WRITTEN TESTIMONY OF
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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

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Introduction

Good morning Chairman Fleming, Ranking Member Huffman, and Members of the Subcommittee. My name is Will Stelle, and I am the Regional Administrator for the West Coast Region of the National Marine Fisheries Service (NMFS) at the National Oceanic and Atmospheric Administration (NOAA), within the U.S. Department of Commerce. Thank you for inviting NMFS to testify before you today on predation of Pacific salmon on the West Coast.

The West Coast Region of NMFS is responsible for the stewardship of our nation's living marine resources and their habitats off the coasts and in the watersheds of Washington, Oregon, California, and Idaho. These responsibilities cover 317,690 square miles of the eastern Pacific Ocean's California Current Ecosystem, over 7,000 miles of tidal coastline, and 176,000 acres of freshwater and estuarine habitats.

The management priority of the West Coast Region is twofold: to maximize productivity and sustainability of fisheries and fishing communities through effective fisheries management and to recover and conserve protected species and their habitats. The responsibility of the Region, and the agency, to protect, conserve, and recover the Pacific's threatened and endangered anadromous and marine species is found in our authorities under the U.S. Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA).

Congress passed the ESA on December 28, 1973, recognizing that the natural heritage of the United States was of "aesthetic, ecological, educational, recreational, and scientific value to our Nation and its people." It was understood that, without protection, many of our nation's living resources would become extinct. NMFS has ESA jurisdiction over marine and anadromous species, including West Coast salmon and steelhead. Under the ESA, our responsibilities include reviewing species' status to determine if listing is warranted, developing protective regulations to conserve listed species, designating critical habitat to protect the ecosystems upon which the species depend, and developing and implementing recovery plans. These recovery plans serve as a roadmap to bringing threatened and endangered species to the point where ESA protections are no longer needed.

Section 4(a)(1) of the ESA specifies that NMFS shall determine whether a species is threatened or endangered because of any of the following five factors[1]:

1. Present or threatened destruction, modification, or curtailment of its habitat or range;
2. Over-utilization of the species for commercial, recreational, scientific, or educational purposes;
3. Disease or predation;
4. Inadequacy of existing regulatory mechanisms; and
5. Other natural or manmade factors affecting its continued existence.

The complex life cycle of Pacific salmon and steelhead (*Oncorhynchus* sp.) spans freshwater streams and rivers, coastal estuaries, and the great expanse of the California Current ocean ecosystem. This complex life cycle and broad geographic range exposes Pacific salmon and steelhead to a diversity of threats, including those listed above. Many Pacific salmon and steelhead stocks have declined substantially from their historic numbers and are now at a fraction of their historical abundance. These declines collectively led to NMFS' listing of 28 salmon and steelhead stocks in California, Idaho, Oregon, and Washington under the ESA beginning in 1989.

We have recovery plans currently in place for 19 of the 28 listed salmon and steelhead stocks, and plans for the remaining 9 are proposed or under development. These recovery plans detail the factors leading to the decline and limiting the recovery of each salmon and steelhead stock, and they outline the site-specific actions that are necessary to address each of these threats.

While the specific suite of factors leading to the decline of each salmon and steelhead stock is unique, the list generally includes overfishing, loss and degradation of freshwater and estuarine habitat, hydropower development and blocked passage, poor ocean conditions, and harmful hatchery practices. For some stocks, predation by resurgent pinniped populations, bird colonies, as well as by thriving populations of native and non-native fish species also poses a serious threat to the stock's persistence and eventual recovery.

No single factor holds the key to recovering Pacific salmon and steelhead stocks. Each factor, each threat, must be addressed and reduced. As such, addressing sources of predation is a key component of our strategy to recovering threatened and endangered Pacific salmon and steelhead.

In the past two decades, NMFS has made targeted investments to further understand the effect of predation on various Pacific salmon and steelhead stocks to better inform our recommendations to address this important and emergent threat. We are also executing the statutory and regulatory authorities granted to us under the ESA and the MMPA to take direct action to reduce specific sources of predation. Under section 7 of the ESA, we work with other Federal Action Agencies on projects to operationalize predation control efforts. In these cases, NMFS is able to provide expertise in the design of predator control programs, however, it is the responsibility of the Action Agencies to carry out the programs in adherence with their Biological Opinions (BiOps). NMFS has additionally coordinated with states and local

[1] The ESA further requires that listing determinations be based solely on the best scientific and commercial information available; economic impacts are not considered in making species listing determinations and are prohibited under the ESA.

authorities to implement a hazing program under section 109 of the MMPA to discourage depredation of salmon and steelhead by pinniped populations. We have also authorized the lethal removal of individual pinnipeds that have become habituated to predating on salmon at Bonneville Dam in the Columbia River using our authority under section 120 of the MMPA.

The following sections detail a few examples of predation impacts on Pacific salmon and steelhead on the West Coast and NMFS's efforts underway to investigate or mitigate these impacts.

Salmon Predation in the Columbia River Estuary (Washington/Oregon)

A. Avian Predation Control

NMFS' 2008 BiOp on the Federal Columbia River Power System (FCRPS BiOp) called for the investigation of avian predation in the Columbia Basin by the FCRPS Action Agencies; primarily, the Army Corps of Engineers (Corps). This investigation validated the finding in a Caspian tern plan prepared in 2005 by the U.S. Fish and Wildlife Service, NMFS and the Corps, which showed that Caspian terns were responsible for consuming large numbers of juvenile steelhead and Chinook salmon in the entirety of the Columbia basin. The investigation called for by the 2008 BiOp found that, on average, Caspian terns were consuming more than five million salmon and steelhead smolts per year. As a result, the Corps has focused efforts on Caspian terns in its Inland Avian Predator Management plan. Active implementation of the plan began in 2014 with both active and passive dissuasion of terns from nesting at two interior Columbia basin sites that once held up to 850 pairs. Despite the plan's success in its initial year, in 2015, approximately 500 pairs of terns relocated themselves to a third new nesting site due to extremely low Columbia River flows during the 2015 nesting season. NMFS, along with the Action Agencies, expects that higher river flows (and perhaps some active management of reservoir levels) in 2016 will again help reduce the nesting area available at interior Columbia basin nesting sites.

The goal of Action Agencies under the 2008 FCRPS BiOp in the lower Columbia is to manage the tern population by limiting the colony on East Sand Island to 3,125 – 4,375 nesting pairs in order to increase juvenile Chinook salmon survival by 2% and steelhead survival by 3%. To accomplish this goal, the Corps has constructed alternate nesting sites in a total of six lake basins in eastern and southern Oregon and in San Francisco Bay to reduce the colony area on East Sand Island to 1.0 acre in size. This reduction led to a relocation of birds to alternate nesting sites outside the Columbia River basin, yielding a 13% reduction in the number of turn breeding pairs on East Sand Island between 2014 and 2015; however, a large number of non-nesting terns remain in the estuary. NMFS expects that many of these remaining birds will move to the constructed nesting sites outside the basin during 2016 and beyond. A multi-agency Caspian Tern Adaptive Management Team (led by the FCRPS Action Agencies with participation from multiple Federal, State and tribal agencies, including NMFS) is in place to assess the program as it moves forward.

The FCRPS Action Agencies (primarily, the Corps) are also managing double-crested cormorants in the Columbia River estuary under the 2008 FCRPS BiOp to achieve increases in survival of yearling Chinook salmon and steelhead of 1.1% and 3.5%, respectively. The mechanism to achieve these survival increases has been to reduce the number of cormorants nesting in the estuary from an annual population of 13,500

pairs to an average of 5,380 - 5,939 nesting pairs. With a depredation permit from the U.S. Fish and Wildlife Service, the Corps began actively reducing cormorant colony size by lethally removing adult birds and oiling eggs in active nests in 2015 after completing their Cormorant Management Environmental Impact Statement (EIS) and Record of Decision. A total of 2,324 adults were culled and 5,089 nests were oiled in 2015 in strict adherence to the EIS' Management Plan. A multi-agency Double-Crested Cormorant Adaptive Management Team (led by the FCRPS Action Agencies with participation from multiple Federal, State and tribal agencies, including NMFS) is in place to assess this program as it moves forward.

In addition to control for these two specific avian predator populations, all mainstem Columbia River dams have monitoring and deterrence plans for avian predators that include some level of active and passive dissuasion activities. Passive dissuasion is accomplished through the deployment of avian wires in the shape of a canopy over parts of the tailrace just below each dam. Active dissuasion includes staff from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service who patrol the dams and fire long-range pyrotechnics at avian predators in areas where they congregate. Five of the eight mainstem FCRPS project dams also employ limited lethal removal of specific problem birds as needed to reinforce their active dissuasion methods. Project-by-project monitoring and deterrence plans are contained in the Corps' annual Fish Passage Plan for the FCRPS (http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/index.html).

B. Piscine Predator Control

Some predatory fish species, such as the northern pikeminnow, are native to the Pacific Northwest. The Oregon Department of Fish and Wildlife estimated that in the early 1990s, this species consumed an estimated 1.4 million juvenile salmonids in the John Day Reservoir alone. In addition, large populations of non-native predatory fish species such as smallmouth bass, northern walleye, and channel catfish were planted in streams and lakes in the Pacific Northwest during the last two centuries to enhance recreational fishing opportunities. A U.S. Geological Survey biological study found that smallmouth bass consumed about 2% of the juvenile spring Chinook and 7% of the juvenile fall Chinook passing The Dalles Dam in 2002, and the Washington Department of Fish and Wildlife (WDFW) has reported observations of large populations of channel catfish below the dams in the Snake River and in the Yakima River.

Population control efforts executed by the States of Oregon and Washington with respect to these predators to date have focused on enhancement programs to increase recreational value of non-native predatory fish and increase license sales. In addition, WDFW removed size and daily limits for bass and walleye and daily limits for channel catfish in the mainstem Columbia above McNary Dam beginning in 2013-2014.

To address predatory fish control associated with projects consulted on by NMFS under the ESA, Douglas County Public Utility District (PUD) and Chelan County PUD have included an annual pikeminnow removal program in their Habitat Conservation Plans for the Wells, Rocky Reach, and Rock Island Hydroelectric Projects. Hook-and-line techniques are employed for all three programs during the juvenile outmigration season (April through July) and target fish in project reservoirs larger than 9 inches.

Annual catch varies, but averages 10,000 to 15,000 pikeminnow from the Wells; 25,000 to 35,000 from the Rocky Reach; and 25,000 to 35,000 from the Rock Island Reservoir.

C. Pinniped Predator Control

Since the passage of the MMPA amendments in 1994, NMFS has been devoting significant resources and partnering with affected parties to better understand the problem of pinniped predation on at-risk stocks on the West Coast, and to develop appropriate responses to relieve impacts to coastal communities. A key component of NMFS' program is our fiscal support of and collaboration on the research and monitoring of West Coast pinniped populations and their impacts on specific threatened and endangered salmon stocks in the Columbia-Snake River Basin, and Puget Sound. A number of port authorities in California, Oregon and Washington have requested NMFS' assistance in addressing their local pinniped predation issues. These ports include the communities of: Monterrey in California; Gold Beach, Newport, and Astoria in Oregon; and Ilwaco and Westport in Washington. NMFS staff work closely with such communities to inform them of the statutory authority to deter marine mammals under section 101(a)(4) of the MMPA to ensure public safety, protect their gear, catch, and private property. These techniques include removing and discouraging haul-out locations on docks and jetties, implementing hazing programs to discourage pinnipeds from predating on fish and interacting with fisheries, and reducing attractants such as through disposal programs for fish carcasses. NMFS assistance includes convening workshops to understand the challenges facing local anglers and communities, and to educate local jurisdictions of the likely impacts if they do not exercise the authorities available to them in addressing this problem.

NMFS is very concerned about the impact robust populations of pinnipeds in the Columbia River and elsewhere in the Pacific Northwest are having on ESA-listed salmon and steelhead stocks. For example, from 2002-2015, California sea lions consumed an estimated total of 45,294 salmonids within ¼ mile of Bonneville Dam. To give perspective on this, total salmonid passage at Bonneville Dam from 2002-2015 was estimated at 2,539,926 fish from January 1 through May 31: the period during which pinnipeds are normally present in the vicinity of Bonneville Dam.

With passage of the MMPA amendments of 1994, Congress recognized the limits of non-lethal deterrence of pinnipeds as a means to protect at-risk, threatened, and endangered salmonids along the West Coast. These amendments included MMPA Section 120, which allows states to apply for authority to lethally remove certain, individually identifiable pinnipeds to protect salmonids.

In accordance with the procedures in Section 120 of the MMPA, the National Environmental Policy Act (NEPA), and the ESA, NMFS authorized in 2008 and 2012 the states of Oregon, Washington, and Idaho to remove or kill individual California sea lions that they determined to be having a significant negative impact on five populations of ESA-listed salmon and steelhead in the Columbia River. Combined, the three States' authorizations allow up to 92 animals to be removed per year. Since receiving removal authority in 2008, the States have permanently removed (to captivity or euthanized) 102 California sea lions.

Preliminary data suggest that our MMPA Section 120 program has been successful overall in reducing the predation rate on salmonids in the immediate vicinity of Bonneville Dam. For example, the Oregon Department of Fish and Wildlife estimates that the Section 120 program has prevented the loss of 15,000-20,000 salmonids at Bonneville Dam since its inception. However, despite the benefits of the program, the number of California sea lions (and predation rates on salmonids) have steadily increased in the past three years. Research conducted by NOAA Fisheries' Northwest Fisheries Science Center estimating survival of adult spring/summer Chinook salmon from the Columbia River estuary to Bonneville Dam from 2010 through 2015 suggests that the weighted mean annual survival (adjusted for harvest, detection efficiency at Bonneville Dam, and gear-associated mortality) was 90%, 87%, 88%, 73%, 59%, and 72%, respectively. With known and assumed sources of mortality accounted for[2], this research suggests that the remaining unaccounted for fish are lost to pinniped predation.

Pinniped predation has also expanded to the Willamette River, where a minimum of 27 and 32 individual California sea lions in 2014 and 2015, respectively, consumed an estimated 5,141 salmonids below Willamette Falls. It is estimated that this represents approximately ten to thirteen percent and eight to ten percent of the potential escapement above Willamette Falls of ESA-listed winter run steelhead and spring run Chinook in 2014 and 2015, respectively.

Effective implementation of Section 120 of the MMPA has been challenging at times, and it could benefit from minor targeted improvements. NMFS has previously provided testimony to this committee articulating our perspective on suggested improvements. This discussion is most recently detailed in testimony provided by Mr. Barry Thom, Deputy Regional Administrator of the West Coast Region of NMFS on July 15, 2015.

Salmon Predation in the Central Valley, California

A study published in 2014 by NMFS' Southwest Fisheries Science Center (SWFSC) found that annual overall survival of outmigrating late-fall-run Chinook salmon smolts in the Sacramento River was between 3-16%, which is low when compared to survival of salmon in other West Coast rivers including the Snake (27.5% survival) and Yakima (28% survival), two rivers that have much longer migration corridors. These low survival percentages likely result from a combination of threats, including low flows, degraded habitat and high densities of both non-native (i.e., striped bass, smallmouth bass, and largemouth bass) and native (e.g., pikeminnow) predatory fish species.

Management actions for improving juvenile salmon survival through the Sacramento River and Delta are described in detail in our Central Valley Chinook Salmon and Steelhead Recovery Plan (Recovery Plan). Specific restoration actions in the Recovery Plan are implemented through agency and stakeholder partnerships and through individual competitive grant opportunities. In addition, our 2009 Biological Opinion for the Long-term Operations of the Central Valley Project and State Water Project (OCAP BiOp) specifies that certain actions are the responsibility of the Action Agencies to execute. In the case of the OCAP BiOp, Action Agencies refer to the U.S. Bureau of Reclamation (Reclamation) in coordination with the California Department of Water Resources (DWR). A few of the key strategies are outlined below.

[2] Natural mortality is generally estimated to be between 2 and 4 percent.

A. Restoring Juvenile Salmonid Rearing Habitat

The vast majority of historic floodplain and wetland habitat in the Central Valley no longer exists or is no longer accessible for juvenile salmonids. Restoring that habitat and access to it is expected to decrease the risk of predation of juvenile salmonids by other fish species because: (1) they will have access to more food, allowing them to grow faster and thereby improve their ability to avoid predation; and (2) the restored wetlands and floodplains will increase habitat complexity and predator refuge areas. Restoring juvenile rearing habitat is a key action in Recovery Plan. In addition, our OCAP BiOP specifies that the Action Agencies will restore 17,000-20,000 acres of floodplain rearing habitat for juvenile winter-run and spring-run Chinook and for Central Valley steelhead in the lower Sacramento River basin.

B. Management of CVP/SWP Operations Conditions During Winter and Early Spring

NMFS and its Federal and State agency partners (Reclamation, DWR, U.S. Fish and Wildlife Service and California Department of Fish and Wildlife) are working with Delta water users including the Northern California Water Association to pursue four related activities to understand, manage, and reduce the exposure of juvenile winter-run Chinook salmon to negative flows and increased predation in the central and south Delta:

(1) Continued partnership and support of the Collaborative Adaptive Management Team (CAMT) and the Salmon Scoping Team;
(2) Installation of barriers at Georgiana Slough and other key junctions;
(3) Improved enhanced particle tracking modeling; and
(4) Real-time salmon monitoring and water export management in the Delta.

Implementing these activities is expected to improve juvenile winter-run Chinook salmon survival by expanding our knowledge of and ability to manage Delta conditions and impacts to ESA species; minimizing the distribution of juveniles from the Sacramento River into the interior Delta; and minimizing juvenile salmonid exposure to reverse flows and predation if they do enter the interior Delta. Of these items, installation of barriers at Georgiana Slough is a requirement of the Action Agencies in our 2009 OCAP BiOp.

C. Modifying Predation "Hot Spots"

The presence of man-made structures in the Sacramento River and Delta likely contributes to increased predation levels of salmonids by other fish species in specific areas where predators congregate in large numbers--termed "hot spots." Red Bluff Diversion Dam in the Sacramento River was one such hot spot until the dam gates were permanently removed by the Action Agencies in 2012 per our 2009 OCAP BiOp. Removing the dam gates greatly improved the flow conditions at the structure in the favor of juvenile salmonids, making them less vulnerable to predation at that site. Consequently, predator densities at the dam decreased after the gates were removed.

D. Isolating Striped Bass within Clifton Court Forebay

Survival of juvenile salmonids through Clifton Court Forebay, on the State Water Project in Contra Costa County, California, is extremely low due to an abundance of striped bass. To fulfill an action required by the 2009 OCAP BiOp to improve juvenile salmonid survival, DWR will this year be initiating a capture and relocation program for striped bass in Clifton Court Forebay. The striped bass will be released in an isolated section of the forebay, eliminating their access to juvenile salmonids in the forebay's open waters. This effort is intended to improve salmonid survival while also enhancing striped bass fishing opportunities in the isolated area.

Conclusion

Pacific salmon are of profound importance to healthy ecosystems, cultures, and economies, making their recovery a priority for the Region and the agency as a whole. NMFS has made great progress in recent years towards completion of high-quality salmon and steelhead recovery plans that provide a roadmap to conservation of these listed icons of the Pacific West Coast.

Recovering Pacific salmon and steelhead populations will take decades to achieve, but should ultimately provide long-term economic stability, allow the United States to honor its commitment to tribal reserved fishing rights, and afford maximum regulatory flexibility. NMFS remains committed to investing in Pacific salmon and steelhead recovery in a way that addresses all threats to the species, including predation, in order to ensure our progress towards recovery remains on track.

Thank you again for the opportunity to provide testimony today on this important topic. I appreciate the Subcommittee's time and attention to these important issues and I look forward to working with you further. I would be happy to answer any questions you may have.