

SUPPLEMENTAL INFORMATION REPORT

**IN RESPONSE TO THE AUGUST 18, 2011 APPLICATION BY
IDAHO, OREGON, AND WASHINGTON FOR LETHAL REMOVAL
AUTHORITY UNDER SECTION 120 OF THE MARINE MAMMAL
PROTECTION ACT**



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I. Introduction

On March 14, 2008, we, the National Marine Fisheries Service (NMFS), issued a final environmental assessment (EA) and finding of no significant impact (FONSI) pursuant to the National Environmental Policy Act (NEPA) supporting our decision to authorize the states of Idaho, Oregon, and Washington (states) to lethally remove certain California sea lions to reduce pinniped predation on Endangered Species Act (ESA) listed salmon and steelhead (salmonids) below Bonneville Dam in the lower Columbia River. On November 23, 2010, the Ninth Circuit Court of Appeals instructed the district court of Oregon to vacate NMFS' authorization and remand the decision to NMFS for further explanation.

On August 18, 2011, the states submitted a new application for lethal removal authority under Section 120 of the Marine Mammal Protection Act (MMPA). In response, we propose to authorize the states to kill individually identifiable California sea lions under Section 120 of the MMPA under the terms and conditions contained in the states' application. The purpose of this supplemental information report (SIR) is to review the action proposed by the states in their new application and determine whether (1) there are any substantial changes between the current proposed action and the proposed action analyzed in the 2008 EA that are relevant to environmental concerns, or (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action.

II. Background

On December 5, 2006, the states applied to NMFS pursuant to Section 120 of the MMPA for authority to lethally take, by intentional means, individually identifiable California sea lions that prey on salmonids listed under the ESA, below Bonneville Dam in the lower Columbia River. Following receipt of the states' application, we requested public comment on the application and established a Pinniped-Fishery Interaction Task Force (Task Force) pursuant to the MMPA to review the application and available data and provide recommendations on whether to approve or deny the application. The Task Force subsequently recommended (with one of 18 members dissenting) that we approve the states' application for lethal take authority, while continuing non-lethal deterrence measures.

After reviewing and considering (1) the states' application, (2) public comment on the states' application, (3) the Task Force report and recommendations, (4) comments and information presented by the Marine Mammal Commission (MMC), (5) several sea lion reports and studies by the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW), and (6) other information about sea lion predation on salmonids at Bonneville Dam, we prepared a draft EA for public review pursuant to NEPA. The draft EA, *Reducing the Impact on At-Risk Salmon and Steelhead by California Sea Lions in the Area Downstream of Bonneville Dam on the*

Columbia River, Oregon and Washington, was released for public comment on January 18, 2008 (73 FR 3453). We received over 3,500 comments, including 16 substantive comments, during the 30-day public comment period.

After considering public comments, on March 14, 2008, we issued a final EA and FONSI. In the FONSI, we determined, based on the information and analysis contained in the EA, that the proposed action would not significantly impact the quality of the human environment and that preparation of an environmental impact statement under NEPA was not necessary (NMFS 2008a).

The 2008 EA described the purpose and need of the lethal removal program as supporting the states' efforts to improve adult salmonid survival by reducing pinniped predation at Bonneville Dam, consistent with the MMPA and in consideration of the Task Force's recommendations. The EA explained there was a need to address the seasonally recurring and increasing problem of pinniped predation, which contributes to the decline or impedes recovery of listed salmon and steelhead passing through Bonneville Dam. The final EA included a reasonable range of alternatives, including the "no action" alternative, and an evaluation of the environmental effects of each alternative. The selected alternative, Alternative 3 – Modified Task Force Recommendation – Combine lethal take by intentional means after non-lethal deterrence (Proposed Action), contained a number of limiting conditions including: (1) a definition of "individually identifiable California sea lions that are having a significant negative impact on ESA listed salmonids" and are therefore eligible for removal, (2) a limit on the number of California sea lion that may be removed annually, (3) methods authorized for removal (capture/chemical euthanasia, shooting), (4) the establishment of an animal care committee to review and recommend appropriate protocols to minimize animal suffering during capture, handling and euthanasia, (5) accommodations for placing California sea lions in permanent captivity in pre-approved facilities in lieu of killing them, and (6) several administrative requirements to ensure public safety, monitoring, reporting, procedures for amending the list of animals for removal, an interim threshold for suspending lethal removal activities, and retrieval, utilization and disposal of carcasses.

After issuance of the final EA and FONSI, on March 17, 2008, we issued a Letter of Authorization (LOA) to the states pursuant to Section 120, and lethal removal efforts commenced. The LOA contained a number of terms and conditions for removal, and stated our intent to reconvene the Task Force after three years to evaluate the effectiveness of the lethal removal program.

In the fall of 2010, we re-convened the Task Force. We asked the group to review the states' 2008-2010 reports and assist them in evaluating the removal program's effectiveness. We provided instructions to the Task Force and asked that they respond to five questions (Griffin pers. comm., 2010). The questions included: (1) does the criterion, the average observed salmonid predation rate falls below 1% of the observed fish passage at the dam, remain useful for evaluating the effectiveness of removal; (2) does non-lethal hazing appear to be an effective aid in reducing sea lion predation on salmonids in the area; (3) do the criteria for identifying predatory sea lions remain

appropriate; and (4) are there other terms and conditions of the authorization that limit the effectiveness of the removal program. A fifth question regarding the potential displacement of sea lions from Bonneville to other areas of the river was dropped from consideration during the meeting because there was insufficient data for evaluation.

The Task Force acknowledged that Section 120 may not be the most effective long-term tool for resolving the pinniped-fishery interaction dilemma at Bonneville Dam or other areas in which there are growing sea lion/salmonid problems. All but one Task Force member expressed a desire to maintain the current authority and strengthen the level of resources needed to remove additional animals while pursuing other longer term strategies (including possibly using other sections of the MMPA, e.g. Sections 101 or 109). They recommended that the 1% predation rate criterion not be changed because it had yet to be tested (because litigation had interrupted program implementation). The Task Force also found that non-lethal hazing did not appear to be effective at reducing predation and recommended that it be removed as a condition of the states' permit. The Task Force reached consensus that the criteria for identifying predatory California sea lions are cumbersome and may reduce the effectiveness of a program to manage predation on salmonids. They made several recommendations to accelerate the lethal removal process. As before, one Task Force member recommended the states abandon the lethal removal program because there is no easy way to increase its effectiveness and no effective long-term solution to the problem of sea lion predation on salmonids. The Task Force did not make recommendations to modify other terms and conditions of the authorization when it delivered its final report on December 17, 2010 (Task Force, 2010).

Shortly after we issued the 2008 Section 120 LOA, the Humane Society of the United States (HSUS) and others filed a complaint in the U.S. District Court for the District of Oregon. Plaintiffs alleged that our approval of the lethal removal of California sea lions violated the MMPA and NEPA. In November 2008, the district court issued an order upholding our approval of the lethal removal program and evaluation of impacts under NEPA. Plaintiffs appealed. On November 23, 2010, the Ninth Circuit affirmed summary judgment in favor of defendants on plaintiffs' NEPA claim, but reversed summary judgment on plaintiffs' MMPA claim. The court instructed the district court to vacate our Section 120 decision and remand the decision "to afford the agency the opportunity either to articulate a reasoned explanation for its action or to adopt a different action with a reasoned explanation that supports it." *Humane Society of the U.S. v. Locke*, 626 F.3d 1040, 1053 (9th Cir. 2010).¹

In response to the litigation, the states (Oregon and Washington only) submitted a letter to NMFS dated December 7, 2010 requesting that the LOA be reissued. We reissued a LOA to the states on May 12, 2011, and relied upon a SIR to assess whether there was a need to supplement the 2008 EA and FONSI. The SIR included an analysis of new information that had become available since the 2008 NEPA analysis and decision. In the SIR we concluded:

¹ The Ninth Circuit determined that we had not adequately explained, for purposes of our MMPA Section 120 decision, our significance determinations in light of seemingly inconsistent findings in other actions that affect salmonid survival, e.g., fishery harvest and hydropower operations. *Id.*

[T]here is no need to supplement the 2008 EA and FONSI because: (1) the changes to the proposed action that are relevant to environmental considerations are not substantial; and (2) the new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts are not significant under NEPA. The changes to the proposed action and the new information and circumstances do not suggest the proposed action will result in significant or uncertain impacts, nor in impacts that were not considered in the 2008 EA and FONSI. Therefore, the 2008 EA and FONSI remain valid and NMFS will continue to rely on them to support the proposed action.

The May 12, 2011 authorization was again challenged in court. We revoked the states' May 2011 LOA, and HSUS withdrew their complaint on August 15, 2011.

To prepare for the 2012 salmon migration, the states submitted a new application for lethal removal on August 18, 2011. The states requested a new 5-year (2012-2016) MMPA Section 120 California sea lion removal authorization. With the exception of two minor modifications, the states' application is the same as the authorization we issued to the states on March 17, 2008. In their application, the states propose to remove no more than 1% of the potential biological removal (PBR) limit (defined below) for the California sea lion population annually. This is the same removal limit as authorized in 2008. The application defines an "individually identifiable predatory California sea lion" as: (1) having natural or applied features that allow them to be individually distinguished from other California sea lions; (2) have been observed eating salmonids at Bonneville Dam, in the "observation area" below the dam, in the fish ladders, or above the dam, between January 1 and May 31 of any year; (3) have been observed at Bonneville Dam on a total of five days (consecutive days, days within a single season, or days over multiple years) between January 1 and May 31 of any year; and, (4) are sighted at Bonneville Dam after they have been subjected to active non-lethal deterrence. This definition is the same as the definition in the original authorization except that it includes animals observed killing salmonids in the Bonneville Dam fish ladders or above the dam (not just those below the dam).

The states propose to review the lethal removal program on an annual basis and evaluate its effectiveness at reducing sea lion predation on salmonids at Bonneville Dam. The states' evaluation will determine whether they intend to continue the removal program in each subsequent year, and if an extension of the authority will be requested at the end of the 5-year period. The expected benefit from implementing the authorization would be to more efficiently and effectively reduce, primarily through lethal techniques, California sea lion predation of ESA-listed salmonids.

III. Scope of the Supplemental Information Report

The purpose of this document is to determine and document whether any changes to the proposed MMPA decision or new circumstances or information require us to supplement the 2008 EA and FONSI.

In making a determination on the need for additional analysis under NEPA, we have considered and have been guided by the Council on Environmental Quality (CEQ) NEPA regulations and applicable case law. The CEQ regulations state “[a]gencies shall prepare supplements to either draft or final environmental impact statements if: (i) the agency makes *substantial* changes in the proposed action that are relevant to environmental concerns; or (ii) there are *significant* new circumstances or information relevant to environmental concerns *and* bearing on the proposed action or its impacts.” 40 C.F.R. § 1502.09(c) (emphasis added). In addition, we have considered CEQ’s “significance” criteria at 40 C.F.R. § 1508.27 and the criteria relied upon for the 2008 FONSI to determine whether any new circumstances or information are “significant,” thereby requiring supplementation of the 2008 EA.

We first describe our proposed action and compare it to the action analyzed in the 2008 EA. We next consider whether there are any significant new circumstances or information that are relevant to environmental concerns and have a bearing on the proposed action or its impacts. For our consideration of new circumstances and information, we have consulted, among other sources, our files, state and Federal field reports and publications from 2008-2011, presentations made during the 2010 and 2011 Task Force meetings, and public comments received on the states’ August 2011 MMPA Section 120 application. The new circumstances and information are related to: (1) updated information on pinnipeds in the action area (population, presence, predation); (2) updated salmonid information (status and trends, recovery planning, passage counts, predation versus run size, hatchery versus wild components); (3) non-lethal deterrence efforts; (4) permanent pinniped removals carried out under the previous section 120 LOA; (5) impacts of predation on other fish species; (6) recent recommendations from the Task Force; and (7) substantive public comment.

IV. Changes in the Proposed Action

We propose to re-authorize the sea lion lethal removal program, as previously authorized in 2008 (i.e. – Alternative 3 from the 2008 EA), with slight modifications based on the states’ new application. The measures, standards, and levels of sea lion removal identified in the 2008 LOA and evaluated in our 2008 EA and FONSI will be continued, with the exception of the two minor changes.

The specific changes are: (1) eliminate the 1% average salmonid predation rate threshold for suspending lethal removal activities (Condition 15 in the 2008 LOA); and (2) modify the criteria for defining “individually identifiable predatory California sea lion” to include animals seen taking salmonids in the Bonneville Dam fish ladders or above the dam.

A. Elimination of the 1% Predation Rate Threshold

We propose to eliminate the 1% predation rate threshold for suspending lethal removal for the following reasons: (1) it is unnecessary for the protection of sea lions because the 1% of PBR limitation is adequate to protect the sea lion population; (2) it is unnecessary

because it is unlikely that the threshold will be achieved over the 5-year term of the proposed action; and (3) if the threshold is achieved and lethal removals are suspended, the predation rate can quickly escalate again. For these same reasons, the change in this term of the LOA does not amount to a substantial change in the proposed action.

(1) The 1% predation rate threshold is unnecessary for the protection of the California sea lion population because the 1% of PBR limit is adequate to ensure that the removal program would have inconsequential effects on the population. As described in more detail in Section V.a.1. below, the California sea lion population is large and growing and the removal of even the full number of animals representing 1% of PBR (92) will have no effect on the status of the California sea lion population. For the same reason, the elimination of the 1% predation threshold from the current proposed action does not represent a substantial change from the 2008 proposed action. That is, whether the states kill 85 sea lions per year, as authorized under the 2008 proposed action, or 92 sea lions per year, as authorized under the current proposed action, the effect on the California sea lion population will be imperceptible.

(2) The 1% predation rate threshold is unnecessary because it is unlikely that the threshold will be achieved over the 5-year term of the proposed action. The 3-year running average predation rate by pinnipeds on salmonids has exceeded the 1% threshold every year since 2005. In 2011 the U.S. Army Corps of Engineers (Corps) summarized the data on the observed predation rate and observed fish passage at the dam from 2002 through 2011 (Stansell et al. 2011) (shown in Table 2 below). Salmonid passage totals for the January 1 through May 31 spring seasons in 2008, 2009, and 2010 (the first three years of the 2008 authorization) were reported as 147,543, 186,060, and 267,194 fish respectively. Predation rates for the same period were reported as 4,466 salmonids (2.9% of the run) in 2008, 4,489 (2.4%) in 2009, and 6,081 (2.2%) in 2010. The 3-year running average predation rate for 2008-2010 was thus 2.44%. In 2011 the predation rate dropped to 1.6%, bringing the 3-year running average to 2.04%, which again exceeded the threshold. At current levels of pinniped predation (6,000 salmonids consumed in 2010 and 3,500 in 2011), consistent run sizes of 350,000 to 600,000 fish would be needed to achieve a 1% threshold, which is unlikely, given that the 2002-2011 average is well below 200,000. Conversely, if run sizes were 250,000, a 1% predation rate would equate to 2,500 fish. This level of predation was last seen in 2003. Although the removal program in 2008-2010 may have led to lower predation levels in 2011 (Stansell et al. 2011), even the reduced predation rate in 2011 exceeded 1% of the salmon run. Based on this past data, it is unlikely that the 3-year average predation rate of 1% would be achieved over the course of the 5-year authorization. Because it is unlikely that the 1% 3-year average rate would be achieved during the term of the 5-year authorization, the effects of the proposed action are likely to be the same, with or without the threshold.²

² If we authorize lethal removal without the 1% predation rate threshold, the predation rate drops below 1%, and lethal removals continue, there would be no effect on the California sea lion population, because even removing 92 animals per year over five years will not have an effect on the population, as explained in point number 1 above.

(3) If the threshold is achieved and lethal removals are suspended, the predation rate can quickly escalate again. Although it is unlikely the predation rate would drop to a 1% 3-year average during the term of the 5-year authorization (for the reasons discussed above), even if it did the history of predation at Bonneville Dam demonstrates that the predation rate is likely to quickly rise again, as sea lion numbers and per capita consumption increase. In that event, the lethal removals would resume. Rather than have the program start and stop based on fluctuation around a set threshold, we have concluded that it would be more meaningful to instead rely on a 5-year retrospective review at the end of the authorization period and consider all the circumstances, including California sea lion abundance, salmonid run size, and any other relevant factors. Because the predation rate would likely rise again even if it did drop below a 1% 3-year average, and removals would therefore resume, eliminating the threshold from the current proposed action will not result in a different outcome than that anticipated in the 2008 analysis.

The evaluation above demonstrates that eliminating the 1% predation rate threshold does not represent a substantial change from the proposed action reviewed in our 2008 EA because the change is not expected to result in impacts that are significant or uncertain or outside the range of the impacts we considered in the 2008 EA and FONSI.

B. Modification in Definition of “Predatory” Sea Lions

The minor modification to include California sea lions observed taking salmonids in the fish ladders or above the dam will address circumstances such as the one observed sea lion (C404) preying on salmonids in the upper fish ladders and public observation area in 2005 (See NMFS’ 2008 EA at 1-6) and the one observed sea lion (C697) preying on salmonids above Bonneville Dam in 2010, and the possibility that additional California sea lions may learn to successfully forage in the fish ladders or above the dam in the future. Sea lion C697 had been observed in the tailrace numerous times before being observed taking fish in the forebay. He was captured and released downstream (because he hadn’t been observed taking fish in the tailrace observation area prior to moving upstream). Once downstream he was observed taking salmonids in the observation area, subsequently captured and euthanized.

The proposed change in the criteria falls within the scope of the previous environmental assessment. Although predatory California sea lions were not regularly observed above the dam prior to 2010, NMFS, the Corps, and the states were aware that animals had the capability to enter the fish ladders to forage and potentially find their way above the dam via the locks. In fact, several actions had to be taken in response to increasing predation in the fish ladders, including installing sea lion exclusion gates, and actively deterring sea lions from the fish ladders (Tackley et al. 2008). The eligibility for removal of individually identifiable California sea lions that are opportunistically observed killing salmonids in the forebay above the dam or in the fish ladders is consistent with the purpose and need statement in the 2008 EA. The revised criteria may hasten the eligibility of individual California sea lions that may be taken by lethal removal, but it is

highly likely that animals entering the fish ladders and/or ascending above the dam will ultimately be added to the list if they aren't already on it. The two sea lions given as examples above both became eligible for removal under the 2008 criteria (one became eligible when the original Appendix 1 list was prepared and the other became eligible as described in the example). Given the actions taken to limit California sea lion presence within the fish ladders and above the dam, we anticipate very few California sea lions would be seen above the tailrace of the dam in the future. Even if they are, and this change hastens their addition to the list, it is unlikely that will result in any more sea lions being killed, either in a given year or in total. As noted in Section V.A.1. below, there is a practical limit to the number of sea lions the states can kill and it is likely the number of sea lions on the list will continue to exceed the states' capacity to kill them.

The evaluation above demonstrates that slightly expanding the definition of "predatory" animals does not represent a substantial change from the proposed action reviewed in our 2008 EA because the change is not expected to result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

V. Consideration of New Circumstances and Information

This section presents circumstances and information that are new or that have been updated since the analysis conducted in the 2008 EA, where those circumstances or that information are relevant to environmental concerns and bear on our proposed action or its impacts. We have evaluated whether any of these new and relevant circumstances or information are "significant" pursuant to NEPA and in light of the analysis contained in our 2008 EA and FONSI.

A. Pinnipeds

1. Population Data

California sea lions (U.S. stock), Steller sea lions (eastern U.S. stock), and harbor seals (Washington/Oregon coastal stock) are present in the action area during the period when California sea lion predation on salmonids peaks during the spring. Population status information is periodically updated and published in NMFS Marine Mammal Stock Assessment Reports (SARs) (Carretta et al. 2011a, and Allen and Angliss 2011).

For California sea lions, a draft SAR was issued for public review in August 2011 (Carretta et al. 2011b). Although it is not yet final, it contains the most up-to-date information and reports the most recent published studies, which is the best information available. The draft SAR reports new abundance estimates showing that the population has grown from 238,000 to 296,750, and the minimum population number (N_{\min}) has also increased, from 141,842 to 153,337. The 2011 draft SAR uses a new logistic growth curve to plot population growth. The new plot indicates that the California sea lion population has yet to reach carrying capacity. The SAR also signals that the optimal sustainable population (OSP) status for this population "has not been formally determined" (that is, not published in the peer reviewed literature). Nevertheless, because the stock is growing and not considered depleted under the MMPA, the SAR

continues to use a “recovery factor” of 1.0 in the PBR calculation. Based on an increase in the N_{\min} from 141,842 to 153,337, the PBR increased from 8,511 to 9,200 per year, between the 2008 proposed action and the current proposed action. Annual human-caused mortality reported as of 2008 was 1,476 from fisheries and 78 from other sources (shootings, boat collisions, power plant entrainment etc.) (Carretta et al. 2006), while the 2011 draft SAR reports annual human-caused mortality of 431, which includes the animals killed under the 2008 authorization. The draft SAR also now reports that California sea lions are recognized as a separate species rather than a subspecies, as was thought in 2008.

For Steller sea lions a new population estimate was reported in the revised SAR (Allen and Angliss 2011) and is currently the best available scientific information. The revised SAR indicates that the N_{\min} for Steller sea lions increased to 52,847 from the N_{\min} of 44,404 reported in 2008, and the calculated PBR increased to 2,378 from the 1,998 previously reported. All sources of human-caused mortality total about 41 animals on average per year, well below the PBR. On August 30, 2010, the states of Alaska, Washington and Oregon submitted petitions to de-list the eastern U.S. stock of Steller sea lions. The petitions cite continued population growth over a sustained period (25 years), occupation of new haul-out and rookery sites, and lack of significant threats to population recovery as justification for a delisting action. The Alaska Region of NMFS is completing a status review and a determination is pending. There is no new information on abundance of harbor seals in the OR/WA coastal stock since the estimate of 24,732 based upon surveys in 1999.

Analysis and Conclusion: For California sea lions, the new circumstances or information include: (1) the minimum population number has increased, resulting in an increase in PBR from 8,511 to 9,200. This means that the proposed action authorizing the states to kill 1% of PBR would allow up to 92 sea lions to be killed annually rather than the 85 considered in the 2008 EA; (2) California sea lions are now considered to be a full species rather than a subspecies; and (3) the agency no longer concludes that the California sea lion population is at OSP.

In the 2008 EA we concluded that the removal of up to 85 animals per year would have no effect on the status of the population range-wide, because 1% of PBR is extremely small compared to the number of animals that can be safely removed³ per year:

The removal of as many as 85 animals from the California sea lion population would have no effect on the overall range-wide abundance, distribution, and productivity of the California sea lion population because the number of sea lions involved is extremely small compared to the current number of animals (8,511)

³ The PBR calculation was developed to establish with a high level of confidence the level of removals from a marine mammal population that will not result in the population dropping below OSP (if it is currently above OSP), or will not prevent a population from achieving OSP (if it is currently below OSP) (Wade and Angliss 1997). OSP, in turn, is a population level between maximum net productivity level and the carrying capacity of its habitat. In general, NMFS scientists look for evidence that a population is at the carrying capacity of its habitat in order to determine whether it is at OSP.

that can be safely removed from the population (PBR) without affecting its status with respect to OSP. There is a surplus of male California sea lions 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. Individual sea lions that would be permanently removed under [the proposed action], 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 [the proposed action]. Thus [the proposed action] 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.

(NMFS 2008, internal citations omitted.) Because the proposed action continues to limit the authorization to no more than 1% of PBR, the same rationale applies to the current proposed action. The removals in the proposed action would occur in addition to many other sources of human-caused mortality. Because all sources of human-caused mortality were low relative to PBR in 2008 (1554 out of 8511) and are even lower currently (431 out of 9200), the mortalities associated with the proposed action would not substantially increase the risk of human-caused mortality exceeding PBR.

In addition, as in 2008, we continue to conclude that the states would be unlikely to kill more than 30 sea lions per year, even if authorized to kill 92. In the 2008 EA we analyzed the impact on the human environment of removing the full 85 animals, and here we have compared that impact to the impact of removing the full 92 animals that would be allowed in the proposed action.⁴ We also noted in the 2008 EA that for practical reasons it was unlikely the full number would be removed, and for purposes of evaluating benefits to salmon we assumed the states would actually only remove 30 animals per year. Under the prior authorization, no more than 15 California sea lions were removed (lethally or transferred to captivity) in any one year (8 in 2008, 15 in 2009, and 14 in 2010). Three additional animals that were not authorized for removal died accidentally when the traps malfunctioned). The same practical limitations continue to exist. Although the proposed LOA, like the 2008 LOA, would authorize the states to shoot California sea lions that are hauled out in certain areas, for a variety of reasons the states have not exercised this option and have only killed animals caught in the floating traps. As a result, the opportunity for the states to kill sea lions will most likely occur when an animal on the list hauls out on a trap and is caught. For this reason, we consider it

⁴ The proposed action identified in the 2008 EA authorized the annual removal of up to 1% of PBR (85 animals based on 2008 data). An alternative considered in the EA (Alternative 4) considered the removal of up to 2% of PBR (170 animals based on 2008 data). Under both scenarios, we concluded the removal of 1% or 2% PBR “would have no effect on the overall range-wide abundance, distribution, and productivity of the California sea lion population because the number of sea lions involved is extremely small compared to the number of animals that can be safely removed from the population without affecting its status.” Although we did not make a finding of no significant impact with respect to Alternative 4, our analysis concluded that even removing 170 California sea lions per year would have no effect on the population.

unlikely the states would be able to remove more than 30 sea lions per year. Thus while even the increase in the maximum number of animals authorized for removal does not represent a significant new circumstance, we note that regardless of the increase, the practical limitations on the program make it likely that similar numbers of sea lions would be removed under the current proposed authorization as under the 2008 proposed action.

We also considered the new information regarding the agency's view of the California sea lion population's status relative to OSP. The SAR reports that the population continues to grow and calculates the PBR of the population using a recovery factor of 1.0. The purpose of establishing a PBR is to set a level of human-caused mortality that will not cause the stock to drop below OSP, if it is above that level, or does not prevent the stock from achieving OSP, if it is below that level (Wade and Angliss 1997, Wade 1998). As noted above, the removal of 1% of PBR would have an inconsequential impact on the status of the California sea lion population in general. Because of the nature of the PBR calculation, it is also very unlikely that removing 1% of PBR would have any effect on the status of the California sea lion population relative to OSP.

Finally, we considered the new information regarding California sea lion status as a full species rather than a subspecies. Because the current proposed action would have the same effects on the California sea lion population as the 2008 proposed action, this change in taxonomic status does result in a different outcome.

For Steller sea lions, the estimated population numbers increased since the 2008 EA was completed, thus continuing the positive trend of Steller sea lion abundance noted in the 2008 EA. As in 2008, the proposed action would not authorize lethal removal of Steller sea lions and would not affect the Steller sea lion population. (Effects of the non-lethal deterrence program are discussed below.)

Information on the population status of harbor seals has not been updated since the 2008 EA. However, Allen and Angliss (2011) suggest that OR/WA coastal harbor seals remain within the stock's OSP.

For the reasons explained above, the new circumstances and information regarding pinniped population data do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

2. Pinniped Presence at the Dam and Deterrence

The Corps conducted observations of pinnipeds and salmonid predation at Bonneville Dam between January 1 and May 31, 2008 through 2011 (Stansell et al. 2010, Stansell et al. 2011) and the results are presented in Table 1. Harbor seals were seen only occasionally at the dam and the number of individuals has remained low (as many as three in 2006 but two per year from 2008-2011). The minimum estimated total number of California sea lions observed at the dam was 82 in 2008, 54 in 2009, 89 in 2010, and

54 in 2011. The minimum estimated total number of Steller sea lions at the dam was 39 in 2008, 26 in 2009, 75 in 2010, and 89 in 2011.

Some of the increase in numbers of Steller sea lions can be explained by a change in methodology for tallying that species (Stansell et al 2010). Prior to 2010, the maximum daily count of Steller sea lions observed during the season was used as the minimum estimated number present during that year. The maximum daily count provides a measure of abundance at one point in time but is ill suited for estimating total abundance because not all animals are likely to be present for any one count. The Corps reviewed photographs and video of Steller sea lions, looking for unique markings (anatomical features, color patterns, scars, etc.) to identify individual animals and refine the minimum estimated number of Steller sea lions present. The methodology is similar to that used for identifying California sea lions at the dam. Applying the new methodology to data from the 2008 season, the Corps revised the estimated minimum number of Steller sea lions at the dam upward from 17 to 39 individuals, more than doubling the previous estimate and revealing that Steller sea lions accounted for 32% of the total pinnipeds present that season. The new methodology for tallying Steller sea lions also shows that individuals are coming and going from the tailrace throughout the season and returning to the dam year after year.

The new methodology provides a more accurate minimum estimate of the number of individual Steller sea lions visiting the dam on a seasonal basis since 2008, and affords an opportunity to attribute observed predation events to specific animals, but does not change estimates of mean daily abundance or daily maximum abundance, which rely on periodic tallies of observed numbers by species. The expanded salmonid consumption estimate is also not affected by the change in methodology for estimating the minimum annual Steller sea lion abundance. As the Steller sea lion presence has increased, total predation attributable to this species on white sturgeon and salmonids has also increased.

The mean daily attendance by pinnipeds in the observation area was about 20 between 2008 and 2010 (Stansell et al 2010), and the highest daily abundance of pinnipeds peaked at 69 individuals in April 2010. In 2011 the highest daily abundance of pinnipeds (48) returned to the level observed in 2009 (Stansell et al. 2011). The mean and maximum daily pinniped abundance figures were strongly influenced by the presence of increasing numbers of Steller sea lions, which surpassed the mean daily attendance of California sea lions in 2010 and 2011. In 2010 the mean daily attendance of 12.6 Steller sea lions was more than half of the overall daily average of 21.5 pinnipeds (Stansell et al. 2010). In 2011 the mean daily attendance of pinnipeds (17.5) was the lowest since 2007 and Steller sea lions again outnumbered California sea lions with a mean daily attendance of 12.0 animals (Stansell et al. 2011).

Mean residency time for California sea lions at the dam declined from just below 20 days in 2008 to 9.3 days in 2010. An analysis conducted by Wright (ODFW) and Stansell (Corps) for the 2011 Task Force concluded that California sea lion attendance at the dam was significantly lower in 2009-2011 following the removal of sea lions beginning in

2008 (Wright and Stansell pers. comm., 2011). California sea lions not previously identified at the dam continue to be encountered there.

Deterrence activities at the dam analyzed in the 2008 EA included permanent removals and non-lethal hazing. Sea lions were to be captured on floating traps. Identified predatory California sea lions were to be permanently removed through euthanasia or transfer to permanent captivity, while California sea lions not on the list were to be marked and released. Steller sea lions were to be released. Under the 2008 LOA, the states permanently removed, through euthanasia or transfer to permanent captivity, 8 California sea lions in 2008, 15 in 2009, and 14 in 2010. They killed one California sea lion in 2011 before we withdrew the 2011 authorization. In addition, in 2008 two of the traps malfunctioned resulting in the deaths of four California sea lions (one of which was authorized for removal and is included in the 2008 total removed above) and two Steller sea lions. A law enforcement investigation did not find evidence of human involvement in the trap malfunction. The states modified the traps to prevent them from accidentally closing, and adopted new protocols to decrease the likelihood of future accidents. No accidents have occurred since 2008. This incident is discussed further below in Section D.2. Research trapping activities to mark, tag and release Steller sea lions at the dam continued in 2011 and 2012 under an MMPA/ESA scientific research permit issued separately from the MMPA Section 120 process.

The 2008 EA describes non-lethal hazing activities proposed to be implemented at the same time as the lethal removal program. [Non-lethal hazing of pinnipeds under these circumstances does not require a permit because non-lethal taking of nuisance marine mammals is authorized under Section 109(h) of the MMPA (16 U.S.C. 1379) and, for Steller sea lions, by regulations at 50 C.F.R. 223.202(b)). Pinnipeds were exposed to noise, under-water and aerial pyrotechnics (deployed from shore and from boats), electronic acoustic devices, vessel chasing, tactile harassment with rubber ammunition, captures on traps, and, marking]. Shore-based hazing is less likely to affect Steller sea lions because they tend to prey on sturgeon farther from the face of the dam as opposed to California sea lions that are more likely to take salmon near the dam and fish ladders (Stansell et al. 2010). In 2008, boat-based hazing was conducted on 89 days resulting in 830 encounters with California sea lions and 523 encounters with Steller sea lions. Steller sea lions increased in number and showed greater tolerance for non-lethal hazing in 2008 than in previous years. In 2009, boat-based hazing was conducted on 57 days resulting in 612 encounters with California sea lions and 427 encounters with Steller sea lions. In 2010, boat-based hazing was conducted on 44 days resulting in 202 encounters with California sea lions and 377 encounters with Steller sea lions. In 2011, boat-based hazing was conducted on 38 days resulting in 173 encounters with California sea lions and 359 encounters with Steller sea lions. Stansell et al. (2011) reports that sea lions are temporarily displaced by hazing but return to the area to forage once hazing activities cease.

TABLE 1: SUMMARY OF ANNUAL PINNIPED ABUNDANCE AND DURATION AT THE BONNEVILLE DAM TAILRACE – 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Min. total number of individual pinnipeds	31	109	104	86	86	82	123	82	166	144
California sea lion	30	104	99	81	72	71	82	54	89	54
Steller sea lion	0	3	3	4	11	9	39	26	75	89
Harbor seal	1	2	2	1	3	2	2	2	2	1
Maximum daily number of pinnipeds	14	32	37	43	46	54	63	47	69	48
Maximum number of days individual California sea lion was present	16	25	33	39	73	70	80	67	39	31
Average number of days California sea lions were present	5.3	6.6	7.8	7.5	19.9	19.7	19.2	19.1	9.3	7.3
Date of first California sea lion sighting	3/20	3/14	2/22	2/20	2/9	1/8 ^a	1/9 ^a	1/5	1/8	2/21
Date of last California sea lion sighting	5/17	5/27	5/26	6/10	6/5	5/26	6/2	5/29 ^b	6/1	6/16 ^c
Total days California sea lions were present	59	71	95	96	106	123	146	145	145	100

Source: (Stansell pers comm. 2008; Stansell et al. 2009; Stansell et al. 2010; Stansell et al. 2011; Stansell pers comm. 2012)

a - In 2007 a California sea lion was seen at the dam in the fall (11/8/07) prior to the 2008 spring season and in 2008 California sea lions were observed as early as 9/18/08 prior to the 2009 season.

b - In 2009 one California sea lion passed the dam and remained upriver and in the forebay all summer, fall and winter.

c - In 2011 one California sea lion passed the dam and remained upriver and in the forebay all summer (to date).

On May 16, 2009 a California sea lion (C697) passed through the locks and subsequently spent the summer up- river from Bonneville to the Dalles Dam. The animal was repeatedly observed by Corps staff consuming salmonids exiting the Bonneville fish ladder in the forebay area near the navigation lock (Brown et al. 2009). Sea lion C697 was trapped in the Bonneville Dam forebay in January 2010 and released at Astoria. He was trapped three more times in the Bonneville Dam tailrace before being euthanized in April 2010. In 2011, an unidentified California sea lion was seen several times above Bonneville Dam (river mile 146) and the Dalles Dam (river mile 192) through the summer months.

Analysis and Conclusion: For California sea lions, the new information on presence at the dam shows sea lion abundance continuing to fluctuate within the range considered in the 2008 EA. New information about the number of California sea lions actually permanently removed suggests that the 2008 EA may have overestimated impacts of the lethal removal program on the California sea lion population. The current proposed action includes substantially the same conditions as the 2008 proposed authorization.

New information about the accidental death of four California sea lions, in 2008, shows that in any animal-trapping operation there is some risk. The modification to the traps and trapping protocols following the accident, and the fact that no additional accidents have occurred, demonstrates the states' ability to take action to limit the risks. Even with these accidental deaths, the number of California sea lions removed annually under the 2008 authorization was well below the 2008 estimate of 30 animals per year and the maximum allowable removal of 85 animals per year. (This incident is discussed below in Section D.2.)

New information about the actual level of hazing indicates that hazing activities were less than anticipated in the 2008 EA. Under the current proposed action it is likely that the level of hazing would continue to fall within the range of what was analyzed in the 2008 EA. In addition, the states do not require authorization to engage in non-lethal hazing and could continue this activity with or without the current proposed action. Observations show that animals are temporarily displaced by hazing and return to forage after hazing activities cease.

The new circumstance of a California sea lion consuming salmonids at the fish ladder exit signals the potential for expansion of pinniped predation above Bonneville Dam. However, the current proposed action would not authorize the states to shoot California sea lions in the fish ladders or above the dams. Methods and locations of lethal removal would remain the same.

For Steller sea lions, the new information about increased numbers of animals and increased residency at the dam means more animals could be subjected to the same types of non-lethal hazing we analyzed in the 2008 EA (no new methods have been developed). Harassment of Steller sea lions during on-water hazing declined from 2008 levels in 2009-2011, due in part to the focus on the California sea lion removal program. Given the increase in abundance of Steller sea lions at the dam, the number of harassment events may return to 2008 levels, as Steller sea lions are exposed to on water deterrence activities. In the 2008 EA we determined that displacement of Steller sea lions from the foraging area below the dam would be unlikely to affect individual Steller sea lions or the population range-wide because ample room existed for the animals to relocate and thrive. Observations of non-lethal hazing show that displacement from hazing is temporary and that Steller sea lions moved back into the area after hazing activities ceased (Stansell et al. 2011). Steller sea lions have increased at the dam regardless of efforts to deter them. In addition, the states do not require authorization to engage in non-lethal deterrence, thus it is likely that hazing of Steller sea lions will continue regardless of the current proposed action.

New information about the accidental death of two Steller sea lions in 2008 shows that in any animal-trapping operation there is risk. The modification to the traps and trapping protocols following the accident, and the fact that no additional accidents have occurred, demonstrates the states' ability to take action to limit the risks. Even with these accidental deaths, the Steller sea lion population overall has continued to grow, as has the number of Steller sea lions at the dam. (This incident is discussed below in Section D.2.)

For the reasons explained above, the new circumstances and information regarding pinniped presence at the dam and deterrence do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

3. California Sea Lion and Steller Sea Lion Movements in the Estuary

New information on movements of California sea lions was presented to the Task Force in October 2010. ODFW captured and fitted satellite location tags to 26 California sea lions at two sites on the Columbia River (Astoria, OR and Bonneville Dam). Approximately half of the California sea lions (12) had unknown foraging histories while the other half (14) were known to have foraged at upriver locations (Bonneville Dam, Willamette Falls). The location fixes received from the animals after their release indicated that range movements were highly variable among and between individuals. The study showed that animals with known upriver foraging histories do occasionally leave the river to feed off the coast of Oregon and Washington as well as move up and downstream in the river to feed. In contrast, the California sea lions that had not been previously documented at the upriver sites (Bonneville, Willamette) only occasionally traveled upriver beyond Astoria. One animal traveled several times upriver as far as the mouth of the Lewis River and another to the mouth of the Kalama River. None of the tagged animals that had not previously been documented at Bonneville Dam or Willamette Falls traveled upriver as far as either of these two sites (Wright et al. 2010). In 2011, 17 sea lions (seven California sea lion, 10 Steller sea lion) were tagged using GPS-phone and/or acoustic tags (Brown et al. 2011). Location fixes from the tags revealed animal movements between the estuary (river mouth) and upriver foraging areas (Bonneville Dam and Willamette Falls). Tagged sea lions made a minimum of one to four round trips between the estuary and upriver feeding sites. Travel speeds averaged 2.28 miles/hour upstream and 4.17 miles/hour downstream. The speed of travel did not differ appreciably between the two species. The GPS data showed distinctive foraging behaviors between individual sea lions.

Analysis and Conclusion: The new information on sea lion movements in the estuary is consistent with the data considered in the 2008 EA. As documented in the 2008 EA, pinnipeds were known to move about the estuary. The October 2010 and 2011 studies reiterate that California sea lions at the mouth of the Columbia River do not necessarily move upriver to forage at Bonneville Dam. This information implies that the pool of California sea lions frequenting the dam is a subset of the larger number of animals that inhabit or pass by the mouth of the river and confirms the strategy of the lethal removal program to target animals observed foraging at the dam. The information also suggests the same may be true for Steller sea lions. The rate of recruitment from the larger population at the mouth and the smaller subset at the dam is unknown but may be relevant to the effectiveness of the removal program.

For the reasons explained above, the new circumstances and information regarding pinniped movement in the estuary do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

4. Pinniped Predation on Salmonids

There is no new information concerning harbor seal predation in the action area. All salmonid predation observed in the 2008-2011 period was attributed to California and Steller sea lions (Stansell et al. 2010). Table 2 shows the “*expanded salmonid consumption estimate*” developed by the Corps. We rely on the expanded estimate methodology because it has remained consistent over time allowing comparisons across all of the years for which data are available (2002-2011). The *expanded salmonid consumption estimate* represents the number of salmonids observed taken at the surface during hours of daylight, expanded to daylight periods when observers were not present (meals, breaks, etc.). The Corps also reports an “*adjusted salmonid consumption estimate*” which incorporates estimates of predation during hours of darkness and apportions takes of unidentified fish according to the observed proportions of identified prey taken by sea lions. Thus the *expanded consumption estimates* are minimum estimates. We rely on them for purposes of analyzing predation trends and comparing across years, because *adjusted consumption estimates* are not available for years prior to 2006. The numbers reported in Table 2 are *expanded consumption estimates*.

TABLE 2: SUMMARY OF ESTIMATED PINNIPED PREDATION ON SALMONIDS 2002-2011

Year	Total Salmonid Passage	All Pinnipeds		California sea lion				Steller sea lion	
		Estimated Salmonid Catch	% Run Taken	Estimated Salmonid Catch	% Catch Taken	Average Catch/Year ¹	Average Catch/Day ²	Estimated Salmonid Catch	% Catch Taken
2002	284,733	1,010	0.4%	1,010	100%	33.7	6.3	0	0%
2003	217,185	2,329	1.1%	2,329	100%	22.4	3.4	0	0%
2004	186,804	3,533	1.9%	3,516	99.5%	35.5	4.6	13	0.5%
2005	82,006	2,920	3.4%	2,904	99.5%	35.9	4.8	16	0.5%
2006	105,063	3,023	2.8%	2,944	97.4%	40.9	2.1	76	2.6%
2007	88,474	3,859	4.2%	3,846	99.6%	54.2	2.7	13	0.4%
2008	147,543	4,466	2.9%	4,294	96.1%	52.4	2.8	172	3.9%
2009	186,060	4,489	2.4%	4,014	89.9%	74.3	3.9	452	10.1%
2010	267,194	6,081	2.2%	5,095	83.8%	57.2	6.2	986	16.2%
2011	223,380	3,557	1.6%	2,527	71.04%	46.8	6.4	1,030	28.96%

Source: Expanded estimates of observed predation (Stansell et al. 2011)

Note: Total salmonid passage, estimated salmonid catch all pinnipeds, and % run taken all pinniped is from Table 1 (Stansell et al. 2011); estimated salmonid catch CSL is from Table 10 (Stansell et al. 2011)

1. Estimated Salmonid Catch (Table 2) ÷ Minimum total number of California sea lions (Table 1)

2. Average Catch/Year (Table 2) ÷ Average number of days California sea lions were present (Table 1)

The data summarized in Table 2 reflect new information about observations of pinniped predation on salmonids at Bonneville Dam for the years 2008-2011. The new information shows: (1) continued increases year-over-year in the numbers of salmonids consumed by California sea lions from 2008-2010, with a decline in 2011 (back down to levels seen in 2003); (2) an increase in total pinniped predation on salmonids (average 2002-2007 level of 2,779 versus 2008-2011 level of 4,648); (3) an increase in California sea lion predation on salmonids (average 2002-2007 level of 2,758 versus 2008-2011 level of 3,886); (4) an increasing trend in the numbers of salmonids consumed by Steller sea lions, with a corresponding increase in the proportion of salmonids taken by Steller sea lions; (5) fluctuations in average consumption per capita per year and per day by California sea lions; and (6) a year-over-year decrease in California sea lion predation rates on salmonids as a proportion of the run from 2008-2011. Although Steller sea lion predation increased from 2008-2011, California sea lions continued to take the majority of salmonids consumed in all years.

The numbers in Table 2 report the observation data. For the 2008 analysis we also calculated the *potential* consumption of salmonids based on: (1) the mean number of California sea lions at the dam from 2003-2007 (86); (2) the average number of days each individual sea lion was present at the dam (20.3); and (3) an estimate of California sea lion salmonid consumption based on energetic modeling (1.48 fish/day) at the low end of the range, and the observed maximum number of fish consumed by an individual (10 fish/day) at the high end of the range. The 2008 calculation yielded an estimated 2,584 to 17,458 salmonids consumed by California sea lions, indicating that salmon consumption could be much higher than observed (NMFS 2008). For the present request we updated the evaluation of potential consumption using data on: (1) the average of the minimum estimated total number of California sea lions at the dam in 2008-2011 (70) (Table 1); (2) the average number of days each individual California sea lion was present (13.7) (Table 1); and (3) an estimate of California sea lion salmonid consumption based on updated energetic modeling (3 fish/day) (Wright pers. comm to Task Force 10/27/2010) at the low end of the range, and the observed maximum number of fish consumed by an individual (10 fish/day) at the high end of the range. The results of these calculations yield an estimated 2,877 to 9,590, indicating as before that consumption may be much higher than that observed.⁵

Analysis and Conclusion: The observation data reveal that total pinniped predation on salmonids from 2008-2011 is higher on average than predation levels considered in the 2008 EA. This increase in predation is consistent with the expectation described in the 2008 EA that predation levels could continue to grow. For California sea lions, the average catch per sea lion per year and per day remains within the range of what was analyzed in the 2008 EA. The rate of salmonids consumed by California sea lions as a proportion of the run decreased steadily from 2008-2011, but the numbers of salmonids consumed increased from 2008-2010 before declining in 2011. This reflects the fact that the rate of consumption as a proportion of the run depends on both the numbers of salmonids consumed and the size of the salmonid run. The potential range

⁵ The estimates based on bioenergetics (1.48 fish/day in 2008 and 3 fish/day currently) were produced primarily as a comparison to the observations. The low end of the range using bioenergetics is lower than the estimates based on observations both for the period 2002-2007 (a bioenergetic estimate of 2,584 versus observed predation of 2,758) and 2008-2011 (a bioenergetic estimate of 2,877 versus observed predation of 3,866). Thus both in the present analysis as in the 2008 EA, the low end of the range remains the observed levels of predation.

of consumption between 2008-2011 (2,877-9,590) is also within the range of what was analyzed in the 2008 EA (2,584-17,458). None of the new information regarding California sea lion predation on salmonids is outside the range of information considered in the 2008 EA.

For Steller sea lions, the total number of salmonids consumed shows an increasing trend from 2008-2011, to levels not seen when we completed the 2008 EA. However, the proposed action would not authorize killing Steller sea lions, and hazing of Steller sea lions is likely to continue in the same manner and at the same intensity as contemplated in the 2008 EA. Thus none of the information about Steller sea lion predation would result in impacts to Steller sea lions that are outside the range of impacts contemplated in the 2008 EA.

For the reasons explained above, the new circumstances and information regarding pinniped predation on salmonids do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

B. Columbia River Salmonids

1. Status and Trends

We completed 5-year status reviews on all of the ESA-listed salmonid stocks on the West Coast (Ford et al. 2010). The status reviews are available on line at <http://www.nwr.noaa.gov/Publications/Biological-Status-Reviews/upload/SR-2010-all-species.pdf>. Overall the abundance of Chinook and steelhead stocks that are potentially impacted by pinniped predation has increased or stayed about the same since the last status review was conducted prior to 2005. The increased abundance is reflected in increased salmonid run sizes at Bonneville Dam during the time relevant to the states' request (January 31-May 31). Table 2 shows the salmonid run size for the years 2002-2011. The status review teams noted that notwithstanding increased abundance for many populations, several factors continue to threaten recovery of Columbia River salmonids including: (1) high uncertainty regarding changes in habitat; (2) no change relative to harvest levels or hatchery practices; (3) degraded conditions due to climate change; (4) no substantive change in impacts by avian and non-native predators; (5) concern regarding increased pinniped populations along the entire West Coast; and (6) continued uncertainty regarding the overall impact of pinniped predation in the lower Columbia River and estuary.

Although the status review team found the increased abundance of some populations encouraging, they noted that recovery is likely to take several decades, abundance levels are likely to fluctuate with changing environmental conditions, and much of the recent increase in abundance can be attributed to good ocean conditions. The underlying threats, however, remain a concern for long-term recovery.

Analysis and Conclusion: The new information on increased abundance of some ESA-listed salmonid populations in the Columbia River is encouraging, but overall abundance is in the range of what was analyzed in the 2008 EA, as reflected in Table 2. Therefore the new circumstances and information regarding salmonid status and trends do not indicate that the

proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

2. ESA Recovery Planning and New Estimates of Pinniped Predation in other Agency Actions

Of the five listed salmonid ESU/DPSs whose spatial and temporal distributions coincide with pinniped presence at the dam, we had completed a recovery plan for upper Columbia River spring Chinook and steelhead at the time of the 2008 EA. Since the 2008 EA, we completed a Recovery Plan for mid-Columbia River steelhead. Recovery plans for Snake River spring/summer Chinook and steelhead and lower Columbia River steelhead are still in progress. Each of these plans has geographical boundaries corresponding to the listing and includes each ESU/DPS's natal streams. All of the ESU/DPSs, including those affected by pinniped predation, share the tidally influenced areas of the Columbia River from the alluvial plume to Bonneville Dam. In 2011, we completed an Estuary Recovery Module to complement other recovery plans and to focus on habitat conditions and processes in the estuary and plume other than hatchery or harvest practices, hydroelectricity production, or lower river tributary habitats (NMFS 2011). The goal of the module is to identify and prioritize management actions to reduce the impacts of factors that in the estuary that limit salmonid recovery. The Estuary Recovery Module identifies predation in general and predation by pinnipeds in particular as a high priority limiting factor and includes a management action to identify and implement actions to reduce salmonid predation by pinnipeds.

In 2010 we issued a supplemental biological opinion on operation of the federal Columbia River power system (FCRPS) (NMFS 2010). To give context to the impact of the power system on listed salmonids, we identified and estimated the impact of other sources of mortality. We recognized that pinniped predation occurs throughout the lower river, but lacked data to quantify the impact. We did, however, quantify the impact of predation at Bonneville Dam, relying on observations since 2002 from Stansell et al. (2009) and estimated an 8.5% impact on the status of upper Columbia River spring-run and Snake River spring/summer-run Chinook ESUs and a 21.8% impact on lower Columbia River winter run steelhead. Assuming the continuation of non-lethal hazing and lethal removals, we projected a future continuing impact of 3% on upriver Columbia River spring-run and Snake River spring/summer-run Chinook and a 7.6% continuing impact on lower Columbia River winter (NMFS 2010).

Analysis and Conclusion: Completion of the Upper Columbia River Recovery Plan and Estuary Module are welcome developments and should help guide recovery actions that will benefit salmonids affected by pinniped predation at Bonneville Dam. As noted previously, recovery is expected to take decades and the conservation status of Columbia basin ESU/DPSs remains the same.

The analysis presented in the biological opinion indicates that some methods of estimating pinniped predation may yield different results than those we relied on in the 2008 EA. These alternative methods showed pinniped predation having a larger impact than estimates in the 2008 EA. In the 2008 EA we displayed estimates of pinniped predation based on observed predation and on bioenergetic modeling, to capture the range of potential predation in the tailrace of the dam. In estimating the benefit to salmonids of the proposed lethal removal program, however, we relied on an analysis based on the number of California sea lions we thought the states could

realistically remove each year. The new estimates of predation presented in the FCRPS biological opinion therefore would not affect our estimates of the benefit to salmonids from removing California sea lions.

The new circumstances and information regarding ESA recovery planning for salmonids and new estimates of pinniped predation in other agency actions do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

3. Salmonid Passage

Table 2 shows that salmonid passage at Bonneville Dam from January 1 through May 31 was 147,543 in 2008, 186,060 in 2009, 267,194 in 2010, and 223,380 in 2011. During the period 2002-2007, salmonid passage through the dam ranged from a high of 284,733 in 2002 to a low of 82,006 in 2005 (NMFS 2008a).

Analysis and Conclusion: Salmonid passage counts at the dam between January 1 and May 31 in the years since completion of the 2008 EA are within the range of those analyzed in the EA. The counts are well below the return of 440,330 adult upriver spring Chinook observed in 2001, the highest observed since counting began at Bonneville in 1938, but well above the all time low of 12,800 fish observed in 1995 (ODFW/WDFW 2011). Fish counts for 2008-2011 are higher than counts in 2005-2007, resulting in lower predation rates, when reported as a percentage of passage at the dam, in spite of increases in the actual number of fish killed by California sea lions and Steller sea lions each year except 2011. As noted in the 2008 EA, run sizes at the dam are likely to remain variable; ocean conditions are cyclic and will likely become less favorable to salmonids, returning to conditions similar to those experienced in the years prior to 2008. As we concluded in the 2008 EA, these cycles are likely to include abundance levels as low as those seen in the 1990s (Peterson et al. 2010).

For these reasons, the new circumstances and information concerning salmonid passage do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

4. Predation by Non-Indigenous Fish

A new NMFS review of studies on the potential effects of predation by non-indigenous fish species on juvenile salmonids in the Columbia River determined the effects could equal or exceed impacts from each of the four most commonly addressed factors affecting salmonids (habitat alteration, harvest, hatchery practices and hydrosystem development) (Sanderson et al. 2009). The report indicates a potential bias in the allocation of salmon recovery resources toward mitigation of the commonly identified factors affecting salmonids at the expense of a newly identified and potentially significant source of mortality. The report does not provide recommendations for mitigation measures to address predation by non-indigenous fish nor an analysis to weigh advantages or disadvantages of redistributing of available resources away from current programs to address non-indigenous fish.

Analysis and Conclusion: The new information about the impacts of predation on salmonids by non-indigenous fish is not significant because it does not have a bearing on the environmental

impacts associated with the proposed action. In the 2008 EA we reported that ESA listed salmonids face numerous threats, including predation by other fish.

5. Predation by Pinnipeds

As described above and reflected in Table 2, the pinniped predation level rose steadily from 2008-2010 then declined in 2011. The predation rate as a percentage of the salmonid run size dropped steadily from 2007-2011, reaching levels in 2011 as low as were seen in 2004. Fluctuations in predation rate are a function of both changing predation levels and changing salmonid abundance.

In the 2008 EA we estimated impacts to salmonids from the proposed action assuming the removal of 30 California sea lions per year, an average number of days of California sea lion presence, and an estimated number of salmonids consumed per day based on bioenergetic modeling by Wright (2007) of 1.48 salmonids per day. Wright (ODFW) presented new information at the 2010 Task Force meeting showing updated bioenergetic modeling that estimates a higher consumption rate of 3 salmonids per day (which is lower than the average catch per day reflected in Table 2). In addition, new information described above shows that the states removed fewer than 30 sea lions per year. Finally, a new analysis presented by Wright (ODFW) at the 2010 Task Force meeting notes that salmonid savings from sea lion removals may be cumulative, rather than occurring only in the year a sea lion is removed. Wright hypothesized that removing an experienced predator would save salmonids not just in the year the sea lion is removed but in subsequent years, based on the probability of an animal returning in a subsequent year had it not been removed. The high end of the range of potential California sea lion consumption of salmonids remains the same as reported in the 2008 EA, or 10 fish/day (Wright, ODFW). In the 2008 EA we calculated that 30 California sea lions could consume 901 to 6,090 salmonids annually. Using the updated bioenergetics estimates of 3 fish/day and the average residency time for 2008-2011 of 13.7 days (Table 1), 30 California sea lions could consume 1,233-4,110 salmonids annually. As in 2008, there is some uncertainty about the actual numbers of California sea lions the states might kill, but for the reasons described previously we continue to conclude that 30 is a reasonable estimate.

The 2008 EA reported that not all salmonids caught by pinnipeds are killed and consumed outright and that monitors at Bonneville documented scars and injuries attributed to pinnipeds on 11 to 37% of returning Chinook and steelhead. New information presented by Michelle Rub to the Task force reported scars on 24.8 and 29% of salmonids returning in 2008 and 2010 respectively (Rub et al. 2010). A recent tagging study on the influence of pinniped-caused injuries on survival of Columbia Basin salmonids (Naughton et al. 2011) concluded that injuries from pinnipeds occurred on a high proportion of Columbia River salmonids but did not consistently influence survival of Chinook or steelhead to spawning areas. Spring Chinook and steelhead showed more negative survival effects from pinniped injuries than summer or fall Chinook with all years of the study combined. Fish without injuries survived at higher rates in 80% of bi-weekly sampling periods for spring Chinook and 90% of sampling periods for steelhead. The differences were small, however, and rose to the level of statistical significance in only one year of the 8-year study for spring Chinook and two years of the study for steelhead. The study also showed that pinniped-caused injuries tended to decrease, as a percentage of run size, with increasing run size (density dependent effect), and that larger fish tended to have a

higher incidence of injuries than small fish. This later finding may indicate that larger fish may be more likely to be attacked or that smaller fish may be less likely to survive an attack and escape with an observable injury.

In response to comments from the Marine Mammal Commission during the 2008 and current decision-making processes, and in response to the Ninth Circuit court's decision, we sought to further quantify the impact of pinniped predation at Bonneville Dam on extinction risk of salmonid populations. We asked the Northwest Fisheries Science Center (Center) if it would be possible to model the effect by incorporating a constant level of pinniped predation into salmonid life cycle models the Center was developing. The Center produced preliminary results, but we considered the modeling exercise too uncertain and the results of absolute impacts too inconclusive and untested to provide a reliable basis for our MMPA decision-making process. Until the models have been further reviewed, both within and outside the agency, and results produced and validated for several populations, the results are not useful for establishing a quantitative estimate of pinniped impacts on salmonids. At this time, there is no other model that can reliably quantify the impact of pinniped predation on extinction risk of ESA listed salmon and steelhead.

Analysis and Conclusion: As described above in the pinniped analysis, the new information on salmonid predation for 2008-2011 is within the range of the information considered in the 2008 EA. Although predation rates declined from 2008-2011 from the all-time high seen in 2007, the predation rates in the years 2008-2011 remain within the range of those seen since 2002 and considered in the 2008 EA. In addition, although the predation rate declined steadily over four years, the predation level rose for three of those years, declining in only one year. In the 2008 EA we recognized that predation levels, salmonid abundance, and predation rates would fluctuate over time, which they continue to do. The estimates of salmonids consumed by 30 pinnipeds per year are within the range of estimates considered in the 2008 EA. Although the states did not remove 30 pinnipeds per year during 2008-2010, for the reasons described above in the discussion on pinnipeds, we continue to conclude that 30 is a reasonable number to expect.

The new research on survival of salmonids injured by pinnipeds is not outside the range of information we considered in the 2008 EA. In the 2008 EA we estimated salmonids saved based on actual consumption and not delayed mortality. In the 2008 EA and currently, we do not have sufficient information to calculate delayed mortality from injuries.

Although we attempted to develop new information regarding impact of pinniped predation on extinction risk of salmonid populations, current information is insufficient to support such an analysis.

For these reasons, the new circumstances and information concerning pinniped predation on salmonids do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

6. Harvest

From 2005 through 2007, Upriver Columbia spring Chinook salmon fisheries were managed through a stipulated Interim Management Agreement adopted by the court under continuing jurisdiction of *U.S. v Oregon*. The interim agreement contained a sliding scale harvest rate schedule that specified harvest impact limits of 5.5% to 17% based on run size. The 2005 through 2007 harvest rate schedule was adopted, with minor treaty/non-treaty catch balancing modifications in the “2008-2017 *U.S. v Oregon Management Agreement for up for upriver Chinook, sockeye, coho, and white sturgeon*,” which was in effect and considered in the 2008 EA analysis. The same Management Agreement remains in effect and is expected to continue through the duration of the proposed action (the 5-year lethal removal authorization would continue through 2017, which is the same year the current Management Agreement expires). We reviewed the implementation of the Management Agreement since the 2008 EA (that is, 2008 through 2011 seasons) to determine if new information suggests harvest over the next five years will have any different impacts than those we analyzed in the 2008 EA.

In 2008, the pre-season forecasted return of upriver Spring Chinook was 269,000 (ODFW/WDFW 2009) and the allowable harvest rate was set at 12% (10% treaty, 2% non-treaty). The actual run materialized late and came in below predicted numbers so fishery managers adjusted the allowable harvest rate down to 11% (9.1% treaty, 1.9% non-treaty). The actual return of 178,564 adults was 66% of the pre-season forecast and resulted in harvest exceeding the guideline for the final run size. The estimated fisheries harvest impact on upriver Chinook totaled 16% (13.9% treaty, 2.1% non-treaty) in 2008.

In 2009, the pre-season forecasted return of upriver Spring Chinook was 298,000 based on traditional cohort relationships (ODFW/WDFW 2009), the allowable harvest rate (pre-season) was set based on state allocation matrices and an amended harvest rate schedule was established to achieve catch balancing between the treaty and non-treaty fisheries. The amended harvest rate schedule incorporated a sliding scale (within the 5.5 – 17% harvest rate) dependent on the total upriver spring Chinook run size. The total harvest rate indicated in the schedule for the forecasted run size (298,000) was 13% (10.8% treaty, 2.2% non-treaty). However, based on their experience in 2008, managers adopted protective buffers, constraining the amount of upriver spring Chinook impacts that each fishery could use prior to an in-season run update to ensure that, in the event of a run downgrade, fisheries would not exceed allowable ESA impacts. The final run size for 2009 was 169,300 (57% of the preseason forecast). The allowable impact limit was reduced to 11% (9.1% treaty, 1.9% non-treaty) as a result of the in-season run size downgrade. The estimated fisheries harvest impact on upriver wild spring Chinook totaled 10.5% (8.8% treaty, 1.7% non-treaty) (ODFW/WDFW 2010). The protective buffers were successful at holding harvest impacts to within the harvest rate schedule limits for the final run size.

For 2010, managers reviewed numerous alternative models to develop a preseason estimate of 470,000 returning upriver spring Chinook (ODFW/WDFW 2010). The final run size totaled 315,345 adults and was less than forecasted but was nevertheless strong at 150% of the recent 10-year (2000-2009) average return. The return showed a more normal run timing curve over Bonneville Dam than the previous two years, which were later than the 1977-2004 average (ODFW/WDFW 2011a). In 2010, managers followed the same basic catch sharing principles,

protective impact buffers and allocations used in 2009. The total harvest impact rate indicated in the schedule for the in-season adjusted (final) run size of 315,000 was 13% (10.8% treaty, 2.2% non-treaty). The estimated 2010 fisheries harvest impact on upriver wild spring Chinook totaled 17% (14.8% treaty, 2.2% non-treaty) (ODFW/WDFW 2011a).

For 2011, managers developed a preseason run size estimate of 198,400 returning upriver spring Chinook (ODFW/WDFW 2011b). The final run size totaled 221,800 adults and was 112% of the forecasted level. The return materialized late over Bonneville Dam. In 2011, managers allocated available ESA impacts for upriver spring Chinook among the various fisheries following catch sharing principles, protective impact buffers and allocations as specified by the Fish & Wildlife Commission. Pre-season harvest impacts, based on the 198,400 run size estimate, were limited to 1.9% for non-treaty fisheries and 9.1% for treaty fisheries. The total harvest impact rate indicated in the schedule for the in-season adjusted (final) run size of 221,800 was 12% (10.0% treaty, 2.0% non-treaty). The estimated 2011 fisheries harvest impact on upriver wild spring Chinook totaled 10% (8.5% treaty, 1.47% non-treaty) (ODFW/WDFW 2011b).

All steelhead handled downstream of Bonneville Dam during November through April are considered winter steelhead. Winter steelhead stocks are comprised of wild natural spawning and hatchery produced fish. Non-Indian fisheries conducted during the winter season incidentally handle wild winter steelhead while targeting hatchery Chinook or hatchery steelhead (wild fish must be released). The highest impacts on wild winter steelhead populations occur in tributaries of the Columbia River where hatchery steelhead are a recreational target species. Lesser impacts also occur during mainstem recreational and commercial spring Chinook seasons. Tributary recreational fisheries are conducted under separate permits issued by NMFS and the associated impacts are considered separately from mainstem fisheries. There is a 2% annual impact rate limit for all non-Indian fisheries on the Columbia mainstem (ODFW/WDFW 2011a & b).

For 2008, 2009, 2010, and 2011 the impact from release mortality in mainstem non-Indian fisheries, 0.16%, 0.13%, 0.57%, and 0.2% respectively were well below the 2% impact rate limit. Winter steelhead take in treaty-Indian commercial fisheries has been low in recent years because fishing effort in the winter season has targeted sturgeon (334 fish in 2008, 0 fish in 2009, 12 fish in 2010, and 300 fish in 2011) (ODFW/WDFW 2011b).

Analysis and Conclusion: The spring Chinook total harvest impact guideline of 5.5 – 17% remains in effect. Both initial harvest rate guidance and actual final harvest rates for the years 2008-2011 have been within the initial and actual harvest rates analyzed in the 2008 EA. Actual harvest rates have been above (2008 & 2010) and below (2009 & 2011) these guidelines. The sea lion removal program had no effect on fisheries management decisions or the prosecution of fisheries in the lower Columbia River. The analysis of impacts from the program conducted in 2008 anticipated possible short-term closures of Corps managed recreational fishing areas near the dam for public safety. The fishing areas would re-open to the public when removal activities were completed. To date, removal activities have been confined to controlled access areas at the dam and fishing areas in the tailrace have been unaffected. The select fishery (wild fish release) regulations and 2% harvest impact guideline for winter steelhead in mainstem non-Indian fisheries (commercial, recreational) is the same condition as considered in 2008. Steelhead

harvest impacts were well below the allowable guideline. The treaty and non-treaty fisheries will continue under the harvest guidelines as outlined in the 2008 Management Agreement negotiated under *U.S. v Oregon* through 2017.

The new information on actual harvest rates shows that they were within the range of those contemplated at the time we prepared the 2008 EA. Therefore, the new circumstances and information concerning harvest do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

C. Non-lethal Deterrence of Pinnipeds

From 2008-2011, personnel from the Corps, ODFW, WDFW, and the Columbia River Inter-Tribal Fisheries Commission (CRITFC) have continued to attempt non-lethal deterrence of pinnipeds. No new non-lethal deterrence techniques have been developed since the 2008 EA, thus all of the measures used from 2008-2011 were those contemplated in the 2008 EA.

The Corps successfully deployed physical barriers to exclude pinnipeds from entering the fish ladders at the dam in each of the years 2008-2011. The Corps had installed acoustic deterrent devices to discourage California sea lions from taking fish that may pause at ladder entrances, but found they were ineffective and removed them prior to the 2011 season. Personnel used aerial pyrotechnics from the dam to target both pinnipeds and avian predators near the structures during 886, 455, 782, and 761 hours between January and May of 2008, 2009, 2010, and 2011, respectively (Stansell et al. 2011).

ODFW, WDFW, and CRITFC conducted non-lethal deterrence activities from boats downstream of the dam during 2008-2011. In 2008, personnel on boats deployed 9,225 crackershells, 3,148 seal bombs, and 590 rubber buckshot rounds, resulting in 830 California sea lions and 523 Steller sea lions being chased from the observation area (Brown et al. 2008). In subsequent years the number of animals chased declined as personnel became more involved in sea lion trapping activities (discussed further below). In 2009, 10,227 crackershells, 1,627 seal bombs, and 168 rubber buckshot rounds were used, resulting in 612 California sea lions and 427 Steller sea lions being chased (Brown et al. 2009). In 2010, 4,921 crackershells, 777 seal bombs, and 97 rubber buckshot rounds were used, resulting in 202 California sea lions and 337 Steller sea lions being chased (Brown et al. 2010). In 2011, 7,839 crackershells, 2,439 seal bombs, and 97 rubber buckshot rounds were used, resulting in 173 California sea lion and 337 Steller sea lion being chased (Brown et al. 2011). Individual California sea lions and Steller sea lions were likely harassed multiple times over the course of a day as they move from place to place around the tailrace or from day to day over the course of a season. Corps' observers documented pinniped presence in the Bonneville Dam tailrace and foraging for ESA-listed salmon and steelhead despite the continued implementation of dam/shore-based and on water non-lethal deterrence measures. Stansell et al. (2011) report that during the period since 2008, as before, individual sea lions leave the area when chased but return shortly after the chase boats move away and resume foraging.

Field reports prepared by the Corps and the states did not mention salmonid injury or mortality resulting from non-lethal deterrence activities. The Corps confirmed that no injuries or mortalities of salmonids associated with non-lethal pinniped deterrence measures have been observed since 2008 and that they have no evidence to suggest any fish injured or killed due to any of the non-lethal deterrents over the years (R. Stansell pers. comm. 2011).

In 2009, WDFW requested assistance from the International Marine Animal Trainer's Association to review the non-lethal deterrence methodology used at the dam and provide recommendations for improving the program. The Association provided three recommendations: 1) maximize expansion of the sea lion exclusion device zone; 2) investigate modifications to the acoustic deterrent devices to allow "command activation"; and 3) pay travel costs for Association personnel to visit Bonneville Dam and provide training to project staff to maximize the effectiveness of the hazing tools currently in use (IMATA 2009). In addition, in 2010 the Task Force suggested that agencies consider how changing spill patterns at the dam might impact predation by California sea lions. They specifically noted that the proportion of predation observed early in the run appeared to fluctuate, with lower predation proportions seen in years when spill at the dam occurred earlier in the year (Task Force 2010).

The 2008 EA reported on the presence of Steller sea lion and predation on sturgeon and salmonids as part of the affected environment at the dam. From 2003 to 2007 a maximum of 10 Steller sea lions had been observed at the dam in any year. In 2008, the number of Steller sea lions increased and Steller sea lions showed increased tolerance to non-lethal hazing activities. Following an unplanned mortality on the sea lion traps in 2008, we recommended that non-lethal hazing targeting Steller sea lion at the traps be used to discourage them from hauling out on the traps and thus reducing potential for trapping Steller sea lion in future year activities. We reinitiated consultation on the approval of the states' Section 120 request and issued a new biological opinion on the effects of the action in 2009 (F/NWR/2008/08780). Based on the increasing trend in the number of Steller sea lions at the dam and increased tolerance to disturbance/displacement by non-lethal hazing techniques, we estimated there would be up to 889 incidents of Steller sea lions being harassed annually for the duration of the project. The observed incidents involving Steller sea lions in 2009, 2010, and 2011, 427, 337, and 359 respectively were less than we had estimated in the biological opinion.

Analysis and Conclusion: The analysis in the 2008 EA indicated that non-lethal deterrence measures had not been effective in reducing total pinniped predation on salmonids in the area below the dam, because many of the animals exposed to non-lethal hazing return to the dam a short time after exposure or seek refuge in the spillway area where they continue to feed. New information for the period 2008-2011 continues to indicate this remains the case. Non-lethal deterrence efforts were somewhat less in 2008-2011 than prior to 2008 because the states focused more attention on lethal removal efforts, with the result that there may have been fewer effects on the human environment from non-lethal deterrence than described as likely to occur in the 2008 EA. As noted previously, the states may engage in non-lethal deterrence with or without the proposed authorization.

Responding to the recommendations received from the International Marine Animal Trainers Association would not increase environmental impacts beyond the levels anticipated in the 2008

environmental assessment. Sea lion exclusion devices are installed at all of the fish ladder entrances at the beginning of each year and are removed following the seasonal departure of sea lions. Installation of additional sea lion exclusion devices (physical barriers) elsewhere at Bonneville is not contemplated at this time. If sea lion exclusion devices were planned for construction in the river itself, additional research and testing would likely be required to determine potential effects on fish passage and in water construction would trigger the need for further NEPA review because it is beyond the scope of the 2008 analysis. The Corps conducted a number of observations and in situ tests of the acoustic deterrence systems installed at the dam and determined that they did not keep sea lions from approaching the fish ladder entrances regardless of operating strategy. The acoustic devices were removed from the dam at the close of the 2010 season and are not in use. The environmental effects from the acoustic devices would not be altered by implementing the recommendation to change the activating switch to allow instantaneous control because the “active” signal from the devices would not change to higher amplitude or seasonal duration of duty cycle. We contacted the states regarding Animal Trainer’s Association training for hazing crews to determine whether hazing methodologies were modified as a result of training. A follow up training session was not held, however, the primary changes suggested by the Association focused on operational strategies (i.e., location in the tailrace where hazing might be concentrated and the duration of pursuit once an animal is engaged) which were adopted by the states and continue to be used. The Association did not recommend new tools beyond those already examined in the 2008 effects analysis. We do not anticipate any change of tools or equipment or in the seasonal timing of hazing activities resulting from these recommendations that would alter the physical impacts of hazing activities on the environment beyond the levels described in 2008.

The Corps, with jurisdictional control of operations at Bonneville Dam, responded directly to the Task Force suggestion to consider spill changes to potentially affect early season predation. In short the Corps reminded the Task Force that the timing of water release is complex and is influenced by factors such as water availability and outmigrating smolts that are naturally variable events. They also indicated that early season predation is likely influenced by the timing and availability of migrating adult salmonids that may or may not be influenced by water releases at the dam. Regardless of the potential effects of spill on predation, the alteration of spill would not change the environmental effects of non-lethal hazing and lethal removal activities at the dam beyond the levels analyzed in the 2008 environmental assessment.

In the 2008 EA we anticipated that the proposed action “would result in increased displacement of foraging Steller sea lions, but no change in the range-wide abundance, distribution, or productivity of the population.” The increased numbers of Steller sea lions describe above in Section V.A.2 may indicate that the effects of non-lethal hazing on Steller sea lions are less severe than we anticipated in the 2008 EA. Observations since 2008 show that displacement proved to be temporary and that Steller sea lions adapted quickly to non-lethal hazing and continued to forage at the dam both within and between seasons (Stansell et al. 2011). Consequently, it is possible that Steller sea lions would not be displaced to the extent we anticipated in the 2008 EA.

Finally, the Corps has not observed any injuries or mortalities of salmonids associated with non-lethal deterrence measures, which is consistent with the 2008 EA.

For these reasons, the new circumstances and information concerning non-lethal deterrence do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

D. Permanent Pinniped Removals

Permanent removal of individually identifiable predatory California sea lions began in 2008. California sea lions captured on the traps that did not meet the criteria for removal outlined in the LOA received permanent marks (brands) for ease of future identification and were released.

1. Authorized Removals and Salmonids Saved

In April 2008, 11 California sea lions and two Steller sea lions were captured during two trapping operations. Of the animals captured four California sea lions and two Steller sea lions were released back to the wild. Seven of the California sea lions captured in April were determined to have met the LOA criteria for removal at the time of capture. Six of the identified predatory California sea lions were subsequently transferred to permanent captivity, at NMFS pre-approved public display facilities, and the seventh died under anesthesia during pre-transfer health screening (Brown et al. 2008).

In 2009, 20 California sea lions were captured and handled during trapping operations. Fifteen of these animals were determined to have met the criteria for removal. Four of the identifiable predatory California sea lions were transferred to permanent captivity at pre-approved facilities and 11 were chemically euthanized. The remaining six California sea lions and one Steller sea lion that were captured during the season were released back to the wild. The five California sea lions released to the wild were instrumented with acoustic transmitters to monitor their movements throughout the estuary and beyond (Brown et al. 2009).

A total of 22 California sea lions were captured during 2010 operations. Some California sea lions were captured more than once during the season. Of the 22 individuals, 14 were determined to have met the criteria for removal and were chemically euthanized because no pre-approved facilities were available to receive transfers for permanent captive holding. The remaining 8 California sea lions were released to the wild, 5 of which were fitted with acoustic transmitters. Nine individual Steller sea lions were captured during the season and were released back to the wild (Brown et al. 2010). In sum, the states intentionally removed 7, 15, and 14 California sea lions in 2008, 2009, and 2010, respectively. This is less than half of the 30 we estimated as a realistic annual rate of removal in the 2008 EA.

In 2011, 13 California sea lions and 10 Steller sea lions were captured and handled and released during non-lethal trapping operations at the dam. Due to a federal appeals court ruling in November 2010 there was no lethal removal authorization in place for most of the 2011 season. An authorization was re-issued on May 13, 2011 but was voluntarily suspended and later revoked in the face of pending litigation. While the re-issued authorization was in effect, one California sea lion was captured, determined to be eligible for permanent removal and was killed on May 18, 2011.

Brown et al. (2011) estimated the number of salmonids saved, using energetic simulation modeling, and based on the 38 California sea lion removals from 2008 through 2011 was in the range of 2,283 to 8,738 salmonids. This estimate is for the cumulative total salmonids saved over the four-year life of the project. In the 2008 EA we had estimated that 901-6,090 salmonids could be saved annually if the states removed 30 California annually. Over a 4-year period those numbers would translate to 3,604-24,360 total. We did not estimate how many salmonids would be saved in subsequent years for each experienced sea lion removed. Therefore it's not possible to directly compare the estimates from Brown et al. (2011) with estimates in the 2008 EA. The methodology employed by Brown et al. (2011) does point out, however, that our 2008 analysis may have underestimated the benefits resulting from each sea lion removal because we did not consider cumulative benefits.

Analysis and Conclusion: The actual removal rate of California sea lions is far less than the numbers authorized in 2008 (85) or that would be authorized under the current proposed action (92). It is also less than the 30 per year we estimated the states could realistically remove in our 2008 EA, although it is possible the rate of removals would increase somewhat in the future as the states gain greater experience with the program. Thus, impacts to California sea lions may be less than anticipated in the 2008 EA. The fewer the number of sea lions removed, the less benefit there will be to salmonids. Thus, the experience since 2008 indicates that the lethal removal program could have fewer benefits to salmonids than anticipated in 2008. However, the lower-than-expected rate of sea lion removals will not result in program-related negative effects to salmonids. Therefore, the new circumstances and information concerning authorized removals and salmonids saved do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

2. Accidental Mortality

In May 2008, six sea lions (4 California sea lion and 2 Steller sea lion) were discovered caged on the traps under unknown circumstances. By the time handling crews arrived at the scene, all of the animals had died. Post-mortem examination of the California sea lion/Steller sea lions involved in the incident indicated that the animals died from conditions exacerbated by heat exhaustion. Of the six sea lions found on the trap in May, one California sea lion met the criteria for removal under the LOA (Brown et al. 2008). The NMFS Office for Law Enforcement initiated an investigation of the deaths but the cause for the entrapment of the animals (i.e., how the trap doors came to be closed in the absence of the capture team) remains undetermined.

Following the event, trapping activities were halted and the project Institutional Animal Care and Use Committee (IACUC) was convened to review capture protocols and make recommendations to improve animal safety during trapping procedures. In August 2008 the states proposed revisions to the capture protocols at Bonneville Dam based on the IACUC recommendations. The revisions included measures to mechanically secure trap doors when left unattended, increase monitoring during active trapping periods and increase security around the traps. NMFS responded with additional recommendations to reduce the incidental capture of Steller sea lions. The revised trapping protocols were further analyzed by NMFS under Section 7 of the ESA and the agency issued its biological opinion on the new procedures on February 20, 2009

prior to the reinitiation of trapping activities at the dam. There have been no additional mortalities from trapping operations since the additional animal safety revisions were made.

Analysis and Conclusion: As a result of changes in trapping protocols, no accidents occurred after the event in 2008. While there will always be some risk associated with trapping wild animals, the lack of incidents following modifications to the traps indicates that it is reasonable to expect that the impacts of the trapping activities will be similar to those reported in the 2008 EA. For California sea lions, the 2008 LOA authorized up to 85 removals per year, and the 2008 EA estimated a maximum of 30 removals per year. Actual intentional removals were 7, 15, and 14 during the three years of the lethal removal program. Even with the California sea lion deaths in 2008, the removal rates for the species were well below that analyzed in the 2008 EA. For the current proposed action we continue to predict that removals of California sea lions will not exceed 30 animals because of the limitations on the program, as discussed under Section V.A.1 above. In the event that some California sea lions are accidentally killed under the current proposed action, the total number of removals is still expected to be much less than the maximum number authorized. In any event, the proposed action is to authorize a maximum number of animals that may be permanently removed from the population, whether they are euthanized, transferred to permanent captivity, or die accidentally.

For Steller sea lions, the 2008 LOA did not authorize any lethal removals nor would the proposed action, because Steller sea lions are listed as a threatened species under the ESA. As noted in Section V.A.1 above, the Steller sea lion population has been growing and the level of human-caused mortality per year (about 41 animals) is well below the PBR (over 2,000 per year). There is always some degree of risk to target and non-target species whenever a lethal removal program is authorized. However, we have considered the risk of accidental Steller sea lion injury or death from trapping operations and continue to conclude it is minimal, for a variety of reasons: (1) The states have implemented new trapping protocols to correct the problems that caused the accidental mortality in 2008 and to date there have been no instances of injury or death from trapping operations; (2) the data reveal that only a few Steller sea lions were caught in the traps during 2008-2011 – 4, 1, 9, and 10, respectively (two of the four in 2008 died accidentally) and we assume that this trend is likely to continue in the future; and (3) in the unlikely event there is another instance of an injury or accidental death of Steller sea lions from trapping operations, we expect it would only involve a very few individuals and there would be no effect on the range-wide abundance, distribution, and productivity of the population.

For these reasons, the new circumstances and information about accidental mortality from trapping and handling operations do not indicate that the proposed action would result in any impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

E. Impacts of Predation on Other Fish Stocks

In addition to information on pinnipeds and salmonids, new information has become available on predation by pinnipeds on white sturgeon and Pacific lamprey.

The minimum estimated consumption of white sturgeon by sea lions (primarily Steller sea lion) in the observation area increased from 792 in 2008 to 1,241 in 2009, 1,879 in 2010, and up to 2,178 in 2011 (Stansell et al. 2011). We stated in the 2008 EA that we expected a reduction in white sturgeon consumption because of expected displacement of Steller sea lions in response to hazing.

The minimum estimated consumption of Pacific lamprey showed a decreasing trend from 2008 to 2011. Lamprey comprises the lowest proportion of observed catch by California sea lion/Steller sea lions at Bonneville. However, predation impacts on lamprey may be significantly underestimated by surface observation techniques because the prey is small relative to adult salmonids and may be consumed below the surface. In 2008 sea lions (primarily California sea lion) took an estimate 145 lamprey followed by 102 in 2009, 77 in 2010, and 33 in 2011 (Stansell et al. 2011). We stated in the 2008 EA that we expected a reduction in lamprey consumption because of expected removals of California sea lions.

Analysis and Conclusion: Steller sea lions are responsible for the majority of predation on white sturgeon that occurs at the dam. From 2008-2011 the number of Steller sea lions has increased several fold and predation on sturgeon has followed that trend. The new information about increase in Steller sea lion predation on sturgeon, and the ineffectiveness of non-lethal deterrence at decreasing this predation, indicates that the proposed action is unlikely to affect Steller sea lion predation on sturgeon.

California sea lions are responsible for the majority of predation on lamprey observed at the dam. The number of lamprey consumed by California sea lions annually is down from the highs observed in 2004 and 2005 but the reason for the decline is unknown. The number of lamprey consumed below the surface is unknown and the overall impact of pinniped predation on lamprey has not been assessed but is of potential concern.

For these reasons, the new circumstances and information about predation on other fish stocks do not indicate that the proposed action would have impacts that are uncertain or outside the scope of impacts we considered insignificant in the 2008 EA and FONSI.

F. Pinniped-Fishery Interaction Task Force Recommendations 2010 and 2011

On October 25, 2010, we reconvened the Task Force to review the information available from the initial three years of implementation of MMPA Section 120 LOA. The purpose was to provide them with an opportunity to evaluate the effectiveness of the lethal removal program and to make any additional recommendations for modifying the action as determined by the Task Force. The results of the review and recommendations can be found in the *Final Report and Recommendations of the MMPA Section 120 Pinniped-Fishery Interaction Task Force – Columbia River 3- Year review and Evaluation*.

On October 24, 2011, we convened a Pinniped-Fishery Interaction Task Force to review the new and relevant information (including public comments) and to advise us on the states' 2012-2016 request for lethal removal of California sea lions. Members of the previous Task Force were invited to participate on this Task Force in order to build off of their continuity of the 2007 and

2010 discussions and because of their familiarity with the subject matter. Final notes from the meeting can be found in Silverberg et al. (2011). Four questions were presented to the Task Force in addition to requesting a final tally of Task Force members in support of, or opposed to, the application. The specific questions were:

1. If we do not have the ability to quantify the impacts of pinniped predation on extinction risk of salmonid populations, are there qualitative criteria you recommend we consider in determining whether pinniped predation is significant?
2. If we had the ability to quantify the impact of pinniped predation on extinction risk of salmonid populations, do you have advice on how to approach setting a threshold for significance? For example, are you aware of other contexts in which managers consider a level of impact to be significant and what those levels are?
3. Steller sea lion presence at Bonneville Dam appears to be growing, as does the numbers of salmonids being consumed by Steller sea lions. Do you recommend that we consider re-allocating funds away from California sea lion non-lethal deterrence? Do you have any specific thoughts/recommendations on non-lethal deterrence measures for Stellers?
4. Does anything in the states' 2011 application or the new information that you have reviewed in consideration of the application, change your support for or against the removal program consistent with the states' application?

The 16 Task Force members discussed the new information and data relevant to the states' new request and offered their individual thoughts but did not make a group recommendation in response to these questions. In a final poll of the Task Force 14 of 16 members expressed support for the states' proposed lethal removal program and two members expressed opposition.

Because the Task Force did not make any new recommendations in 2011, we consider below the recommendations from 2010, to evaluate whether their implementation by the states would present significant new circumstances or information.

1. The Authorization Has Not Been Fully Implemented

The Task Force reviewed the available data and determined that in their view, "the current program (hazing, identifying, trapping, and removing) has not been effective at allowing the authorization to be fully implemented, nor at reducing predation on listed salmonids to less than 1% [the interim goal threshold recommended by the 2008 Task Force]."

Analysis and Conclusion: There is nothing in this recommendation that constitutes new information.

2. The Interim Goal Should be Retained

The interim goal of reducing predation to 1% or less of salmonids passing the dam has not yet been tested but still remains a reasonable target. NMFS should revisit the goal after five years, considering other factors, such as ratio of listed to unlisted fish.

Analysis and Conclusion: As described previously, the current proposed action is to issue an authorization without this condition. This represents a change in the proposed action, but will

not, as discussed above in Section IV.A, result in impacts that are significant or uncertain or outside the range of the impacts we considered in the 2008 EA and FONSI.

3. Hazing Not Effective at Reducing Predation

Remove non-lethal hazing as a condition of the lethal take authorization but retain it as an option for the States to enhance permanent removals.

Analysis and Conclusion: As described previously, the current proposed action is to retain the requirement that an individual sea lion must have been subjected to non-lethal deterrence before it may be considered “predatory” and therefore eligible for removal. The authorization maintains flexibility for the states to allocate resources between to non-lethal hazing and the lethal removal program, as occurred in 2008-2010. That possibility is discussed above in Section V.C above.

4. Increase Trapping

To increase the number of California sea lions trapped, increase the number of traps, dedicate more people to the operation, operate the traps more frequently, discourage Steller sea lions on traps, and decrease alternative haul-out sites to encourage California sea lion to use the traps.

Analysis and Conclusion: The 2008 LOA did not address the number or location of floating traps used for implementing the removal program. If the states implement this recommendation, it may increase the numbers of California sea lions that are killed or permanently relocated. The 2008 EA and FONSI considered the impact of the states removing the full number of animals authorized, which was 1% of PBR (85). The current proposed action retains the limit of 1% of PBR (92), which is discussed above in Section V.1.

If the states increase the number of floating traps, more Steller sea lions could be exposed to trapping operations, with the potential for the risk of injury or death, as discussed above in Section V.D.2. As also discussed in that section, the states responded to the accidental deaths of six pinnipeds in 2008 with mechanical improvements to the traps and improved procedures. No further accidents have occurred since 2008.

5. Change the Authorization to Encourage Removal Using Firearms

Encourage use of firearms on land and from boats, increase haul out areas that are suitable for shooting or make current haul out sites accessible to shooters. Develop and use a plan for shooting California sea lions from boats.

Analysis and Conclusion: The 2008 proposed action authorized the use of firearms by the states and the 2008 EA analyzed the potential impacts of firearm use. Alternative 4 analyzed in the 2008 EA would have authorized expanded use of firearms, including use similar to the 2010 task force recommendations. The current proposed action retains the limitations on firearm use contained in the 2008 EA.

6. Change Predatory Sea Lion Criteria

Use alternative marking techniques to identify individual California sea lions more quickly and add them to the list of animals eligible for lethal removal as soon as possible **or** end the lethal take authorization.

- a) **Option A** - Change the eligibility criteria so that more California sea lions may become eligible for removal more quickly. Allow California sea lions to become eligible for removal by virtue of meeting any one of a number of criteria including taking a fish above Tanner Creek **or**; sighted above Tanner Creek multiple days **or**; sighted above Tanner Creek in more than one year.
- b) **Option B** – Change the eligibility criteria so that California sea lions that arrive early in the run (February – April) can be targeted immediately.
- c) **Option C** – Zero tolerance of California sea lions above Tanner Creek. Any California sea lion above Tanner Creek shall meet the statutory definition and be eligible for removal.
- d) **Option D** – Acknowledge that small-scale lethal removal is ineffective and discontinue the authorization for lethal take.

Analysis and Conclusion: The Task Force suggested options A through C for changing the criteria for defining “predatory” California sea lions to increase the number of animals eligible for removal and remove them more quickly. We conducted a preliminary analysis of the potential effects of changing the “predatory” sea lion criteria during the 2010 Task Force review and found that a primary factor in the rate of sea lion removal is the ability to catch sea lions on the traps (Norberg pers. comm., 2010).

Option A, to change the “predatory” definition by eliminating the “additive” criteria to increase the number of animals eligible for removal, would not automatically make them “available” for capture and removal. Option B, to allow removal of animals arriving early to the dam, is within the scope of the 2008 authorization which allowed removal whenever an eligible animal is encountered. Option C, the “zero tolerance” alternative proposed by the Task Force and which we considered in the 2008 EA may not meet the statutory requirement that animals to be removed must be “individually identifiable” and are having a significant negative impact on salmonids that are listed or approaching listing under the ESA. For reasons described, we have not included Options A and C in the proposed new action. Option B was within the scope of the 2008 authorization and has been retained in the proposed criteria. The practical result of Option D was examined as the “No Action” alternative in the 2008 EA and was not selected because it would not reduce sea lion predation on at-risk salmonids.

The proposed authorization does not alter the criteria for identifying animals eligible for removal. The 2008 EA and LOA criteria for identifying animals eligible for removal included natural and human applied markings and did not limit marking strategies and therefore alternative marking strategies were allowed under the 2008 authorization and would continue to be so under the proposed authorization. Based on this information, the proposed action would not have impacts that are significant or uncertain or outside the range of impacts we considered in the 2008 EA and FONSI.

G. Other Aspects of the Affected Environment

The 2008 EA examined the potential effects of the proposed action and alternatives on a number of additional elements of the human environment (e.g., air quality, tourism, recreation, water quality, etc.). The new information on the effects of the proposed action on these resources falls

within the analysis contained in the 2008 EA. Appendix 1 to the NEPA determination memorandum accompanying this analysis is a table summarizing the comparison of new information, collected since the issuance of the 2008 authorization, to information considered in the 2008 EA. For example, effects of smoke from aerial pyrotechnics or boat exhaust in the air were short term, localized and immeasurable in the large open areas where the activities occurred. Similarly, effects on water quality, fish habitat, terrestrial wildlife and birds, general vegetation, social and economic resources, tourism and recreation, cultural resources, noise, aesthetics, transportation, public services, and safety and human health were minimal, as previously described. Some commenters, critical of the 2008 action, speculated that tourists would be deprived of opportunities to view California sea lions in the action area or participate in water sports such as kayaking in the action area. The new information collected since 2008 shows that California sea lions continue to visit the action area and can be viewed from the surrounding shoreline. The observation areas defined by the sea lion removal project are closed to vessel traffic for security and safety reasons unrelated to the project. Water sports activities in the open areas adjacent to the boat restricted zone were unaffected.

Analysis and Conclusion: The new information concerning other aspects of the affected environment is consistent with the data considered in the 2008 EA and does not suggest there will be any level or type of impact different from that reported in the 2008 EA.

VI. Public Review and Participation

After considering the new information and circumstances, the changes to the proposed action, the prior public review and comment on this action, and the nature of this report, we have concluded that additional public review and comment on the NEPA component of our decision to authorize lethal removal of California sea lions is not warranted or practicable. As discussed above, we prepared a draft EA for the proposed action and released the EA for public review and comment on January 18, 2008. During the 30-day public comment period, we received over 3,500 comments, including 16 substantive comments. We considered and responded to these comments in the Final EA issued on March 18, 2008. In addition, we provided the public an opportunity to comment on the states' August 18, 2011, Section 120 lethal removal application. As part of the current MMPA process, we requested input on six specific issues related to the Bonneville Dam pinniped-salmonid conflict. Our consideration of public comment, particularly in light of these issues, is reflected within this SIR.

Moreover, we faced a significant time constraint in issuing a new decision. We received the states' application on August 18, 2011. Section 120 of the MMPA requires that if we decide such an application may be warranted, we must publish a notice in the Federal Register and take public comment. We must then convene a Pinniped-Fishery Interaction Task Force and allow it time to meet, deliberate, and provide advice. We received the Task Force's advice on the states' most recent request on November 14, 2011.

In order for the sea lion removal program to be implemented by the start of the 2012 season (when pinnipeds begin to arrive at the dam and forage for salmonids), we must issue our decision by the end of February 2012. This is because California sea lions have typically begun to arrive at Bonneville Dam to hunt for early returning salmonids by February and their numbers increase

by April 1 when spring Chinook passage begins to accelerate. In 2011 the run did not ramp up until April 25 and predation peaked during a very short period in May. California sea lions typically exit the area for the season by early June. If additional public review and comment, and agency consideration and response to public comment, were required, it could delay implementation of the proposed action well beyond the start of pinniped-salmonid conflict, which would result in lost opportunity to reduce the number of predatory California sea lions already identified and continue the unchecked growth of sea lion predation on at-risk salmonids.

Finally, the public has had ample opportunity to comment on previous related actions. This action is essentially the same as that evaluated and authorized in 2008, for which there was significant public involvement. The public also had an opportunity to comment on the states' request prior to the Task Force meeting. The substantive information we relied on to support the current action has also been generally available to the public. Therefore, additional opportunity for public review and comment on this SIR would not further inform our proposed action.

VIII. Conclusion

After considering the relevant new information and circumstances, and the changes to the proposed action, NMFS has determined there is no need to supplement the 2008 EA and FONSI because: (1) the changes to the proposed action that are relevant to environmental considerations are not substantial; and (2) the new circumstances and/or information relevant to environmental concerns and bearing on the proposed action or its impacts are not significant under NEPA. Therefore, the 2008 EA and FONSI remain valid and NMFS will continue to rely on them to support the proposed action.

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