortality rates since implementation of the mark-selective hatchery-only harvest strategies in these fisheries have more typically been in the range of 8-12%. This selective fishing regime has resulted in an approximate 75% reduction in average fishing mortality compared to previous years (1981-1997; ODFW 2001).

The most recent status review for UWR spring-run Chinook and winter steelhead (NMFS 2016) concluded that harvest-related impacts on natural-origin spring-run Chinook salmon and winter steelhead remain low on all populations in the ESU and DPS.

Willamette Basin Project (WBP). Mitigation for dam construction under the WBP was initially focused on producing hatchery fish to replace lost natural fish production, but in recent years mitigation efforts have also focused on operations, configuration, and management of the basin water supply to improve survival of natural origin salmon and steelhead. Examples include:

- Upstream adult collection facilities have been built in the North and South Santiam Rivers and at Cougar dam in the McKenzie River.
- An adult passage facility is currently under construction at Fall Creek Dam.
- Design planning is underway for a juvenile downstream passage collector at Cougar Dam.
- A temperature control tower was constructed in the Cougar reservoir to improve downstream temperatures.
- An improvement to the Foster downstream passage fish weir in the South Santiam River is about to be implemented in 2018.
- U.S. Army Corps is currently in the early stages of design for temperature control and downstream passage at Detroit Dam on the North Santiam River.

These efforts are currently guided by the RPAs outlined in the Willamette River biological opinion (NMFS 2008). The RPAs address the impacts of the WBP as outlined in recovery plans for winter steelhead and spring-run Chinook (ODFW and NMFS 2011).

Habitat Restoration. Since the time of ESA listing there has been considerable investment in restoring habitat to improve degraded habitat conditions and restore fish passage throughout the basin. Efforts are being undertaken by both state and federal agencies and non-governmental organizations. Specific projects and planning efforts are too numerous to mention here, though some key measures implemented to address the habitat limiting factors in the UWR Recovery Plan (ODFW and NMFS 2011) include:

Willamette Special Investment Partnership—OWEB's Willamette Special Investment Partnership was initiated in 2008 and focuses on funding restoration efforts in the mainstem Willamette and model watersheds (Calapooia, Long Tom, Luckiamute, Marys River, Middle Fork Willamette, North Santiam, and South Santiam). Since 2008, OWEB has invested approximately $6.08 million in main stem Willamette restoration and $3.16 million in the model watershed program.

Willamette River Initiative. Since 2007, Meyer Memorial Trust has invested over $11.4 million in the Willamette River Initiative (~$4.3 million in the mainstem; ~$5 million in the model watersheds; ~$2 million for basin-wide impact – monitoring, demonstration projects, tools and resource development).

Willamette Wildlife Mitigation Program. In 2010, the state and Bonneville Power Administration (BPA) entered into a fifteen year agreement to permanently settle wildlife mitigation responsibilities for the federal Willamette River Basin Flood Control and Hydroelectric Project in the Willamette subbasin. The Agreement provides funding for habitat protection in the Willamette Basin, and requires that at least 10 percent of the funding protects habitat that provide dual benefits (benefit wildlife and ESA-listed anadromous fish). Since the Agreement was signed in 2010, just over 7,000 acres of wildlife habitat have been permanently protected in the Willamette Basin. This includes an investment of approximately $37 million by BPA, as well as leveraging over $11 million in cost share from the Program partners. Over 2,600 acres of those protected were designated as 'dual benefit' projects that will benefit both wildlife and ESA-listed anadromous fish.

The 2016 status review for UWR spring-run Chinook and steelhead (NMFS 2016) found that a number of restoration and protection actions have been implemented in freshwater and estuary habitat throughout the range of UWR salmon and steelhead. However, at this time the information is not available to document the effects of these actions on habitat quality, quantity, and function. As a result, NMFS concluded that the risk to the species' persistence because of habitat destruction or modification had not changed since the last status review.

Hatchery reform—ODFW discontinued the winter steelhead hatchery program in the Willamette basin in the late 1990's. Similarly, hatchery coho and fall Chinook releases above Willamette Falls have been eliminated because these species were not native or could affect the native stocks. The spring-run Chinook, summer steelhead, and catchable trout programs in the basin have been significantly reformed to assure that they either assist in the recovery of natural populations or mitigation hatchery programs do not impede progress towards recovery. Specific measures include (but are not limited to):

Broodstock. Managed summer steelhead brood stock to further separate temporal overlap of spawning winter and summer steelhead.

Release Strategies

- Reduced spring-run Chinook production at McKenzie hatchery to reduce straying of hatchery fish to the spawning grounds

- Ended fall releases of Chinook salmon from the McKenzie Hatchery
- Reprogrammed Chinook salmon releases into the Coast Fork Willamette River, using Willamette stock instead of McKenzie stock to reduce straying back into the McKenzie.
- Curtailed juvenile releases of hatchery-origin Chinook salmon and steelhead trout into wild fish sanctuary waters (above Leaburg, Foster, and Minto Dams).
- Eliminated most releases of catchable trout in running waters where fisheries might incidentally catch spring-run Chinook smolts.
- Released only non-reproductive catchable trout to reduce potential for reproductive interactions with native conspecifics.
- Released only smolt-sized summer steelhead to minimize competition with native salmonids.

Reduction of hatchery fish on spawning grounds

- Released only non-fin clipped Chinook salmon and steelhead trout above Minto, Foster, and Fall Creek dams.
- Instituted removal of surplus hatchery Chinook at Leaburg Hatchery to reduce straying of hatchery fish to the spawning grounds.
- Increased capture efficiency at McKenzie Hatchery trap to increase removal of hatchery-origin Chinook salmon.
- Constructed acclimation site in the Molalla River to improve homing of hatchery origin spring-run Chinook.
- Reduced recycling of summer steelhead ("one and done" on the N. Santiam River).
- Fin-clipped summer steelhead are not passed above any of the major UWR project dams.

The above investments are being made to improve survival of the UWR spring-run Chinook salmon and UWR winter steelhead in the Willamette River and will continue as the RPA's in the WRBO and tasks identified in comprehensive recovery plan are implemented.

3.4 Non-Listed Fish Species

Non-listed Salmonids

Non-listed salmonids in the action area consist of summer steelhead. Willamette River summer steelhead are hatchery-produced fish and are part of the harvest mitigation program managed solely to provide fish for sport fisheries habitat lost or made inaccessible by the construction and operation of Willamette Valley Project dams.

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 current white sturgeon population in the lower Columbia River is estimated at 237,900 fish (WDFW 2017).

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.

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

The Lower Willamette River ecosystem 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 (Corps 2015). There are dozens of federal, state, local, and private dams and reservoirs in the greater Willamette River Basin. Most notable of the federal projects is the WBP, which consists of 13 dams built by the Corps beginning in the 1960s for downstream flood reduction and hydroelectric power generation, in addition to various bank protection structures for flood control and hydropower production (Corps 2015).

3.6 Recreation

Through both local and regional initiatives, Oregon City and West Linn (the two municipalities surrounding the project site) maintain approximately 10-15 percent of overall city land as public open space within their city limits (WFHAC, 2013). Some of these spaces stretch along the bluffs overlooking Willamette Falls, as well as along the riverfronts downstream from Willamette Falls. These particular open spaces offer great opportunities for scenic views of Willamette Falls and mills as well as recreational opportunities for boaters, hikers, and cyclists.

The Willamette River also serves as an important source of recreation, including fishing, boating, and wildlife viewing. The river is highly accessible at a number of public access sites, which adds to the general sense that this is a shared resource with multiple benefits. The Locks are within the Willamette River Greenway which is managed by the Oregon State Parks. The Willamette River Greenway lands dot the banks of the length of the Willamette River. The goal of the Greenway is to protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River.

Although there are gaps along the Greenway, it currently provides scenic river views, access to historical sites (like the Locks), and river access for boating, fishing and passive recreation. The Willamette River is also a nationally recognized water trail.

Several recreation facilities are nearby the Locks, including the Willamette Park, where the Tualatin River joins the Willamette just upstream of Willamette Falls, a day-use picnic area and museum at the Locks themselves, operated by the Corps, and Clackamette Park, a county park downstream of Willamette Falls where the Clackamas River enters the Willamette. Public access to Willamette Falls is limited due to the industrial complexes on either side, however, several development efforts are ongoing to improve public access to the falls on the shore opposite to the Locks. As the region has grown, along with the interest in the regions natural and historic resources, Willamette Falls has come to the attention of its surrounding communities as an important resource.

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 NRHP is the official list of the nation's historic places, nominated through Oregon's State Historic Preservation Office. It includes properties that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, and local levels. The NRPH contains one site in the action area, the Willamette Falls Locks, listed in 1974.

Archeological evidence of Native American activity around Willamette Falls potentially dates to as early as 13,000 years ago, after the last of the Missoula Floods. The Willamette Falls area has a rich past, both from a cultural context as well as historic. The river environment, which includes the Clackamas and Tualatin rivers and the natural falls on the Willamette, provided a location which supported the lifeways of Native Americans as well as Oregon's first Euro-Americans.
Willamette Falls are an important center of Native American fishing and trade. The area was ideal for dip-net and spear fishing, for the harvest of salmon and lamprey and other native fisheries.

Historically Willamette Falls have contributed to the economic development of Portland and the Pacific Northwest. Willamette Falls have been a source of hydroelectric energy for over 100 years. Construction of the Willamette Falls Locks enabled transport of goods around the falls in 1873.

Willamette Falls is 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.

Adjacent to the Locks site are other facilities important to Portland regional history. In 1889 a paper mill – currently owned by the WLP Co. - was built on the island adjacent to the Locks. And the T.W. Sullivan hydroelectric power plant and associated dam were constructed by the forerunner to PGE in 1889, with Station A providing the first long distance transmission of both DC and AC hydropower generated electrical current in the country. A fish ladder over the falls was first built in 1885 and then redesigned and rebuilt by the Oregon Department of Fish and Wildlife in 1971.

3.8 Law Enforcement

In Oregon, the Oregon State Police enforce game and fish regulations. Local law enforcement is enforced by the Clackamas County sheriff's department. Enforcement of the MMPA is administered by the National Oceanic Atmospheric Administration's (NOAA) Office of Law Enforcement.

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 state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures, e.g., relocation, to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's application.

With respect to CSL in the Willamette River, CSL will likely continue to congregate in the action area to feed on returning adult spring-run Chinook salmon and winter steelhead. The No-action Alternative would have no effect on overall abundance and productivity of the CSL population range-wide, and the population would likely remain at OSP. Male CSL migrate south from the Columbia River as the breeding season approaches in May and June (subsection 3.2.1). Neither the migration timing nor the abundance of migratory male sea lions would be affected by the No-action Alternative.

It is likely that the presence of Steller sea lions in the Willamette River would likely occur, but the presence of Steller sea lions in the action area is likely to fluctuate based on large-scale ecosystem variability in the California Current Ecosystem. The No-action Alternative would have no effect on overall abundance and productivity of the Steller sea lion population range-wide because there would be no takings. Male Steller sea lions migrate north and south from the Columbia River as the breeding season approaches in April (subsection 3.2.2). Neither the migration timing nor the abundance of migratory Steller sea lions would be affected by the No-action Alternative.

The presence of harbor seals under the No-action Alternative would likely remain stable or increase slightly, although their presence in the vicinity of Willamette Falls is rare. Harbor seals typically consume small prey, and it is unlikely their abundance would fluctuate in response to fluctuating numbers of returning adult salmonids. Harbor seals are generally non-migratory but local movements are associated with factors such as prey availability and reproduction (subsection 3.2.3). 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.

4.2.2 Alternative 2

Under Alternative 2, NMFS would grant the state's request for lethal and non-lethal removal as proposed in the state's application. Alternative 2 describes those CSL that would be considered eligible for permanent removal (either by killing or permanent captivity). Lethal removal would be conducted in a humane manner under the guidance of a standing ACC. The state would kill eligible CSL via lethal injection.

This alternative would allow up to 1 percent of the CSL PBR (92 animals) to be removed each year, in additional to all other source of human-caused mortalities. The removal of up to 92 animals per year (for 5 years) 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 CSL involved is extremely small compared to the current number of animals that can be safely removed from the population without affecting its status with respect to OSP (subsection 3.2.1). There is a surplus of male CSL in the 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 (subsection 3.2.1). 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. The migration timing would not be affected by this alternative. Thus, compared to the No-action Alternative, Alternative 2 would result in no change in status of the population range-wide, although it would reduce (albeit inconsequentially) the number of individual animals from the population.

Permanent captive holding of some CSL 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 annual limit of 1 percent of PBR 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 could be reduced by as much as 1 percent of PBR (currently 92). Over time, if experienced CSL were removed, it is possible that the remaining animals would be less experienced and less effective as predators. The removal of CSL in the vicinity of Willamette Falls might deter other CSL 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 would make it less likely that they would learn to forage successfully. These possibilities are too uncertain, however, to support a reliable estimate of any decrease in pinniped predation. Conversely, it is likely that other CSL may eventually replace the CSL that were lethally removed, so the decrease in the number of CSL may be less than the number removed.

Under Alternative 2, Steller sea lions and 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 Steller sea lion or 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 92 CSL may be permanently removed, Alternative 2 would not have a significant impact on the CSL population, and there would be no population effects on SSL or harbor seals.

4.2.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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, while up to 92 CSL may be permanently removed from the U.S. population, Alternative 3 would not have a significant impact on the CSL population as the level of removals is well below OSP. Alternative 3 would not have a significant impact on SSL or 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 state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's application.

With respect to CSL in the Willamette River, animals would likely continue to congregate in the action area to feed on returning adult UWR spring-run Chinook salmon and UWR winter

steelhead, and pinniped consumption of UWR spring-run Chinook salmon and UWR winter steelhead would likely continue at current rates similar to those in Table 1.2.
Under the No-action Alternative, the long-term predictions of predation by CSL on the four UWR winter steelhead populations, and the McKenzie population of the UWR spring-run Chinook salmon ESU, and their probabilities of extinction, are shown in Table 4.1 and Table 4.2, respectively. The population viability analyses (PVA) on the four UWR winter steelhead population (Falcy 2017) is shown in Table 4.1.

Table 4.2 also shows the PVA for two spring-run Chinook salmon populations that are for comparison of impacts to spring-run Chinook salmon populations where there is no observed CLS predation (Falcy 2018), Population and estimated probabilities of extinction for the McKenzie population of the UWR spring-run Chinook salmon ESU is shown in Table 4.2.

Table 4.1. Probabilities of quasi-extinction over a 100 year period in four populations of UWR winter steelhead under four different scenarios. Scenarios with CSL assume that the predation mortality estimated during that year will continue indefinitely. The lowest predation rate was observed in 2015 and the highest predation rate was observed in 2017 (Falcy 2017).

	Population			
Scenario	**North Santiam**	**South Santiam**	**Calapooia**	**Molalla**
No CSL	0.015	0.048	0.993	0.000
2015 CSL	0.079	0.158	0.998	0.001
Average CSL	0.274	0.335	0.999	0.021
2017 CSL	0.644	0.599	0.999	0.209

Table 4.2 PVA Results. Numerical entries are probabilities of quasi-extinction over a 100 year period of three spring-run Chinook salmon. Scenarios include two different assumptions about the relative reproductive success (RRS) of hatchery-origin fish and two different statistical recruitment models. There is strong information-theoretic evidence that Model 2 is superior to Model 1. In the McKenzie, simulation scenarios included maximum observed CSL predation and no CSL predation (Falcy 2018).

Population								
	McKenzie				Clackamas		Sandy	
	RRS=1		RRS=0.5		RRS=1	RRS=0.5	RRS=1	RRS=0.5
	Max CSL	No CSL	Max CSL	No CSL				
Model 1	0.35	0.23	0.28	0.22	0.007	0.006	0.010	0.004
Model 2	0.45	0.30	0.33	0.20	0.006	0.002	0.009	0.001

Under the No-action Alternative, pinniped predation on UWR winter steelhead and UWR spring-run Chinook salmon is likely to continue at rates similar to those estimated in Table 4.1 and 4.2. Therefore, if NMFS denies the states application, the No-action Alternative will continue to have the same population-level impacts on UWR winter steelhead and UWR spring-run Chinook salmon as currently exist.

4.3.2 Alternative 2

Under Alternative 2, NMFS would grant the state's request for lethal and non-lethal removal as proposed in the state's 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 adult UWR winter steelhead and UWR spring-run Chinook salmon compared to the No-action Alternative.

Estimated benefits of the lethal removal program.

The implementation of the lethal removal program is expected to reduce pinniped predation on listed salmon and steelhead, as well as non-listed salmonids, white sturgeon, and lamprey. Table 4.3.2.1 provides a summary of the benefits expected to be realized from implementation of the lethal removal program in the Willamette River. The expected benefits analysis is based on CSL bioenergetics and empirical CSL residency data in the vicinity of Willamette Falls, and is looked at two scenarios. The first scenario is based a removal of CSL at 0.5 percent of PBR, and the second scenario is based on the removal of CSL at 1.0 percent of PBR.

Table 4.3.2.1. Range of expected benefits on salmon and steelhead stocks in the Willamette River (Wright 2018[8]).

n = 46 CSL					
Run	Chinook Marked Total	Chinook Wild Total	Steelhead Summer Total	Steelhead Winter Total	Total
Min	2,102	472	473	411	3,458
Max	4,833	1,085	1,088	945	7,592
n = 92 CSL					
Run	Chinook Marked Total	Chinook Wild Total	Steelhead Summer Total	Steelhead Winter Total	Total
Min	4,953	1,112	1,115	968	8,148
Max	8,646	1,941	1,947	1,690	14,224

The estimated total number of listed adult salmonids that could be consumed by 46 CSL per year ranges from 2,985 to 6,504 fish. If 46 CSL were removed annually, the expected benefits to wild listed spring-run Chinook salmon would range from 2,574 to 5,918 fish per year, and the expected benefits to wild winter steelhead would range from 411 to 945 fish per year. These numbers represent approximately 7.2 to 16.0 percent of the average total return of listed spring-run Chinook salmon and 11.2 to 25.8 percent of the average total return of listed winter steelhead from 2014 to 2018 in the Willamette River, respectively.

The estimated total number of listed adult salmonids that could be consumed by 92 CSL per year ranges from 7,033 to 12,277 fish. If 92 CSL were removed annually, the expected benefits to wild spring-run Chinook salmon would range from 6,065 to 10,587 fish per year, and the expected benefits to wild winter steelhead would range from 968 to 1,690 fish per year. These numbers represent approximately 17.0 to 29.7 percent of the average total return of listed spring-run Chinook salmon and 26.5 to 46.2 percent of the average total return of listed winter steelhead from 2014 to 2018 in the Willamette River, respectively.

In addition, the lethal or non-lethal removal of CSL in the vicinity of Willamette Falls might deter other CSL from the action area, either because exposure to the lethal or non-lethal activities would cause newly arriving animals to avoid the area or because the removal of experienced CSL would make it less likely that they would learn to forage successfully. These possibilities are too uncertain, however, to support a reliable estimate of any decrease in pinniped predation (and corresponding increase in salmonid survival). Conversely, it is likely that other CSL may eventually replace the CSL that were lethally or non-lethally removed, so the increase in the number of salmonids passing Willamette Falls would likely be less than the range of numbers estimated in Table 4.3.2.1.

[8] Email from Bryan Wright, Oregon Department of Fish and Wildlife, to Robert Anderson, NMFS, July 26, 2018.

Therefore, Alternative 2 is expected to have a positive impact on UWR winter steelhead and UWR spring-run Chinook salmon from the reduction of pinniped predation. However, these impacts would be small and therefore not significant.

4.3.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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 is expected to have a positive impact on UWR winter steelhead and UWR spring-run Chinook salmon from the reduction of pinniped predation. However, these impacts would be small and therefore not significant.

Critical Habitat

Under Alternative 2, NMFS would grant the state's request for lethal and non-lethal removal as proposed in the state's application. Under Alternative 3, impacts to critical habitat (subsections 3.3.1 and 3.3.2) or any of the PCEs (e.g., spawning sites, juvenile rearing areas and migration corridors, adult migration corridors, food resources, water quality and quantity, and riparian vegetation) for UWR Chinook spring-run salmon or UWR winter steelhead in the action area are expected to be negligible as this area of the Willamette River is highly industrialized and we expect effects to UWR spring-run Chinook salmon and UWR winter steelhead critical habitat primary constituent elements (PCEs) – specifically, freshwater migration corridors – in the immediate project area are likely to be too small to affect the conservation of the PCE freshwater migration corridors in the project area as well as the action area. Therefore, we expect the probability of effects on critical habitat PCEs for UWR spring-run Chinook salmon and UWR winter steelhead will 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.

4.4 Non-Listed Fish Species

The sections below describe the potential direct and indirect effects of the three alternative actions on fish species other than listed salmonids in the action area. As with listed salmonids, if NMFS grants the state's 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 pinniped predation, which could lead to a change in survival of fish residing in or passing through the action area. Effects are 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 pinniped presence.

4.4.1 Alternative 1 (No Action)

Under the No-action Alternative – NMFS denies the state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's application.

California sea lion predation and consumption of white sturgeon and lamprey fishes would likely continue at levels observed in the past (126 lamprey and 3 white sturgeon, 175 lamprey and 2 white sturgeon in 2015, 182 lamprey in 2016, and 145 lamprey in 2017[9]) in the Willamette River. California sea lion consumption of non-listed salmon and steelhead would likely continue at levels similar to those in Table 4.3.2.1.

Therefore, under the No-action Alternative, pinniped predation on non-listed fish species is likely to continue at rates similar to those estimated in Table 4.1 and 4.2. Therefore, if NMFS denies the states 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.

4.4.2 Alternative 2

Under Alternative 2, NMFS would grant the state's 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 (Table 4.3.2.1), white sturgeon and lamprey relative to the No-action Alternative. Under Alternative 2, predation by CSL on non-listed salmon and steelhead, white sturgeon would be expected to continue at levels observed in the past (3 white sturgeon in 2014, 12 white sturgeon in 2015, 8 white sturgeon in 2016, and 69 white sturgeon in 2017[10]) in the Willamette River.

The estimated total number of non-listed adult salmonids that could be consumed by 46 CSL per year ranges from 2,485 to 5,921 fish. Conversely, if 46 CSL were removed annually, the expected benefits to non-listed adult salmonids would range from 2,485 to 5,921 fish per year. The estimated total number of non-listed adult salmonids that could be consumed by 92 CSL per year ranges from 6,074 to 10,593 fish. Conversely, if 92 CSL were removed annually, the expected benefits to non-listed adult salmonids would range from 6,074 to 10,593 fish per year.

Therefore, Alternative 2 is expected to have a positive impact on non-listed fish species due to a reduction in pinniped predation. However, these impacts would be small and therefore not significant.

[9] ODFW Willamette Falls Pinniped Monitoring Project Reports, 2014-2017.
[10] ODFW Willamette Falls Pinniped Monitoring Project Reports, 2014-2017.

4.4.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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 is expected to have a positive impact on non-listed fish species due to a reduction in pinniped predation. However, these impacts would be small and therefore not significant.

4.5 Fish Habitat

Impacts to freshwater habitats are anticipated to be negligible. There would be no CSL 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 in the action area. Therefore, the proposed action will not impact EFH (subsection 3.7) for MSA-managed species.

Therefore, the No-action Alternative would not have a significant impact on fish habitat, and Alternatives 2 and 3 would not have a significant impact on fish habitat.

4.6 Recreation

4.6.1 Alternative 1 (No Action)

Under the No-action Alternative, NMFS denies the state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's 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 CSL management activities in the Willamette River, 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. 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.

Therefore, Alternative 2 would not have a significant impact on recreation because recreation use would not be prevented.

4.6.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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 recreational use would not be prevented.

4.7 Cultural Resources

4.7.1 Alternative 1 (No Action)

Under the No-action Alternative – NMFS denies the state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's application.

Under the No-action Alternative, CSL would likely continue to prey on listed salmon and steelhead, 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. The No-action Alternative would have a small negative impact on the historic significance of Willamette Falls Locks as there would be no changes CSL management activities in the Willamette River, and thus continued predation on these cultural and commercial resources 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 state's request for lethal removal and non-lethal removal as proposed in the state's 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, non-listed salmonids, white sturgeon, and lamprey compared to the No-action Alternative because of the lethal or non-lethal removal of CSL. Under Alternative 2, these increases in survival of listed salmon and steelhead, 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, there would be a small, positive impact on the historic significance of Willamette Falls Locks due to a reduction in pinniped predation on listed salmon and steelhead, non-listed salmon and steelhead, white sturgeon, and lamprey in the action area

Therefore, Alternative 2 would have a small, positive impact on the historic significance of Willamette Falls Locks by increasing the availability of culturally and commercially important fishes.

4.7.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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 the historic significance of Willamette Falls Locks by increasing the availability of culturally and commercially important fishes.

4.8 Law Enforcement

4.8.1 Alternative 1 (No Action)

Under the No-action Alternative – NMFS denies the state's request for lethal removal authority, and there would be no lethal removal of CSL in the Willamette River. If NMFS denies the state's application, the state may, under Section 109(h) of the MMPA, continue to use non-lethal deterrence measures to reduce the presence of pinnipeds in the Willamette River, but these activities are not linked to NMFS' decision to approve or deny the state's application. Since nothing is changing under the No-action Alternative, there would be no need for increased law enforcement presence in the area.

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 state's request for lethal and non-lethal removal as proposed in the state's application.

Law enforcement services under Alternative 2 are not anticipated to be required, but it is possible that members of the public may seek to take a closer look at CSL in the traps which may necessitate the need for law enforcement personnel to intervene. Therefore, if law enforcement services are required, the Clackamas County sheriff's department and NOAA's Office of Law Enforcement would be available, but impacts on law enforcement personnel or services are expected to be negligible as law enforcement responses under Alternative 2 would not be expected to divert a substantial number of law enforcement personnel from other duties.

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

4.8.3 Alternative 3

Under alternative 3, NMFS would grant the state's 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 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 Alternatives 2 and 3 (Proposed Action), no significant effects to climate change are expected. 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.

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 UWR spring-run Chinook salmon and UWR winter steelhead, NMFS does not expect that climate change would be significant enough to have an appreciable effect on UWR spring-run Chinook salmon and UWR winter steelhead 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 could have an impact on CSL. 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 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).

5.2 Marine Mammals

Subsection 3.2, describes the status of the CSL population following adoption of the MMPA, and Figure 3.2.1 illustrates that the U.S. stock of CSL is currently at OSP. Subsection 3.2 also describes the PBR method for determining a level of removals from a marine mammal population that will be low enough to avoid causing the population to fall below its OSP level. For the U.S. stock of CSL the PBR is 9,200 CSL per year (Carretta et al. 2015). The most recent comprehensive estimate of fisheries-related California sea lion mortality is in Carretta et al. 2015. Data from fisheries observers and west coast stranding networks reported an average annual mortality in fisheries of greater than 331 (CV 0.14) for the years 2008 through 2012. Carretta et al. (2015) reported an annual average mortality for 2008 through 2012 of 58 CSL from human sources other than fisheries, with the minimum number of non-fishery related deaths and serious injury estimated at 291 animals. Under the MMPA, a section 120 Letter of Authorization was issued to the states of Oregon, Washington, and Idaho for the lethal removal program at Bonneville Dam, resulting in a total of 214 CSL have been removed since 2008, with 15 animals being placed in captivity, 7 accidental mortalities, and 192 euthanized. These are minimum numbers, as they represent only those reported. Such human-caused mortalities are reasonably expected to continue into the future. If human-caused mortalities remain at levels reported through 2018 (331 fisheries related plus 58 other human causes, and an average of 20 removed annually at Bonneville Dam), and an additional 92 CSL are killed each year under the proposed action, the cumulative total human-caused mortalities would represent 5.4 percent of the estimated PBR (9,200)[11]. Even though human-caused mortalities are likely higher than those reported, this level of impact is well below what the population can sustain.

Under Alternative 3, it is likely that CSL would continue to be present in the Columbia River, and in the Willamette River. (Figure 5.1.1).

[11] 5.4 percent was derived by taking the total estimated human-caused mortality/PBR.

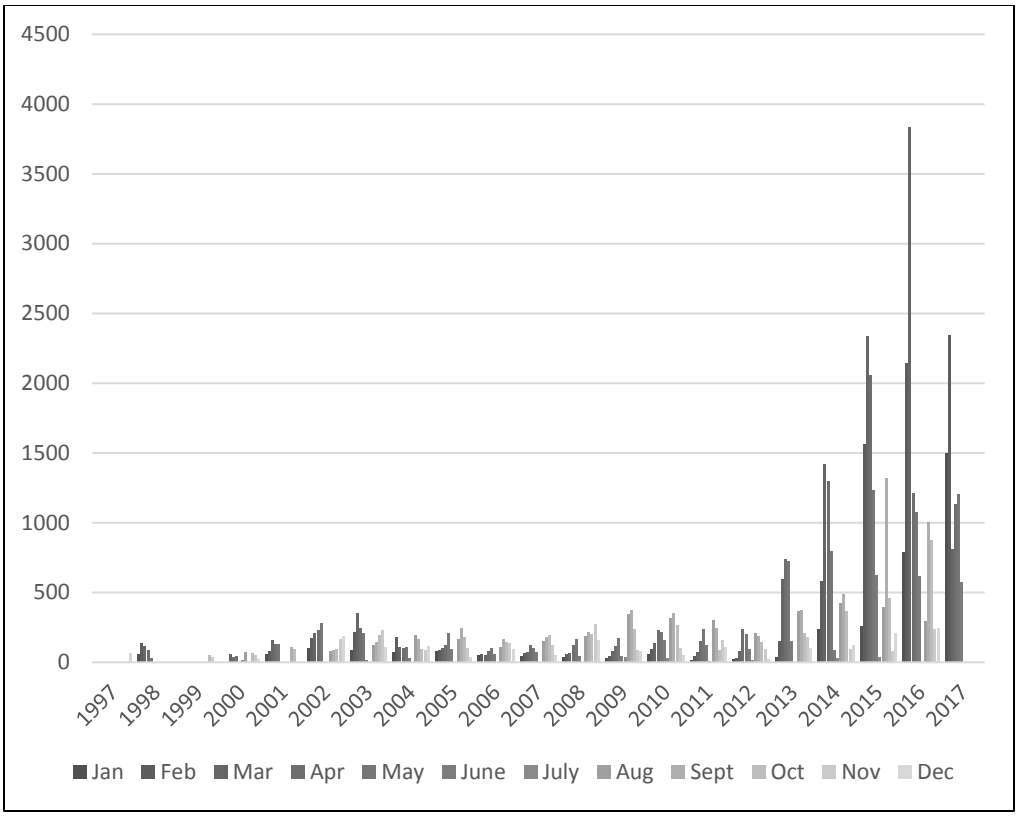

Figure 5.1.1. Monthly Maximum CSL Count, East Mooring Basin, Astoria, OR, 1997-2017 (ODFW 2018[12]).

There are no significant cumulative impacts associated with the No-action Alternative or Action Alternatives. Human-related mortality will remain below the PBR (4.7 percent under the no-action and 5.4 percent under either Alternatives 2 or 3). 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 Listed Salmonids

Subsection 3.3 describes the current status of UWR spring-run Chinook salmon and UWR winter steelhead. The UWR spring-run Chinook salmon ESU is comprised seven populations. Five populations are at very high risk, one population is at moderate risk, and one population is at low risk. The UWR winter steelhead DPS has four demographically independent populations. One population (Calapooia) is moderate risk and three populations are at low risk.

These salmon and steelhead species potentially affected by the proposed action have been listed for several years. Many factors have led to their decline and are preventing their recovery (subsection 3.3). As a result, recovery plans for these species encourage the management of all

[12] Email from Bryan Wright, Oregon Department of Fish and Wildlife, to Robert Anderson, NMFS, May 18, 2018.

sources of mortality (harvest reductions; changes in operations, configuration, and management of flood-control and hydroelectric dam; habitat restoration, hatchery reforms, as reflected in subsection in 3.4, as well as marine mammal predation.

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, and the elimination of a direct fishery on UWR winter steelhead has functionally eliminated harvest effects, 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.

Under Alternatives 2 and 3, the estimated total number of listed adult salmonids that could be consumed by 92 CSL per year ranges from 7,033 to 12,277 fish. If 92 CSL were removed annually, the expected benefits to wild spring-run Chinook salmon would range from 6,065 to 10,587 fish per year, and the expected benefits to wild winter steelhead would range from 968 to 1,690 fish per year. These numbers represent approximately 17.0 to 29.7 percent of the average total return of listed spring-run Chinook salmon and 26.5 to 46.2 percent of the average total return of listed winter steelhead from 2014 to 2018 in the Willamette River, respectively. Therefore, Alternatives 2 and 3 would offer a positive incremental effect on ESA-listed salmonids.

While as a single action it is not sufficient to recover these listed species, there is no single action available that would accomplish that goal. 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 UWR spring-run Chinook salmon and UWR winter steelhead.

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 Willamette Falls. 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
- Eric Murry — NMFS, West Coast Region

Scientists Knowledgeable about Pinniped-Fishery Interaction

- Robin Brown — Retired, Marine Mammal Scientist

Conservation Organizations

- Sharon Young — Humane Society of the United States
- Sara LaBorde — Wild Salmon Center
- Charles Harry — International Fund for Animal Welfare

Fishing Organizations

- Liz Hamilton — NW Sport Fishing Industry Association
- Bob Reese — Association of NW Steelheaders
- Norm Ritchie — Association of NW Steelheaders (alternate)

Indian Treaty Tribes

- Carl Scheeler — Confederated Tribes of the Umatilla Indian Reservation
- Olney "JP" Pratt — Confederated Tribes of the Warm Springs Reservation
- Paul Ward — Confederated Tribes and Bands of the Yakama Nation

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
- Meagan West — Washington Department of Fish and Wildlife

Other

- Doug Hatch — Columbia River Inter-Tribal Fish Commission
- Amy Gibbons — U.S. Army Corps of Engineers
- Tim Ragen — Retired, Marine Mammal Commission

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 Willamette River, 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 and adverse impacts, but these impacts will not result in a significant impact on the quality of the human environment.

The estimated total number of ESA-listed adult salmonids that could be consumed by 92 CSL per year ranges from 7,033 to 12,277 fish. If 92 CSL were removed annually, the expected benefits to wild spring-run Chinook salmon would range from 6,065 to 10,587 fish per year, and the expected benefits to wild winter steelhead would range from 968 to 1,690 fish per year. These numbers represent approximately 17.0 to 29.7 percent of the average total return of listed spring-run Chinook salmon and 26.5 to 46.2 percent of the average total return of listed winter steelhead from 2014 to 2018 in the Willamette River, respectively.

The proposed action will adversely affect individual CSL (target species) because as many as 92 CSL may be removed—transferred to zoos or aquaria or killed, annually. The most recent stock assessment report reveals the current population estimate for the U.S. stock of CSL is 257,631 (Laake et al. 2018). Permanent removal of 92 animals will have neither a measurable effect on the local abundance of CSL elsewhere in the Columbia River estuary, nor will there be any effect on the overall range-wide abundance, distribution, and productivity of the U.S. population. The current estimate of the PBR level for the U.S. population of CSL is 9,200 animals. PBR is the estimated number of animals that can be safely removed from a marine mammal population without affecting its status. Therefore, given the U.S. CSL population size and its PBR, the number of animals potentially affected (i.e., 92) is extremely small, and the proposed action will have no effect on the range-wide abundance, distribution, or productivity of either population of Steller sea lions or harbor seals.

Many factors have led to the decline and are preventing the recovery of listed salmon and steelhead in the Willamette Basin. Implementation of the proposed action will make a contribution to improving survival of returning adult salmon and steelhead. 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, in addition to other efforts, to 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 intentionally killed will be euthanized by lethal injection off-site and disposed of in accordance with applicable laws.

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 located in the Willamette River prey upon at-risk salmonids. The impacts of the proposed action of removing a small fraction of CSL population are straight forward and well understood.

There is, however, disagreement among various constituents as to the significance of CSL predation on at-risk salmonids and whether these animals should be held responsible for declining salmonid 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) 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 the U.S. stock of CSL is well known: removing up to 92 animals, particularly the male CSL identified as candidates for removal in the

Willamette River, will be inconsequential at the population level. As explained above and in the EA, the removal of as many as 92 animals from the CSL population will have no effect on the overall range-wide abundance, distribution, or productivity of the U.S. CSL population because the number of sea lions involved is extremely small compared to the current number of animals (9,200) that can be safely removed from the population (PBR) without affecting its status with respect to OSP. It is also known that pinniped removal will result in improved salmon and steelhead 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 state's application for lethal removal authority under MMPA Section 120. NMFS, the Task Force, and the state 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 state. No additional applications have been received or are under consideration 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 and steelhead in the Willamette Basin. Implementation of the proposed action will make a contribution to improving survival of returning adult salmonids. 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, in addition to other efforts, to decreasing mortality from known sources. Furthermore, even with implementation of the preferred alternative (Alternative 3), the cumulative effects on the U.S. population of CSL — assuming that the total human-caused mortalities would only represent 5.4 percent of the estimated PBR (9,200), will not have a material 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 safely removed from the population without affecting its status with respect to its 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 will not result in substantial cumulatively significant effects for the reasons outlined in response to question 3 above.

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 6,065 to 10,587 wild spring-run Chinook salmon per year, and 968 to 1,690 wild winter-run steelhead year, which will likely result in an incremental increase in wild spring-run Chinook salmon and wild winter-run steelhead productivity by reducing CSL predation (beneficial effect). Because there are no effects on riparian areas, substrate, or water quality, no impacts to salmon and steelhead 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 and steelhead survival in the Willamette Basin. The proposed action will be limited to those activities necessary to reduce adult salmonid losses due to pinniped 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 (target species) because as many as 92 sea lions may be removed—transferred to zoos or aquaria or killed, annually. The most recent stock assessment report reveals the current population estimate for the U.S. stock of CSL is 257,631 (Laake et al. 2018). Permanent removal of 92 animals will have neither a measurable effect on the local abundance of CSL elsewhere in the Willamette River or the Columbia River, nor will there be any effect on the overall range-wide abundance, distribution, and productivity of the U.S. population. The current estimate of the PBR level for the U.S. population of CSL is 9,200 animals. PBR is the estimated number of animals that can be safely removed from a marine mammal population without affecting its status. Therefore, given the U.S. CSL population size and its PBR, the number of animals potentially affected (i.e., 92) is extremely small, and the proposed action will have no effect on the range-wide abundance, distribution, or productivity of the CSL stock, as defined by the MMPA. Additionally, since other marine mammals in the area (i.e. Steller sea lions and harbor seals) will not be removed, there will be no adverse effect on either population of Steller sea lions or harbor seals.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?

Response: The proposed action will not 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 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 is in the Willamette River, which is approximately 128 river miles from the Pacific Ocean.

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 will have negligible effect on bio-diversity in the action area. In spite of limited removals, the abundance of CSL will continue to fluctuate in response to available prey. The proposed action will not eliminate CSL from the action area. CSL that are not removed are thus likely to remain in the action area, and there are likely to continue to be CSL throughout the Columbia River estuary.

The Willamette River has been described as a highly altered and degraded ecosystem and an active program has been implemented to control piscivorous predators in the Willamette River. The purpose of this program, 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 state in the Willamette River 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 environmental assessment prepared for NMFS' approval of the state of Oregon's application requesting authorization to intentionally take, by lethal methods, California sea lions in the vicinity of Willamette Falls, pursuant to MMPA Section 120 (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 environmental assessment. 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.

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

Nov. 14, 2018
Date