Endangered Species Act (ESA) Section 7 Consultation –
Supplemental Biological Opinion

Action Agency: National Marine Fisheries Service, Alaska Region (NMFS)

Species/Evolutionarily Significant Units Affected:

Species	Evolutionarily Significant Unit	Status	Federal Register Notice	
Chinook Salmon (*O. tshawytscha*)	Lower Columbia River	Threatened	70 FR 37160	6/28/05
	Upper Willamette River	Threatened	70 FR 37160	6/28/05

Activities Considered: Supplemental Biological Opinion Reinitiating Consultation on the January 11, 2007 Biological Opinion regarding Authorization of Bering Sea/Aleutian Islands (BSAI) Groundfish Fisheries

Consultation Conducted by: NMFS, Sustainable Fisheries Division, Northwest Region.

Consultation Number: F/NWR/2009/06426

In this Supplemental Biological Opinion NMFS considers new information related to the effects of the BSAI groundfish fisheries on ESA listed salmonids. The effects of the BSAI groundfish fisheries were reviewed most recently in a Supplemental Biological Opinion dated January 11, 2007. The North Pacific Fishery Management Council and NMFS Alaska Region are considering changes to management practices in the current Fishery Management Plan that are designed to minimize the bycatch of Chinook. The details of these changes are proposed for implementation in 2011 through Amendment 91 to the BSAI Groundfish FMP. In this opinion NMFS concludes that the proposed action is not likely to jeopardize Upper Willamette Chinook or Lower Columbia River Chinook, and will have no effect on designated critical habitat for these two species. This Supplemental Biological Opinion has been prepared in accordance with section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 et seq.). A complete docket of this consultation is on file with NMFS, Sustainable Fisheries Division in Seattle, Washington.

Approved by: _____
for Barry A. Thom, Acting Regional Administrator

Date: 12/2/09

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1. INTRODUCTION

This Supplemental Biological Opinion is a consultation with the National Marine Fisheries Service (NMFS) regarding NMFS' authorization of the Bering Sea and Aleutian Island (BSAI) Groundfish Fishery Management Plan (FMP) which is implemented pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act). NMFS is reinitiating consultation on its most recent biological opinion because of a proposed change in the action that would be implemented through Amendment 91 to the FMP. The North Pacific Fishery Management Council (NPFMC) has recommended and NMFS Alaska Region is considering changes to management practices in the current FMP that are designed to minimize the bycatch of Chinook salmon in the Bering Sea pollock fishery. Under the proposed action, the Bering Sea pollock fishery would continue to be managed in 2010 subject to provisions of Amendment 84a of the BSAI Groundfish FMP. Amendment 91 would be implemented beginning in 2011.

1.1. Background and Consultation History

This Supplemental Biological Opinion and incidental take statement were prepared by NMFS in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), and implementing regulations at 50 CFR 402.

NMFS often conducts an essential fish habitat (EFH) consultation, prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801, et seq.) and implementing regulation at 50 CFR 600 in conjunction with a biological opinion. In this case, the NMFS Alaska Region is the action agency and they will address EFH requirements as part of their review of Amendment 91.

There are two recent biological opinions that considered the effect of BSAI fisheries on listed salmonids. NMFS consulted on the take of listed salmon in the groundfish fisheries conducted under the BSAI FMP and the Gulf of Alaska (GOA) FMP in a December 22, 1999 Biological opinion (NMFS 1999). This opinion focused only on the effects on ESA listed salmonids. NMFS issued a subsequent opinion on the BSAI FMP and GOA FMP, dated November 30, 2000, that considered the effects on ESA-listed marine mammals, and other non-salmonids (NMFS 2000)[1]. The November 30, 2000 Biological Opinion, summarized considerations for listed salmonids from the 1999 Biological Opinion, and reiterated the Chinook salmon bycatch limits and other terms and conditions contained therein. Both biological opinions have the same annual expected bycatch specified in the incidental take statement of 55,000 Chinook salmon for the BSAI groundfish fishery. The 2000 Biological Opinion did, however, modify the incidental take statement by inclusion of an additional reasonable and prudent measure.

Chinook bycatch in the BSAI groundfish fishery averaged about 35,000 from 2000 to 2003. In 2004, however, Chinook bycatch totaled just over 60,400. As a consequence, the NMFS Alaska Region (herein after "Alaska Region") asked that the NMFS Northwest Region (herein after "Northwest Region") reinitiate consultation on the BSAI FMP (Balsiger 2004). At the time the

[1] The December 22, 1999 Biological opinion and November 30, 2000 Biological opinion both consulted on authorization of the BSAI FMP and GOA FMP. Authorization of these FMPs are separate actions, but were considered together to provide a more comprehensive overview of the effects of groundfish fisheries on listed species in the Alaska EEZ. Events considered in this supplemental Biological opinion pertain only to the BSAI FMP.

regions were unsure whether the higher bycatch was a transient event or an indicator of an increasing trend in Chinook bycatch. The regions agreed to jointly monitor the circumstance during the 2005 season.

On June 29, 2005 (Balsiger 2005) the Alaska Region reported that the bycatch of Chinook through June 11, 2005 was 27,700, slightly less than reported in 2004 with a projected year-end total of about 55,000. Provisions under the FMP for reducing salmon bycatch in the BSAI fishery have many details, but at the time relied primarily on the use of a Chinook Salmon Savings Area (CSSA). This is an area where, based on previous experience, Chinook bycatch was relatively high. Under the current FMP, if Chinook bycatch in the fishery is projected to exceed 29,000 and depending on when that occurs, the area is closed to further directed fishing for pollock. Because bycatch was expected to exceed the 29,000 trigger level by July 2005, the CSSA was closed to directed fishing for pollock. Because of the closure and other voluntary measures taken by the industry, the Alaska Region was cautiously optimistic that the Chinook bycatch in 2005 would remain below 55,000. The Northwest Region reviewed the information provided, and concurred with the conclusions (Lohn 2005). Unfortunately, closure of the CSSA during the latter part of 2005 seemed to exacerbate the bycatch problem. Bycatch rates remained high even though the CSSA was closed. By the end of 2005 bycatch totaled nearly 75,000 Chinook.

When it became apparent in 2005 that the higher bycatch observed in 2004 was not just a transient event, the NPFMC recommended changes to the existing salmon bycatch management measures that were implemented through Amendment 84a to the BSAI Groundfish FMP. Amendment 84a provided for regulatory changes designed to reduce the incidental catch of salmon in the pollock trawl fishery where virtually all of the salmon bycatch occurs. Amendment 84a was initiated in response to new information about the distribution of bycatch, and to implement management measures that would be more flexible and effective at reducing Chinook bycatch in the fishery.

The original intent of the NPFMC and the Alaska Region was to implement Amendment 84a prior to, or at least during, the 2006 season. However, for various reasons it was not implemented in 2006 (Mecum 2006a, b, c). Chinook bycatch rates during the first half of 2006 remained high, and there was general concurrence that taking action to reduce bycatch was a priority. Because of the delay in implementing Amendment 84a the pollock harvest cooperatives submitted an Exempted Fishing Permit (EFP) to allow for earlier implementation of the management provisions of the draft Amendment 84a, and to better assess the ability of the fleet to identify 'hot spot' salmon closures areas, and monitor and enforce compliance among the participating vessels. The provisions described in the EFP were unchanged from those contemplated under the draft Amendment 84a. However, the EFP applied only to the remainder of the 2006 pollock season, which extended from August 1 to October 31, 2006.

Because of the above described circumstances, the Alaska Region asked that the Northwest Region conduct an informal consultation related to the EFP and its implementation for the remainder of the 2006 fishing season (Mecum 2006b, Mecum 2006c). In response, the NMFS Northwest Region concluded that implementing the BSAI FMP including further provisions required under the EFP for the remainder of 2006 would either have no effect or was not likely to adversely affect ESA listed Chinook, coho, sockeye, or chum salmon Evolutionarily Significant

Units (ESU) or steelhead Distinct Population Segments (DPS) (Lohn 2006).

The Northwest and Alaska Regions anticipated the need for continuing consultation on Amendment 84a as it developed, and the associated management provisions that would presumably be implemented for 2007 and beyond. The 2007 Supplemental Biological Opinion (NMFS 2007a) responded to the Mecum (2006b, 2006c) request for consultation and addressed the need to reinitiate consultation on the BSAI Groundfish FMP including consideration of the additional management provisions being proposed for 2007 and beyond.

In 2007, the 2000 Biological Opinion was supplemented to address Amendment 84a to the FMP, which changed salmon bycatch management in the Bering Sea pollock fishery by allowing for intercooperative agreements for the purpose of reducing salmon bycatch. The Supplemental Biological Opinion included a new incidental take statement that was based on the range of recent observations of Chinook salmon incidental catch and recovery of coded-wire tagged (CWT) ESA-listed Chinook salmon stocks (NMFS 2007a). The 2007 supplement to the 2000 biological opinion is therefore the current operative opinion for the BSAI FMP. The more detailed information contained in these recent biological opinions is incorporated by reference.

In 2007, under the management measures of Amendment 84a, the bycatch of Chinook in the BSAI groundfish fishery was approximately 130,000, the highest bycatch on record since 1991. Due to the high levels of Chinook salmon bycatch, the Alaska Region discussed the circumstances with the Northwest Region in October 2007, and provided additional information on January 14, 2008 (Balsiger 2008). In 2007, the NPFMC determined that more needed to be done to reduce salmon bycatch in the pollock fishery and began development of Amendment 91. For unknown reasons, the Chinook salmon bycatch amounts in 2008 and 2009 have dropped substantially from 2007. This new Supplemental Biological Opinion responds to the Alaska Region's request for consultation on the change in the action and to provide a new incidental take statement that reflects the expected take of ESA-listed Chinook salmon under the management measures of Amendment 91.

1.2. Description of the Proposed Action

NMFS Alaska Region and the NPFMC manage the groundfish fisheries in the exclusive economic zone (EEZ) off Alaska under the FMPs for groundfish for the BSAI and GOA. The NPFMC prepared the FMPs under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act), 16 U.S.C. 1801, et seq., implemented by regulations appearing at 50 CFR part 679. Regulations governing U.S. fisheries and implementing the FMPs appear at 50 CFR parts 600 and 679. The proposed action evaluated in the November 30, 2000 Biological Opinion was authorization of fishery regulations for BSAI groundfish fishery based on the associated FMP. The 2007 Supplemental Biological Opinion evaluated the implementation of Amendment 84a to the BSAI FMP that pertained, in particular, to the Bering Sea pollock fishery.

The objective of this Supplemental Biological Opinion is to reinitiate consultation on the BSAI Groundfish FMP in response to a proposed change in the action that is designed to reduce Chinook salmon bycatch in the Bering Sea pollock fishery compared to the high bycatch years of 2005 to 2007, and to consider the effect of the additional management provisions that are proposed for implementation in 2011 and beyond, through Amendment 91 to the BSAI

Groundfish FMP. Under the proposed action, the Bering Sea pollock fishery would be managed in 2010 subject to provisions of Amendment 84a of the BSAI Groundfish FMP.

Management provisions related to Chinook salmon bycatch in the FMP rely on pollock fishing vessels participation in an intercooperative agreement (ICA) for the purpose of reducing salmon bycatch. Those not participating in the ICA are subject to the closures of the Chinook Salmon Savings Areas (CSSA), which are closed when the bycatch reaches particular trigger levels. As an alternative to either opening or closing the CSSA, Amendment 84a relies on a salmon bycatch management system developed by Bering Sea pollock harvesting cooperatives to identify areas of elevated salmon bycatch during the course of the Bering Sea pollock fishery and close fishing in those areas. High salmon bycatch amounts are identified and reported to participating vessels within hours with the associated closure established within days. Vessels in the program are required to move immediately in response to these hotspot closures. The program is implemented through an intercooperative agreement (ICA) among participating vessels. The ICA is binding on participating vessels and requires that they respond to closure announcements. Amendment 84a provides exemptions from the closures in the CSSA for participating vessels, and instead implements a management system based on real time, site specific information. This sort of real time, hotspot management has been effective at reducing bycatch in the west coast whiting fishery. Details related to the ICA and associated management provisions can be found in the respective Environmental Assessments (NMFS 2006a, Balsiger 2005). Experience from 2007 indicates that the ICA measures did not reduce the number of Chinook salmon taken as bycatch in the BSAI groundfish fishery. Even though all pollock vessels had participated in the ICA, the amount of Chinook salmon bycatch was still very high. Bycatch in 2008 and 2009 has conversely been quite low.

The NPFMC began further development of Chinook salmon bycatch management measures for the Bering Sea pollock fishery in 2007. These measures would be implemented by Amendment 91 to the BSAI Groundfish FMP. Amendment 91 would include a suite of management measures including an incentive plan agreement (IPA) to reduce salmon bycatch, hard caps for salmon bycatch that would stop pollock fishing when reached, performance standards for IPA participants, and a census monitoring program so that every Chinook salmon caught will be counted. A detailed description of the management measures are in Section 2.5 of the Draft Final Environmental Impact Statement for Bering Sea Chinook Salmon Bycatch Management and is incorporated by reference (NMFS 2009a). The proposed management measures are summarized in Table 1. below.

Table 1. Summary of Amendment 91 Management Measures

Setting the hard cap (Component 1)	**47,591 Chinook salmon**	The fleet-wide cap unless industry submits and NMFS approves an IPA agreement which provides explicit incentives for salmon avoidance.			
	60,000 Chinook salmon	The fleet-wide cap if fishery participants form one or more IPAs that meet the criteria in regulations.			
	28,496 Chinook salmon	Vessels not in an IPA would fish under a portion of this "opt-out" or backstop cap.			
	A season/ B season division	The Chinook salmon caps would be divided 70% A season and 30% B season before allocations to sectors, CDQ groups, and cooperatives.			
	Seasonal rollovers	NMFS would rollover 100% percent of a sector's, cooperative's, or CDQ group's unused salmon bycatch from its A season account to that sector's or cooperative's B season account. No rollover would occur from the B season to the subsequent A season.			
Allocating a hard cap to sectors (Component 2)		CDQ	Inshore CV	Mothership	Offshore CP
	A season	9.3%	49.8%	8.0%	32.9%
	B season	5.5%	69.3%	7.3%	17.9%
Sector transfers (Component 3) + Cooperative transfers	Upon request, NMFS could transfer allocations among all recipients of transferable allocations during a fishing season. If an entity's allocation account falls below zero in a given season, the entity would be provided the opportunity to receive transfers of Chinook salmon bycatch sufficient to bring the entity's account to zero.				
Allocating the hard cap to cooperatives (Component 4)	Each inshore cooperative and the inshore open-access fishery would receive a transferable allocation of the inshore CV sector level cap and must stop fishing once the allocation is reached.				
	Inshore cooperative allocations would be based on that cooperative's AFA pollock allocation percentage. Inshore open access allocation would be based on the pollock history of those vessels participating in the inshore open access fishery.				
Performance Standard (Component 5)	If a sector's annual bycatch exceeds its performance standard in any three years within seven consecutive years, NMFS would reduce that sector's Chinook salmon allocation to that sector's portion of 47,591 Chinook salmon for perpetuity.				
Observer Program (Component 6)	Increase observer coverage to 100% for catcher vessels not delivering unsorted codends at sea and modify, if necessary, shoreside processors' catch monitoring plans.				

Amendment 91 includes a rather complicated set of caps that are contingent on certain circumstances, rules for allocating the allowable bycatch between sectors, incentives designed to encourage conservative management, and penalties for failing to meet specified performance standards. Although complicated, Amendment 91 sets limits on Chinook salmon bycatch that are unambiguous and enforceable.

The caps shown in Table 1 are hard caps that apply to the BSAI pollock fishery. In most years sectors within the pollock fishery would be operating under different hard caps and allocated only their portion of the hard cap that would be applied to the entire pollock fishery, if every vessel operated under the same cap. For instance, if an IPA is established and all of the vessels except two decided to participate, all of the IPA vessels would be operating under the 60,000 cap that is reduced by the amount that would have been applied to the two vessels that opted out of the IPA. The vessels that opt out would receive only their portion of the 28,496 salmon cap, which is a fishery wide cap. The difference in what the opt out vessels would have received under the IPA and what they do receive under the 28,496 cap is not redistributed to any other

vessels and therefore results in a total cap for the pollock fishery that is less than if all vessels participated under the IPA. Under Amendment 91, at no time would the entire pollock fishery be authorized to exceed 60,000 salmon. The performance standard for vessels participating in the IPA would ensure that the IPA participants are operating with an industry wide 47,591 cap the majority of the time (not to be exceeded three years out of seven consecutive years). The Alaska Region expects to complete Amendment 91 prior to the start of the 2011 fishery. Under the proposed action, the Bering Sea pollock fishery would continue to be managed in 2010 subject to provisions of Amendment 84a of the BSAI Groundfish FMP.

Amendment 91 has no effect on management provisions related to salmon bycatch in other components of the BSAI groundfish fisheries including the non-pelagic trawl, hook-and-line, and pot fisheries that target other groundfish species. Additional information regarding Chinook salmon bycatch in these other fishery sectors is provided later in this opinion and becomes pertinent when describing expected bycatch levels in the incidental take statement.

1.3. Action Area

The action area means "all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action" (50 CFR 402.02(d)). As such the action area for the Federally managed BSAI groundfish fishery effectively covers all of the Bering Sea under U.S. jurisdiction, extending southward to include the waters south of the Aleutian Islands west of 170° W long. to the border of the U.S. EEZ.

1.4. Associated Informal Consultations

There is no new information suggesting that our previous no effect and not likely to adversely affect determinations are incorrect or require reconsideration. As a consequence, this opinion does not include any informal consultations or reinitiations of existing informal consultations. This biological opinion therefore continues to focus on the potential affects to Upper Willamette River and Lower Columbia River Chinook.

2. ENDANGERED SPECIES ACT BIOLOGICAL OPINION

2.1. Introduction to Biological Opinion

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat.

To jeopardize the continued existence of a listed species means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

In this Biological Opinion we consider the effects of the proposed action on ESA listed salmon species.

2.2. Status of the Species and Critical Habitat

The only ESA listed salmon or steelhead species likely to be affected by the BSAI groundfish fishery are Upper Willamette River Chinook and Lower Columbia River Chinook. This section on species status is therefore limited to a review of information related to the status of those two ESUs. Information on the status of UWR and LCR Chinook is summarized in the prior Supplemental Biological Opinion on the BSAI fishery which was completed in January 2007 (NMFS 2007a). Additional information regarding the status of the two ESUs has developed over the past three years, primarily through subsequent recovery planning efforts and biological opinions. The general conclusions about the species' status have not changed, but there are some refinements that supplement the previously available information. New information regarding species status is therefore summarized below.

2.3. Upper Willamette River Chinook Salmon

More recent information regarding the status of Upper Willamette River Chinook is provided in biological opinions on the Willamette River Flood Control Project (NMFS 2008a) and the Federal Columbia River Power System (FCRPS) (NMFS 2008b), and the associated Supplemental Comprehensive Analysis (NMFS 2008c). That information is incorporated by reference and summarized below.

Current Rangewide Status of the Species

The Upper Willamette River Chinook salmon ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River and its tributaries above Willamette Falls, Oregon, as well as Upper Willamette River Chinook from seven artificial propagation programs (NMFS 2005a). The seven artificial propagation programs considered part of the ESU are the McKenzie River Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock # 24), Marion Forks/North Fork Santiam River (ODFW stock # 21), South Santiam Hatchery (ODFW stock # 23) in the South Fork Santiam River, South Santiam Hatchery (ODFW stock # 23) in the Calapooia River, South Santiam Hatchery (ODFW stock # 23) in the Molalla River, Willamette Hatchery (ODFW stock # 22), and Clackamas hatchery (ODFW stock # 19) spring-run Chinook hatchery programs (NMFS 2005a).

The Willamette/Lower Columbia Technical Recovery Team (WLCTRT) identified seven independent populations within this ESU (Table 2) (Myers et al. 2006); all populations are part of the same stratum, or major population group (WLCTRT 2003). The McKenzie population is the only genetic legacy population. Oregon's recovery planners have tentatively prioritized all of the core populations including the McKenzie, Clackamas, North Fork Santiam, and Middle Fork Willamette for high viability, and indicated that the status of all populations needs to improve from current conditions.

Table 2. Historical populations in the Upper Willamette River Chinook salmon ESU (Myers et al. 2006)

Stratum	**Population***
	Clackamas (C)
	Molalla

Upper Willamette	North Fork Santiam (C)
	South Fork Santiam
	Calapooia
	McKenzie (C)(G)
	Middle Fork Willamette (C)

*The designations "C" and "G" identify Core and Genetic Legacy populations, respectively. Core populations historically represented the centers of abundance and productivity for a major population group. Genetic legacy populations have had minimal influence from nonendemic fish due to artificial propagation activities or exhibit important life history characteristics no longer found throughout the ESU (WLCTRT 2003).

Limiting Factors and Threats

The factors that have caused the decline of this ESU to its threatened status and that are limiting the ESU's ability to recover include multipurpose dams, hatcheries, harvest, habitat degradation (tributary, mainstem, and estuarine), predation, and ocean and climate conditions. These factors are reviewed in the biological opinion on the Willamette River Project (NMFS 2008a) and discussed in detail in the draft recovery plan (ODFW 2007a). ODFW concluded in the draft recovery plan that harvest in fisheries directed at salmon has been reduced to a point where it is no longer limiting recovery (ODFW 2007a). This has been accomplished through reductions in ocean fisheries and particularly as a result of implementation of mark selective fisheries in freshwater fisheries that target marked hatchery fish and require the release of all unmarked fish. The recovery plan does not comment or provide recommendations related to the bycatch of Chinook in groundfish fisheries.

Abundance, Productivity, and Trends

Historically the Upper Willamette supported large numbers (perhaps exceeding 275,000 fish) of Chinook salmon (Myers et al. 2006). While counts of hatchery- and natural-origin adult spring Chinook salmon over Willamette Falls since 1946 have increased (Figure 1), approximately 90 percent of the return is now hatchery fish. Current abundance of natural-origin fish is estimated to be less than 10,000, with significant natural production occurring only in two populations – the Clackamas and McKenzie (McElhany et al. 2007). The Clackamas and McKenzie are the only two watersheds in the ESU where sufficient habitat is still accessible and of sufficient quality to produce significant numbers of natural-origin spring Chinook.

On the Clackamas most of the available habitat and natural spawning occurs above the North Fork Dam. Marked hatchery fish have been removed and not passed above the Dam since 2002. The number of unmarked fish passed above the Dam has averaged over 2,700 since then (ODFW 2008). This compares to a minimum abundance threshold of 1,300 recommended for the viability of large Chinook populations (McElhany et al. 2007) and a broad sense recovery goal of 2,900 identified in ODFW's draft Recovery Plan (ODFW 2007a). The estimates of productivity and long-term trends noted above may be relatively flat because escapements are near habitat capacity.

Fish returning to the McKenzie are counted at Leaburg Dam. Like the Clackamas marked

hatchery fish have not been passed above the Dam since 2002. The number of fish passed above Leaburg Dam has averaged over 3,700 since 2002 (ODFW 2008) compared to the minimum abundance threshold of 1,300 and a broad sense recovery goal of 3,100 (ODFW 2007a).

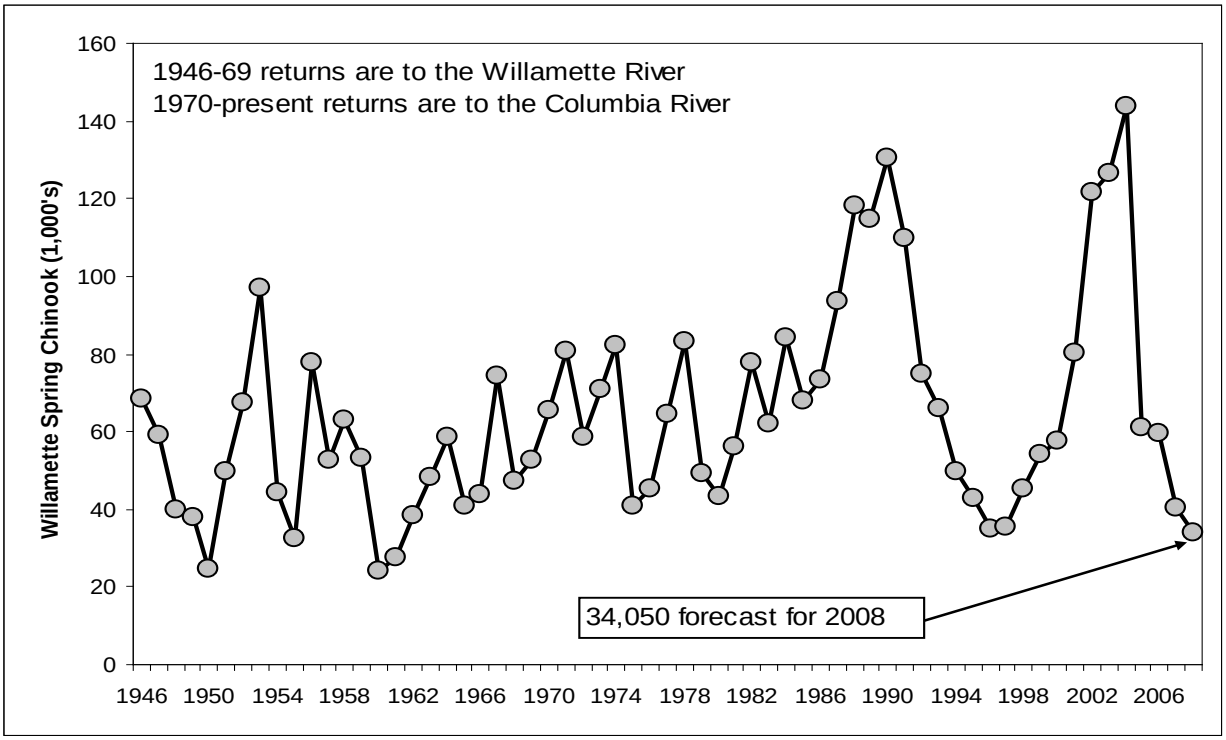

Figure 1. Total Willamette spring Chinook returns, (hatchery and wild fish combined) 1946-2007 and 2008 forecast[2] (ODFW 2008)

With the exception of the Clackamas and McKenzie, natural-origin populations in this ESU have very low current abundances (less than a few hundred fish), and high proportions of hatchery-origin spawners. Quantitative estimates of trends in abundance and adult returns per spawner are available only for the Clackamas and McKenzie Chinook populations. In both cases, while the long-term trend in abundance is slightly higher than 1.0, long-term median population growth rates (lambda) are negative, as are recruits per spawner (Table 3) (McElhany et al. 2007).

All three of these metrics evaluate whether a population is maintaining itself, declining, or growing. A long-term trend > 1.0 indicates that population abundance is increasing over time, while a trend of <1.0 indicates abundance is decreasing. A median population growth rate (lambda) of 1.0 indicates a stationary population. Similarly, recruits per spawner of 1.0 indicates that 100 parental spawners would produce 100 progeny that survive and spawn successfully, while values above and below 1.0 indicate that each parental spawner produces less than one successful spawner, or more than one successful spawner, respectively. The long-term trend calculation may be elevated by the way in which it includes the progeny of hatchery-origin spawners, whereas the lambda and recruits per spawner values assess how a population would

[2] Figure uses 2 datasets. Prior to 1970, estimates are for fish returning to the Willamette (do not include fish harvested in ocean and Columbia). For 1970 – present, estimates are for Willamette fish entering the Columbia River (do not include fish harvested in ocean).

perform in the absence of continued hatchery production (NMFS 2008b; McElhany et al. 2007).

Table 3. Abundance, productivity, and trends of Upper Willamette River Chinook populations (source: McElhany et al. 2007). 95% confidence intervals are shown in parentheses.

Population	Recent Natural Spawners			Long-Term Trend		Median Growth Rate		Recruits/spawner	
	Years[1]	No. [2]	pHOS[3]	Years	Value[4]	Years	λ[5]	Years	Value[6]
Clackamas	90-05	1656 (1122-2443)	47%	58-05	1.04 4 (1.033-1.055)	58-05	0.967 (0.849-1.102)	58-05	0.888 (0.667-1.182)
Molalla	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NF Santiam	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SF Santiam	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Calapooia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
McKenzie	90-05	2104 (1484-2983)	33%	70-05	1.017 (0.994-1.04)	70-05	0.927 (0.761-1.129)	70-05	0.705 (0.485-1.024)
MF Willamette	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: Reported time series correspond to reported values in available information.
1 Years of data for recent means.
2 Geometric mean of natural-origin spawners.
3 Average recent proportion of hatchery-origin spawners
4 Long-term trend of natural-origin spawners (regression of log-transformed natural-origin spawner abundances against time).
5 Long-term median population growth rate after accounting for the relative reproductive success of hatchery-origin spawners compared to those of natural origin. The statistic is corrected for hatchery fish to model the growth rate of the natural population if there had been no hatchery supplementation (McElhany et al. 2007).
6 Geometric mean of recruits per spawner using all brood years in the analysis period.
N/A = not available

Spatial Structure, Diversity, and Extinction Risk

Spatial structure, or geographic distribution, of the North Fork Santiam, South Fork Santiam, McKenzie, and Middle Fork Willamette populations has been substantially reduced by the loss of access to the upper portions of those tributary basins due to flood control and hydropower development, including dams owned and operated by the Corps. It is likely that genetic diversity has also been reduced by this habitat loss. The habitat conditions conducive to salmon survival in the Molalla and Calapooia subbasins have been reduced significantly by the effects of land use, including forestry, agriculture, and development. Spatial structure of the Clackamas population remains relatively intact (McElhany et al. 2007).

The diversity of some populations has been further eroded by hatchery and harvest influences and degraded habitat conditions in lower elevation reaches, all of which have contributed to low population sizes (McElhany et al. 2007). Historically, Upper Willamette River Chinook had diverse life history types, with greater variation in the age structure and timing of both returning adults and out-migrating juveniles (Myers et al. 2006). At present, the life history diversity of all Upper Willamette River Chinook populations has been significantly simplified because there is less variation in ages and run timing. The healthiest populations (Clackamas and McKenzie) still have life history characteristics representative of historical runs, although interbreeding with hatchery fish has likely resulted in genetic introgression over the last 50 years.

Extinction risk for each population was estimated qualitatively, based on criteria identified by the WLCTRT (Table 5.1.2.1-4 and Figure 5.1.2.1-5) (McElhany et al. 2007). The rating system categorized extinction risk as very low, low, moderate, high, and very high based on abundance, productivity, spatial structure, and diversity characteristics. Based on the results for each population, McElhany et al. (2007) determined that the risk of extinction for the ESU was “high.”

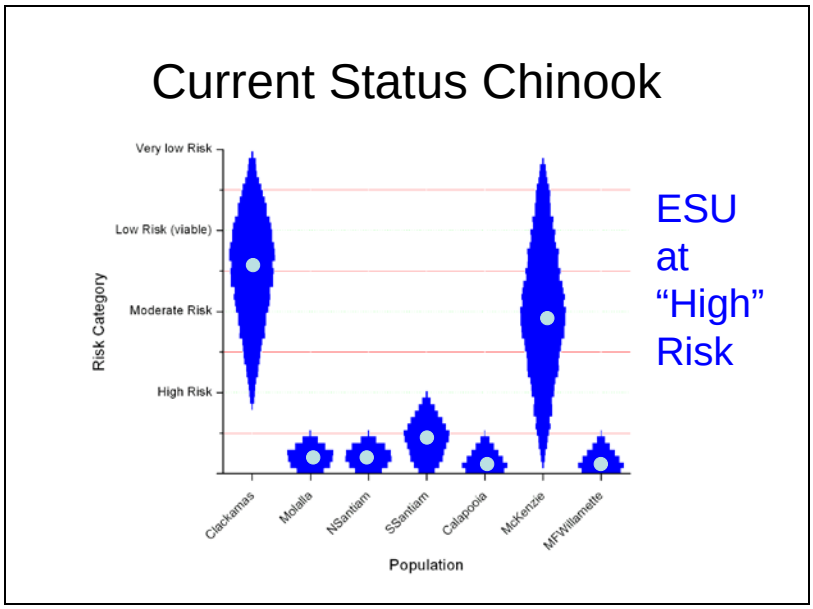

Figure 2. Current risk status of Upper Willamette River spring Chinook salmon populations. Width of diamond corresponds with likelihood that the population is at status shown (McElhany et al. 2007).

Rangewide Status of Critical Habitat

Designated critical habitat for Upper Willamette River Chinook salmon includes all Columbia River estuarine areas and river reaches proceeding upstream to the confluence with the Willamette River as well as specific stream reaches in the following subbasins: Middle Fork Willamette, Coast Fork Willamette, Upper Willamette, McKenzie, North Santiam, South Santiam, Middle Willamette, Molalla/Pudding, Clackamas, and Lower Willamette (NMFS 2005b). Offshore marine areas, including those in action area of this biological opinion, were not included as designated critical habitat. A more detailed discussion of critical habitat is provided in the Biological Opinion on the Willamette River Projects (NMFS 2008a).

2.4. Lower Columbia River Chinook Salmon

Information on the status of LCR Chinook is summarized in the prior Supplemental Biological Opinion on the BSAI fishery which was completed in January 2007 (NMFS 2007a). More recent information regarding the status of Lower Columbia River Chinook is provided in a Biological Opinion on the FCRPS (NMFS 2008b) and the associated Supplemental Comprehensive Analysis (NMFS 2008c), and in the recent opinion on 2009 Pacific Fishery Management Council and Fraser Panel fisheries (NMFS 2009b). The general conclusions about the species' status have not changed, but there are some additional details that are summarized below.

Rangewide Status of the Species

Lower Columbia River Chinook display three life history types including early fall runs ("tules"), late fall run ("brights"), and spring-runs . All three life-history types have been designated as part of a Lower Columbia River Chinook ESU that includes Oregon and

Washington populations in tributaries from the ocean to and including the Big White Salmon River in Washington and Hood River in Oregon. Fall Chinook salmon historically were found throughout the entire range, while spring Chinook salmon historically were only found in the upper portions of basins with snowmelt driven flow regimes (western Cascade Crest and Columbia Gorge tributaries). Late fall Chinook salmon were identified in only two basins in the western Cascade Crest tributaries. In general, late fall Chinook salmon mature at an older average age than either lower Columbia River spring or fall Chinook salmon, and have a more northerly oceanic distribution. Currently, the abundance of fall Chinook greatly exceeds that of the spring component.

Lower Columbia River Chinook salmon is composed of 32 historical populations. The populations are distributed through three ecological zones. The combination of life history types based on run timing, and ecological zones result in six major population groups (MPG, referred to as strata by the WLC TRT) (Table 4). There are 21 fall populations, two late fall populations, and nine spring populations, some of which are considered extirpated or nearly so. Also included in the ESU are 17 hatchery programs. Excluded from the ESU are Carson spring Chinook, and introduced bright fall Chinook occurring in the Wind and (Big) White Salmon rivers as well as spring Chinook released at terminal fishery areas in Youngs Bay, Blind Slough, and Deep River and in the mainstem Columbia. Populations of spring Chinook in the Willamette, including the Clackamas, are also in a separate ESU.

Table 4. Chinook salmon ESU description and major population groups (MPGs) (Sources: NMFS 2005a; Myers et al. 2006). The designations "(C)" and "(G)" identify Core and Genetic Legacy populations, respectively (Appendix B in WLC-TRT 2003)

ESU Description	
Threatened	**Listed under ESA in 1999; reaffirmed in 2005**
6 major population groups	32 historical populations
Major Population Group	**Population**
Cascade Spring	Upper Cowlitz (C,G), Cispus (C), Tilton, Toutle, Kalama, Lewis (C), Sandy (C,G)
Gorge Spring	(Big) White Salmon (C), Hood
Coastal Fall	Grays, Elochoman (C), Mill Creek, Youngs Bay, Big Creek (C), Clatskanie, Scappoose
Cascade Fall	Lower Cowlitz (C), Upper Cowlitz, Toutle (C), Coweeman (G), Kalama, Lewis (G), Salmon Creek, Washougal, Clackamas (C), Sandy
Cascade Late Fall	Lewis (C,G), Sandy (C,G)
Gorge Fall	Lower Gorge, Upper Gorge (C,G), (Big) White Salmon (C,G), Hood
Hatchery programs included in ESU (17)	Sea Resources Tule Chinook, Big Creek Tule Chinook, Astoria High School (STEP) Tule Chinook, Warrenton High School (STEP) Tule Chinook, Elochoman River Tule Chinook, Cowlitz Tule Chinook Program, North Fork Toutle Tule Chinook, Kalama Tule Chinook, Washougal River Tule Chinook, Spring Creek NFH Tule Chinook, Cowlitz spring Chinook (2 programs), Friends of Cowlitz spring Chinook, Kalama River spring Chinook, Lewis River spring Chinook, Fish First spring Chinook, Sandy River Hatchery (ODFW stock #11)

Core populations are defined as those that, historically, represented a substantial portion of the species abundance. Genetic legacy populations are defined as those that have had minimal influence from nonendemic fish due to artificial propagation activities, or may exhibit important life history characteristics that are no longer found throughout the ESU (WLC-TRT 2003).

As discussed in the following section on Effects of the Action, only the spring component of the LCR ESU is affected by the BSAI fisheries. The following discussion therefore emphasizes information related to the status of the spring populations in the LCR ESU. Details regarding the status of other components in the ESU are included in NMFS' recent Biological Opinion on 2009 PFMC fisheries (NMFS2009b) and are incorporated by reference.

Limiting Factors and Threats

Understanding the limiting factors and threats that affect Lower Columbia River Chinook provides important information and perspective regarding the status of a species. Lower Columbia River Chinook salmon populations began to decline by the early 1900s because of habitat alterations and harvest rates that were unsustainable given these changing habitat conditions. Human impacts and limiting factors come from multiple sources including hydropower development on the Columbia River and its tributaries, habitat degradation, hatchery effects, fishery management and harvest decisions, and ecological factors including predation and environmental variability. The particulars of these limiting factors and threats are described in the Supplemental Comprehensive Analysis (SCA) done in association with the FCRPS Biological Opinion (NMFS 2008c). For Washington populations also see the Interim Regional Recovery Plan (LCFRB 2004), and for Oregon populations, Oregon's draft Lower Columbia Recovery Plan (ODFW

2007, 2009).

Abundance, Productivity and Trends

One of the functions of recovery planning is to describe a scenario that defines the role of each population in recovery. Not every population in an ESU needs to be highly viable, but a recovered ESU must include several highly viable populations that represent the full diversity of the ESU. McElhaney (et al. 2000) provide criteria that describe the recommended characteristics of a recovered ESU that have been used by recovery planners. The Interim Regional Recovery Plan described a recovery scenario for Lower Columbia River Chinook (LCFRB 2004) based on these criteria. It identified each population's role in recovery as a primary, contributing, or stabilizing populations which define a desired viability level. The Plan focused on Washington populations and made some assumptions or suggestions regarding Oregon populations. Since then Washington has reconsidered the recovery scenario and changed priority designations for some of the populations including some of the spring populations (LCFRB 2007) Oregon has also provided tentative priority designations for spring populations in Oregon (ODFW 2009). The Hatchery Scientific Review Group (HSRG) suggested alternative priorities for some populations[3]. The HSRG recommendations may influence the final recommendations from the recovery planners. Table 5 summarizes the status recommendations from the Interim Regional Recovery Plan, and the current working hypotheses from the ongoing recovery planning process for recovery scenarios for Lower Columbia River Chinook indicating the proposed viability level for each spring population. There are differences in recommended priority designations for some populations and these need to be resolved. But there is agreement on priority designations for most of the spring populations in the ESU thus providing reasonable certainty about the forum of the likely final scenario.

[3] The states of Oregon and Washington and other co-managers have recently completed a review of all hatchery programs in the Columbia River Basin through the HSRG. The HSRG was established and funded by Congress to provide an independent review of current hatchery programs in the Columbia River Basin. The HSRG has completed their work on Lower Columbia River Chinook programs (HSRG 2009). Because of the substantive involvement of the co-managers with the HSRG, their recommendations are likely to influence final recommendations for recovery planning.

Table 5. Current status for Lower Columbia River Chinook populations expressed as extinction risk ((LCFRB (2004) for Washington populations and McElhany et al. (2007) for Oregon populations)), and recommended delisting status goals from the Interim Regional Recovery Plan (LCFRB 2004) and subsequent information from (LCFRB 2007) and (ODFW 2009), and HSRG (2009)

	Strata	Population	State	Extinction Risk Category	Interim Recovery Plan Delisting Status Goals	Potential Future Delisting Status Goals (LCFRB 2007; ODFW 2009)	Status Goals Consistent With HSRG (2009) Findings
Spring	**Cascade**	Upper Cowlitz	W	H	P*	P*	P
		Cispus	W	H	P	P*	P
		Tilton	W	VH	S	S	S
		Toutle	W	VH	C	C	-
		Kalama	W	VH	P	C	S
		NF Lewis	W	VH	P	P	P
		Sandy	O	M	P	P	P
	Gorge	(Big) White Salmon	W	VH	C	C	S
		Hood	O	VH	P	P*	C

[1] **Primary populations** are those that would be restored to high or "high+" viability. **Contributing populations** are those for which some restoration will be needed to achieve a stratum-wide average of medium viability. Contributing populations might include those of low to medium significance and viability where improvements can be expected to contribute to recovery. **Stabilizing populations** are those that would be maintained at current levels (likely to be low viability). Stabilizing populations might include those where significance is low, feasibility is low, and uncertainty is high.

Population status indicators are all affected by available habitat. Steel and Sheer (2003) analyzed the number of stream kilometers historically and currently available to salmon populations in the lower Columbia River (Table 6). Stream kilometers usable by salmon are determined based on simple gradient cutoffs and on the presence of impassable barriers. This approach overestimates the number of usable stream kilometers, because it does not account for aspects of habitat quality other than gradient. However, the analysis does indicate that the number of kilometers of stream habitat currently accessible is greatly reduced from the historical condition for some populations. Hydroelectric projects in the Cowlitz, North Fork Lewis, and White Salmon Rivers have greatly reduced or eliminated access to upstream production areas and therefore extirpated some of the affected populations. Spring populations on the Cowlitz and its tributaries (Cispus and Tilton), and the Lewis rivers that depend on headwater spawning and rearing areas are particularly affected by these barriers.

The information in Table 7 is from NMFS' most recent status review (Good et al. 2005). It summarizes information on the abundance, productivity, and trends for Lower Columbia River Chinook populations. The status assessments were updated for Oregon populations in a more recent review (McElhany et al. 2007). Some of the natural runs (e.g., the Youngs Bay, Kalama River and Upper and Lower Gorge fall runs, and all of the spring run populations) have been replaced largely by hatchery production. Quantitative data is not available for about half of the populations.

The majority of spring populations for which data is available have a long-term trend of less than 1, indicating the population is in decline. The Sandy population is the only exception. Information for the Sandy indicates that the median growth rate is less than 1. Similar information is not available for the other spring populations.

The data used for the analysis shown in Table 7 is current only through 2001 for Washington populations and 2004 for Oregon populations. More recent estimates of escapement along with available data going back to 1971 are shown in Table 8.

Table 6. Current and historically available habitat located below barriers in the Lower Columbia River Chinook salmon ESU.

Population/Strata	Potential Current Habitat (km)	Potential Historical Habitat (km)	Current/ Historical Habitat Ratio (%)
GORGE SPRING			
White Salmon (WA)	0	232	0
Hood (OR)	150	150	99
CASCADE SPRING			
Upper Cowlitz (WA)	4	276	1
Cispus (WA)	0	76	0
Tilton (WA)	0	93	0
Toutle (WA)	217	313	69
Kalama (WA)	78	83	94
Lewis (WA)	87	365	24
Sandy (OR)	167	218	77

Table 7. Abundance, productivity, and trends of Lower Columbia River Chinook salmon populations (sources: Good et al. 2005 for Washington and McElhany et al. 2007 for Oregon populations)

	Strata	Population	State	Recent Abundance of Natural Spawners			Long-term Trend[b]		Median Growth Rate[c]	
				Years	Geo Mean	pHOS[a]	Years	Value	Years	λ
Spring	Cascade	Cowlitz	W	na	na	na	80-01	0.994	na	na
		Cispus	W	2001	1,787	na	na	na	na	na
		Tilton	W	na	na	na	na	na	na	na
		Toutle	W	na	na	na	na	na	na	na
		Kalama	W	97-01	98	na	80-01	0.945	na	na
		NF Lewis	W	97-01	347	na	80-01	0.935	na	na
		Sandy	O	90-04	959	52%	90-04	1.047	90-04	0.834
	Gorge	(Big) White Salmon	W	na	na	na	na	na	na	na
		Hood	O	94-98	51	na	na	na	na	na

[a] Average recent proportion of hatchery-origin spawners. Hatchery-origin fish are the offspring of fish that were spawned in a hatchery. Gomeans are calculated for total spawners where hatchery fractions are unavailable.
[b] Long-term trend of total (hatchery- and natural-origin) spawners (regression of log-transformed spawner indices against time).
[c] Long-term median population growth rate after accounting for hatchery spawners (equal spawning success assumption).
Note: time series represent available information and therefore may not correspond to reference periods identified in this biological opinion's evaluations for other species.

Gorge Spring MPG

Spring Chinook populations occur in both the Gorge and Cascade MPGs. The Hood River and White Salmon populations are the only populations in the Gorge MPG. The 2005 Biological Review Team report describes the Hood River spring run as "extirpated or nearly so" and the 2005 ODFW Native Fish Status report describes the population as extinct (ODFW 2005). Spring Chinook from the Deschutes River are being reintroduced into the Hood River. The Deschutes River is the nearest source for brood stock, but the population is from the Middle Columbia River ESU. Most of the habitat that was historically available to spring Chinook in the Hood River is still accessible, but the basin was likely not highly productive for spring Chinook due to the character of the basin. Oregon recovery planners have indicated that further reduction in harvest from current levels are not required to achieve the desired future status of very low risk for Hood River spring (ODFW 2009).

The White River population is also considered extinct (LCFRB 2007). Recovery of this population will therefore also depend on a reintroduction effort. Condit Dam located at river mile 3.3 on the White Salmon River is scheduled for removal in 2009 once final permits are approved. The Interim Regional Recovery Plan calls for eventual reintroduced of spring Chinook to the White Salmon River, but the program will have to be initiated from an out of basin stock.

Cascade Spring MPG

There are seven spring Chinook populations in the Cascade MPG. The Upper Cowlitz, Cispus, and Tilton populations (collectively referred to as Cowlitz) are all located above Mayfield Dam which has no juvenile or adult passage. Current production of spring Chinook above Mayfield Dam is maintained from juvenile hatchery plants and an adult trap and haul program. Escapement estimates to the Cowlitz refers to fish returning to the area below Mayfield Dam (Table 8).

The return of combined hatchery-origin and natural-origin spring Chinook to the Cowlitz, Kalama, and Lewis river populations in Washington have all numbered in the thousands in recent years (Table 8). The Cowlitz and Lewis populations on the Washington side are managed for hatchery production since most of the historical spawning habitat is inaccessible due to hydro development in the upper basin (LCFRB 2004). Supplementation programs are now being implemented on the Cowlitz and Lewis rivers that involve trap and haul of adults and juveniles. These reintroduction programs are consistent with the recommendations of the Interim Regional Recovery Plan (LCFRB 2004) and constitute the initial steps in a more comprehensive recovery effort. However, the programs are limited for the time being by low collection efficiency of out-migrating juveniles (there are currently no juvenile collection or bypass facilities on the Lewis) and the lack of facilities that allow for the collection of adults that may return from supplementation efforts. Some unmark adults return voluntarily to the hatchery intake, but for the time being the reintroduction programs rely primarily on use of surplus hatchery adults. The reintroduction programs facilitate the use of otherwise vacant habitat, but cannot be self sustaining until the juvenile and adult collection problems are solved. Efforts are underway to improve juvenile and adult collection facilities. Given

the circumstances, fisheries are managed to achieve hatchery escapement goals and thereby preserve the genetic heritage of the populations, and the option for the reintroduction program and eventual rehabilitation of the Cowlitz and Lewis populations. A supplementation program is also being implemented on the Kalama with fish being passed above the ladder at Kalama Falls.

Table 8. Total annual escapement of Lower Columbia River spring Chinook populations (TAC 2008)

Year or Average	Cowlitz River	Kalama River	Lewis River	Sandy River (Total)	Sandy River (natural-origin fish at Marmot Dam)
1971-1975	11,900	1,100	200	-	
1976-1980	19,680	2,020	2,980	975	
1981-1985	19,960	3,740	4,220	1,940	
1986-1990	10,691	1,877	11,340	2,425	
1991-1995	6,801	1,976	5,870	5,088	
1996	1,787	627	1,730	3,997	
1997	1,877	505	2,196	4,625	
1998	1,055	407	1,611	3,768	
1999	2,069	977	1,753	3,985	
2000	2,199	1,418	2,515	3,641	1,984
2001	1,649	1,784	3,777	5,329	2,445
2002	5,019	2,883	3,554	5,903	1,275
2003	15,890	4,528	5,104	5,600	1,151
2004	16,712	4,573	11,090	12,675	2,698
2005	9,200	3,100	3,400	7,475	1,808
2006	7,000	5,600	7,500	4,812	1,381
2007	3,700	7,300	6,700	3,400	790
2008	2,679	1,622	2,400		

These systems have all met their respective hatchery escapement goals in recent years, and, based on available forecast information, are expected to do so again in 2009 (JCRMS 2009). The existence of the hatchery programs mitigates the risk to these populations; the Cowlitz and Lewis populations would be extinct but for the hatchery programs (LCFRB 2004).

The Cowlitz and Lewis populations are designated as primary populations and are thus targeted in the Interim Regional Recovery Plan for high viability. Achieving high viability will require reintroducing the species and providing access to upstream habitat through by providing passage for juveniles and adults. The historical significance of the Kalama population was likely limited because access to the preferred upstream spawning areas was likely blocked by lower Kalama Falls. The prospects for improving the status for Kalama Spring Chinook are enhanced by passing fish above the falls to utilize otherwise suitable habitat. The recovery status for the Kalama spring Chinook population is designated as contributing by the revised Draft Interim Plan (LCFRB 2007), and stabilizing by the HSRG (Table 5).

The Sandy River is managed with an integrated hatchery supplementation program that incorporates natural-origin brood stock. There is some spawning in the lower river, but the area above Marmot Dam is preserved for natural-origin production. The Marmot Dam was used as a counting and sorting site in prior years, but the Dam was removed in October 2007. The return of natural-origin fish to Marmot Dam has averaged almost 1,700 since 2000. This does not account for the additional spawning of natural-origin fish below the dam. The total return of spring Chinook to the Sandy including hatchery fish has averaged more than 6,000 since 2000 (Table 8). The tentative delisting and broad sense recovery goals for Sandy River spring Chinook are 1,229 and 7,822, respectively, although these goals are subject to further review through Oregon's ongoing recovery planning process (ODFW 2009). The Sandy River spring Chinook population is also designated as a primary population that will be important to the overall recovery of the ESU (Table 5).

Spatial Structure, Diversity, and Extinction Risk

The Interim Regional Recovery Plan provides an overview of the status of Washington populations in the ESU based on TRT recommendations for assessing viability (LCFRB 2004). The risk of extinction category integrates abundance and other viability criteria (Table 5). The Recovery Plan provides further detail regarding population status through their assessment of persistence (which combines the abundance and productivity criteria), spatial structure, and diversity, and also habitat characteristics (Table 9). Lower scores indicate higher risk. This review reflects the depressed status of all of the spring populations. The zero scores for several of the populations reflect the fact that habitat is inaccessible because of dam blockages. Access to habitat for the Upper Cowlitz and Cispus is a consequence of the trap and haul program designed to introduce hatchery fish to what is otherwise inaccessible habitat. Habitat on the Toutle is accessible, but much of the quality habitat was destroyed by the 1980 eruption of Mt. St. Helens. That habitat is now recovering through natural processes. Comparable information is not available for the Oregon populations.

Table 9. Summary of current status for Lower Columbia River spring Chinook populations for VSP characteristics expressed as a categorical score (LCFRB 2004, Appendix E)

	Strata	Population	State	Persistence	Spatial Structure	Diversity	Habitat
Spring	Cascade	Upper Cowlitz	WA	1.7	2	2	2
		Cispus	WA	1.7	2	2	2
		Tilton	WA	0.0	0	0	0
		Toutle	WA	0.7	4	0	0
		Kalama	WA	1.2	4	1	1
		NF Lewis	WA	0.2	0	0	0
		Sandy	OR	-	-	-	-
	Gorge	(Big)White Salmon	WA	0.0	0	0	0
		Hood	OR	-	-	-	-

Notes:
Summaries are taken directly from the LCFRB Recovery Plan. All are on a 4 point scale, with 4 being lowest risk and 0 being highest risk.
Persistence: 0 = extinct or very high risk of extinction (0-40% probability of persistence in 100 years); 1 = Relatively high risk of extinction (40-75% probability of persistence in 100 years); 2 = Moderate risk of extinction (75-95% probability of persistence in 100 years); 3 = Low (negligible) risk of extinction (95-99% probability of persistence in 100 years); 4 = Very low risk of extinction (>99% probability of persistence in 100 years)
Spatial Structure: 0 = Inadequate to support a population at all (e.g., completely blocked); 1 = Adequate to support a population far below viable size (only small portion of historic range accessible); 2 = Adequate to support a moderate, but less than viable, population (majority of historic range accessible but fish are not using it); 3 = Adequate to support a viable population but subcriteria for dynamics or catastrophic risk are not met; 4 = Adequate to support a viable population (all historical areas accessible and used; key use areas broadly distributed among multiple reaches or tributaries)
Diversity: 0 = functionally extirpated or consist primarily of stray hatchery fish; 1 = large fractions of non-local hatchery stocks; substantial shifts in life-history; 2 = Significant hatchery influence or periods of critically low escapement; 3 = Limited hatchery influence with stable life history patterns. No extended intervals of critically low escapements; rapid rebounds from periodic declines in numbers; 4 = Stable life history patterns, minimal hatchery influence, no extended intervals of critically low escapements, rapid rebounds from periodic declines in numbers.
Habitat: 0 = Quality not suitable for salmon production; 1 = Highly impaired; significant natural production may occur only in favorable years; 2 = Moderately impaired; significant degradation in habitat quality associated with reduced population productivity; 3 = Intact habitat. Some degradation but habitat is sufficient to produce significant numbers of fish; 4 = Favorable habitat. Quality is near or at optimums for salmon.

Rangewide Status of Critical Habitat

Designated critical habitat for LCR Chinook salmon includes all Columbia River estuarine areas and river reaches proceeding upstream to the confluence with the Hood River as well as specific stream reaches in the following subbasins: Middle Columbia/Hood, Lower Columbia/Sandy, Lewis, Lower Columbia/Clatskanie, Upper Cowlitz, Cowlitz, Lower Columbia, Grays/Elochoman, Clackamas, and Lower Willamette (NMFS 2005b). The lower Columbia River unit includes the estuary, where both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats, but offshore marine areas, including those in action area of the proposed action considered in this Biological opinion, were not included as designated critical habitat. A more detailed discussion of critical habitat is provided in the Biological Opinion on the 2009 PFMC fisheries (NMFS 2009).

2.5. Environmental Baseline

Environmental baselines for biological opinions include the past and present impacts of

all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR §402.02). NMFS concluded in previous consultations that there were no state, federal, or private actions in the action area that are likely to impact the listed species considered in this opinion (NMFS 1999). Additional information regarding the environmental baseline is discussed in a Final EIS on the Alaska Groundfish Harvest Specifications (NMFS 2007b) and the Draft Final EIS on Amendment 91 (NMFS 2009a) which are incorporated by reference. After review of the new information, NMFS confirms our prior conclusion that there are no actions in the environmental baseline that are likely to impact listed species considered in this opinion. The action area is outside the bounds of designated critical habitat so there can be no effects to critical habitat resulting from actions that are part of the environmental baseline.

2.6. Recovery Planning

There are six listed species in the Willamette/Lower Columbia Recovery Domain. NMFS expects to propose a recovery plan in 2010 for the Upper Willamette River which will address Upper Willamette Chinook and Upper Willamette winter steelhead. A separate recovery plan for Lower Columbia species will address Lower Columbia River Chinook, Lower Columbia River steelhead, Columbia River chum and Lower Columbia River coho. NMFS endorsed an Interim Regional Recovery Plan for the Washington management unit of Lower Columbia River Chinook, steelhead and chum in 2005 (NMFS 2005c). That management unit plan will be updated for Chinook, steelhead, and chum and amended to address Lower Columbia River coho, and along with a management unit plan from Oregon, will be incorporated into a Lower Columbia River Recovery Plan for all four species in 2010. Information related to the Interim Regional ESA Salmon Recovery Plan for the Washington Management Unit of the Lower Columbia River (LCFRB 2004) is posted at: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Willamette-Lower-Columbia/Interim-Recovery.cfm The LCFRB will release a new draft of this plan in late 2009 or early 2010.

Oregon is well along with their recovery planning process and has posted drafts of their recovery plans for the Upper Willamette River and Lower Columbia River regions (ODFW 2007a, 2007b). These are posted at: http://www.dfw.state.or.us/fish/CRP/conservation_recovery_plans.asp. Oregon expects to post a new draft of the Lower Columbia River Plan in December 2009 and of the Willamette Plan in 2010.

The recovery plans that address Upper Willamette Chinook and Lower Columbia River Chinook discuss the effects of fisheries directed at salmon in detail, but do not discuss the effects of Chinook bycatch that occurs in groundfish fisheries that occur off the west coast, and in the Bering Sea and Gulf of Alaska, or provide any related recommendations.

2.7.Large Scale Environmental Variation

ESA listed salmon are subject to the effects of inter-annual climatic variations (e.g. El Niño and La Niña), longer term cycles in ocean conditions pertinent to salmon survival (e.g. Pacific Decadal Oscillation), and ongoing global climate change and its implications for both oceanic and inland habitats and fish survivals. The nature of these phenomena and their potential affect on salmon is discussed in a recent biological opinion on the Pacific Salmon Treaty (NMFS 2008d). That opinion focuses in particular on the effect to species from the Columbia River Basin. Additional information more specific to the Bering Sea, the action area considered in this opinion, is provided in the Draft Final EIS on Amendment 91 (NMFS 2009a). The FEIS discusses the potential consequences of regime shifts that are considered natural phenomena, and climate change that can be attributed to anthropogenic sources of atmospheric carbon. These phenomena are generally understood and the subject of intense ongoing research. However, directional changes related to these phenomena and their immediate near term effect on ESA listed species cannot be predicted with reasonable certainty. Continued monitoring of the status of the species and study of the phenomena that affect them is being used to better understand, anticipate, and respond to changes if and when they occur.

2.8. Effects of the Action

Effects of the action means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02).

This biological opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat (Hogarth 2005).

NMFS previously concluded that the BSAI groundfish fishery will likely have no effect or was not likely to adversely affect ESA listed coho, sockeye, and chum salmon, and steelhead NMFS (NMFS 1999, 2007a).

There are currently nine ESA listed Chinook salmon ESUs. The primary source of information for the stock specific ocean distribution of Chinook salmon is from CWTs, and particularly their intensive use for management in coast wide salmon fisheries over the last twenty five years. The Alaska Region, with assistance from the Alaska Fisheries Science Center, Auke Bay Laboratory, completed a comprehensive review of CWT recoveries in the BSAI and GOA groundfish fisheries (Mecum 2006c). This information was used in the 2007 Supplemental Biological Opinion (NMFS 2007a). Of the nine listed Chinook salmon ESUs, CWT recoveries have been limited to the UWR and LCR ESUs. Based on this information and other considerations NMFS concluded that the BSAI groundfish fishery is not likely to adversely affect seven of the nine Chinook ESUs. The two ESUs that are affected include Upper Willamette River and Lower Columbia River Chinook which are the subject of the following discussion.

Since 1984, there have been ten and nine observed CWT recoveries in the BSAI fishery of UWR and LCR Chinook, respectively (Table 10). Information on CWT recoveries has been updated since the prior Supplemental Biological Opinion to include observations from 2007, 2008, and through August 2009. There have been no new recoveries of CWTs from the Upper Willamette River or Lower Columbia River during the last three years (Table 10). When observed recoveries are expanded for sampling fraction in the fishery and mark rate (the proportion of the release group that is tagged) the total number of *estimated* recoveries is 70 UWR Chinook and 17 LCR Chinook (but see Table 10 and the associated footnote). One or more recoveries were observed in eight out of 25 years for UWR Chinook, and five out of 25 years for LCR Chinook. As a result, the CWT information can be used to characterize that the take of listed UWR and LCR Chinook in the fishery as an occasional, but relatively rare event.

The LCR Chinook ESU includes both spring-run and fall-run life history types. All of the recoveries from the LCR ESU are from spring-run populations. UWR Chinook also have a spring-run life history. This suggests that spring-run populations from the lower Columbia River (the Willamette River is a tributary that enters the lower Columbia River near Portland, Oregon) are distinct in having the most northerly distribution, at least among the ESA listed Chinook from the southern U.S. No CWTs from other components of the LCR Chinook ESU have ever been observed in the fishery. The tule and bright fall Chinook components have been marked with CWTs at high rates for 25 years or more. The fact that none have ever been recovered in the fishery suggests that the tule and bright components of the ESU are not likely to be adversely affected by the proposed action.

Table 10. The bycatch of Chinook salmon in the BSAI groundfish fishery, observed CWT recoveries and total estimated contribution for LCR and UWR Chinook (NMFS 2009a)[4]

		LCR Spring Chinook		UWR Chinook	
Year	Chinook Bycatch	Observed CWT Recoveries	Total Estimated Contribution	Observed CWT Recoveries	Total Estimated Contribution
1984		0	0	1	2.7
1985		0	0	0	0
1986		0	0	0	0
1987		0	0	0	0
1988		0	0	0	0
1989		0	0	0	0
1990	13,990	0	0	0	0
1991	48,880	0	0	0	0
1992	41,955	0	0	0	0
1993	46,014	0	0	0	0
1994	43,821	0	0	0	0
1995	23,436	0	0	0	0
1996	63,205	0	0	1	2.6
1997	50,530	0	0	0	0
1998	55,431	0	0	0	0
1999	14,599	0	0	1	2.2
2000	8,223	0	0	1	2.5
2001	40,547	1	2.7	1	2.7
2002	39,684	1	2.0	2	24.3
2003	53,571	0	0.0	0	0
2004	60,442	3	5.6	1	14.9
2005	74,281	3	5.0	2	17.7
2006	87,084	1	1.7	0	0
2007	129,534	0	0	0	0
2008	23,195	0	0	0	0
2009*	12,127	0	0	0	0
Total	930,549	9	17.0	10	69.7

As of 8/25/09. CWT recovery numbers are preliminary

The CWT data can be used to estimate the expected catch of ESA listed Chinook in the BSAI fishery, although as noted in the footnote below the resulting estimates likely high. The estimated annual catch of LCR and UWR Chinook has ranged from 0 to 5.6 and 0 to 24.3, respectively. The catch of LCR and UWR Chinook, expressed as number per 100,000 total Chinook, averaged 1.8 and 7.2 per year. Under the proposed action the

[4] The Alaska Regional staff advised the Northwest Region during the consultation process that they recently found some potential errors in their previously reported estimated contributions shown in Table 10. The errors relate to how observed CWT recoveries were expanded for sample size to estimate the number of ESA listed fish caught in the fishery. The nature of the errors is such that they would lead to over estimates of the number of listed fish caught in the fishery. Unfortunately, the information necessary to correct the expanded numbers is not available. Based on the most current and reliable information, we continue to rely on the information summarized in Table 10 to complete this consultation. This is an appropriate conservative solution given the circumstances because we expect that the proposed action will reduce the estimated impacts to listed fish. Further, as referenced above, the available data likely overestimates the potential effects on ESA-listed salmon, providing a conservative approach to analyzing the impacts of the action.

fishery would be operating under hard caps that range between 47,591 and 60,000 depending on various contingencies (Table 1). If 60,000 Chinook were caught the average expected catch of listed LCR and UWR Chinook would be 1.1 and 4.3. (As discussed in the footnote to Table 1, this is likely an overestimate of recoveries because of uncertainties in the expansion factors.) Under Amendment 91 the expected number of listed fish caught would generally be less than the average described above to the degree that the bycatch provisions are successful at keeping bycatch below the 60,000 cap.

Not all fish caught in the BSAI fisheries would be expected to survive long enough to return to spawn because of subsequent natural mortality had they not been caught in the fishery. The parameter used to characterize the expected mortality of immature fish is referred to as the adult equivalency rate; this represents the proportion of the fish caught that would be expected to return to spawn absent further fishing. The adult equivalency rate is age specific - about 60% for age 3 fish, and about 85% for age 4 fish (pers. com. Dell Simmons, Pacific Salmon Treaty, Chinook Technical Committee co-chair, December 12, 2006). The CWT information indicates that the fish caught in the BSAI fishery are roughly half age 3 and half age 4. So, if the average expected catch of LCR and UWR Chinook is 1.1 and 4.3, the effect on subsequent spawning would be a reduction of about 0.8 LCR Chinook and 3.3 UWR Chinook spawning adults per year, assuming that the age compositions of the fish caught was half age 3 and half age 4 fish. The estimated annual catch of LCR and UWR Chinook has been as high as 5.6 and 24.3 (Table 10), suggesting that the maximum expected reduction in spawners could be up to 4.1 and 17.6 fish. However, in most years the expected reduction in spawners is zero based on the absence of CWT recoveries in most years.

Another way to provide perspective regarding these estimates of adult equivalent mortality in the BSAI fishery is to compare them to recent estimates of run size. From 2005-2008 the average returns of LCR and UWR spring Chinook to the Columbia River are 21,000 and 46,000, respectively (JCRMS 2009). The associated average annual adult equivalent mortality rates caused by BSAI fisheries are 0.004% and 0.007% per year.

The Alaska Region expects that the bycatch rate will be reduced from recent high catches under Amendment 91 (NMFS 2009a). The pollock fishery would be managed under hard caps that would result in fishery closures for sectors as their hard cap allocations are reached. In addition, the action would increase the monitoring of salmon incidentally taken ensuring that every salmon is counted and increasing the likelihood that every CWT tagged fish would be identified and included in the subsequent catch data summaries and catch estimates. Therefore, the effect of Amendment 91 is that it would likely minimize mortality and provide better information to understand the potential effects of the Bering Sea pollock fishery on ESA-listed Chinook salmon.

The Alaska Region has proposed implementing Amendment 91 because they conclude it provides for a more effective management system that will result in minimizing the bycatch of Chinook salmon compared to the current management system. Information from the recent Draft Final EIS for this action supports their conclusion (NMFS 2009a). The available information continues to indicate that there is some catch of listed UWR and LCR Chinook associated with implementation of the BSAI Groundfish FMP.

Nonetheless, as indicated in the prior biological opinions, the number of fish killed is quite limited, amounting to no fish in most years and a few fish in the remaining years.

The preceding description of bycatch of Chinook has been reported as a total, combining the bycatch that occurs in all gear types (Table 10). However, Amendment 91 would place hard caps on the pollock (pelagic trawl) fishery, but other gear types would not be constrained by the provisions of Amendment 91. The distinction between bycatch from different gear types is therefore important.

There are four basic gear types in the fishery including pelagic trawl (pollock), non-pelagic trawl, hook-and-line, and pot. The pollock fishery accounts for the majority of the bycatch and is thus the focus of Amendment 91 (Table 11). There is very little bycatch of Chinook in the hook-and-line and pot fisheries. Some bycatch does occur in the non-pelagic trawl fishery. Since 2003 Chinook bycatch in the non-pelagic trawl fishery has ranged from 1,560 to 8,679, averaged 5,679 per year, and accounted for about 9% of the total bycatch. Chinook bycatch in the hook/line and pot gears have ranged from 10 to 74 per year. To date there have been no CWT recoveries of ESA listed fish in any gear other than pelagic trawl, although we assume that the probability of catching a listed fish is proportional to that in other sectors of the fishery. The fact that no listed fish have been observed in these other components of the fishery is presumably a result of the low overall bycatch, and overall low probability of finding a listed fish among all of the Chinook that are caught.

Table 11. The bycatch of Chinook salmon by gear type in the BSAI groundfish fishery (pers.comm. Melanie Brown, NMFS Alaska Region, November 3, 2009)

Year	Hook/Line	Pot	Trawl		Total
			Non-pelagic	Pelagic	
1991	60	-	48,821		48,880
1992	52	-	41,903		41,955
1993	50	-	45,964		46,014
1994	36	-	43,693		43,821
1995	745	-	22,691		23,436
1996	26	-	63,178		63,205
1997	11	-	50,519		50,530
1998	4	-	60,545		55,431
1999	7	-	14,586		14,599
2000	-	-	8,220		8,223
2001	17	-	40,531		40,547
2002	25	-	39,658		39,684
2003	13	-	7,972	45,586	53,571
2004	66	-	8,679	51,696	60,442
2005	58	-	6,846	67,377	74,281
2006	31	-	4,358	82,694	87,084
2007	55	19	7,713	121,758	129,534
2008	10	-	2,623	20,560	23,195
2009	11	-	1,560	12,422	12,127

Designated critical habitat for UWR and LCR Chinook does not include offshore marine

areas, including distant areas in the Bering Sea and Aleutian Islands. As a consequence, implementation of the BSAI groundfish FMP in general and the proposed action in particularly, will have no effect on designated critical habitat for UWR and LCR Chinook salmon.

2.9. Cumulative Effects

'Cumulative effects' are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). The action area includes the EEZ of the BSAI under the jurisdiction of the NPFMC. Additional information regarding possible future actions is discussed in the Draft Final EIS on the Alaska Groundfish Harvest Specifications (NMFS 2007b) and the Final EIS on Amendment 91 (NMFS 2009a). The listed fish that may be present are mostly large, age 3 or age 4 fish residing in offshore areas of the Bering Sea. The nature of the future actions is such that they are unlikely to affect large Chinook salmon in the open marine areas of the Bering Seas where they reside. NMFS concludes that there are no future actions that would result in cumulative effects to UWR or LCR Chinook.

2.10. Conclusions

The purpose of this Supplemental Biological Opinion is to reinitiate consultation on the BSAI Groundfish FMP to consider the effect of the additional management provisions that would be implemented in 2011 through Amendment 91 to the BSAI FMP.

From the available record it is apparent that some take of UWR Chinook and the spring component of the LCR Chinook ESU does occur on occasion. Coded wire tags provide the longest and most consistent record of species composition in the fishery. One or more recoveries were observed in eight out of 25 years for UWR Chinook, and five out of 25 years for LCR Chinook. The CWT data was used to estimate the expected catch of ESA listed Chinook in the BSAI fishery. A maximum of 60,000 Chinook is expected to be caught in the pollock fishery, which results in an average expected catch of 1.1 listed LCR and 4.3 UWR Chinook. These estimates are based on expanded data before 2008, which is likely an overestimation. The effect on subsequent spawning would be a reduction of about 0.8 Lower Columbia River Chinook and 3.3 Upper Willamette River Chinook per year, compared to escapements that have averaged 21,000 and 46,000 fish in recent years. Under Amendment 91 the expected number of listed fish caught would generally be less than described above to the degree that the bycatch provisions are successful at keeping bycatch below the cap. There is some additional bycatch of Chinook in the non-pelagic trawl fishery. The bycatch of Chinook in the non-pelagic trawl fishery has averaged 5,679 accounting for 9% of the total bycatch in the BSAI fishery with a few additional tens of fish in the hook/line and pot fisheries. No ESA listed fish have been observed in the non-pelagic trawl fishery to date, although we assume that the probability of catching a listed fish is proportional to that in other sectors of the fishery.

Through this consultation, NMFS reviewed the current status of the ESUs, the environmental baseline for the action area, the cumulative effects, and the effects of the

proposed action with respect to both the survival and recovery of the listed species. The review included consideration of our understanding of the ocean distribution of UWR Chinook and LCR Chinook, the relative frequency and magnitude of observed take, and the relative abundance of hatchery and natural origin fish in the ESUs. Based on this review, NMFS concludes that the effects of the proposed action are not likely to jeopardize the continued existence of either UWR or LCR Chinook. Since the proposed action occurs outside of designated critical habitat, NMFS concludes that the proposed action will have no effect on designated critical habitat for UWR and LCR Chinook salmon.

3. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species by significantly disrupting normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Section 7(b)(4) and Section 7(o)(2) provide that taking that is incidental to an otherwise legal agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this incidental take statement.

3.1. Amount or Extent of Incidental Take Anticipated

Our ability to characterize the amount of incidental take in the BSAI fishery is complicated by changes in bycatch patterns in recent years. Chinook bycatch has fluctuated with levels increasing and reaching record highs in 2007 followed by very low levels in 2008 and 2009 (Table 10). Recoveries of CWTs from listed LCR and UWR Chinook ESUs that are indicative of take have been few and can be characterized as rare events based on 25 years of monitoring. Rare events by their nature are difficult to predict. Because of the related uncertainty, it is difficult to characterize future bycatch in terms of the total catch of Chinook as done in the past, or even CWT recoveries which would be more directly indicative of the effect on the listed ESUs. The use of CWTs as an indicator is further complicated by changes in the methods for assessing Chinook bycatch from the sampling protocol used in the past to the census that will be used in the future, and the potential errors that were recently discovered in the methods used for expanding observed CWTs to the estimated contribution (see discussion related to Table 10). Given these circumstances, NMFS concludes that take of listed Chinook in the Bering Sea pollock fishery is best characterized by the hard caps that will be implemented pursuant to the proposed action, and by the range of recent observations for the remaining BSAI groundfish fisheries. The incidental take statement therefore has two components, one for the Bering Sea pollock fishery and one for the remaining elements

of the BSAI groundfish fishery.

The BSAI fishery will operate under the terms of Amendment 84a of the BSAI groundfish FMP in 2010. The effect on ESA listed fish from Amendment 84a were considered in the previous Supplemental Biological Opinion (NMFS 2007a). The Incidental Take Statement in the 2007 Biological Opinion will therefore continue to defined the level of expect take in 2010.

Amendment 91 would implement hard caps on the BSAI pollock fishery beginning in 2011. The hard caps are summarized below and described in more detail under the proposed action and in related references. These caps and the associated performance standards are used as surrogates to define the level of expected take in the BSAI pollock fishery. Beginning in 2011, the Alaska Region will manage the BSAI pollock fishery to ensure these caps are not exceeded, and the performance standards are implemented.

Hard cap	**47,591 Chinook salmon**	The fleet-wide cap unless industry submits and NMFS approves an IPA agreement which provides explicit incentives for salmon avoidance.
	60,000 Chinook salmon	The fleet-wide cap if fishery participants form one or more IPAs that meet the criteria in regulations.
	28,496 Chinook salmon	Vessels not in an IPA would fish under a portion of this "opt-out" or backstop cap.
Performance Standard	If an IPA sector's annual bycatch exceeds its performance standard in any three years within seven consecutive years, NMFS would reduce that sector's Chinook salmon allocation to that sector's portion of 47,591 Chinook salmon for perpetuity.	

Since 2003 the bycatch of Chinook salmon in the other BSAI trawl groundfish fisheries has ranged 2,623 fish to 8,679 fish with a few tens of additional Chinook taken in the hook/line and pot fisheries. The bycatch in these fisheries has averaged 9% of the total bycatch of Chinook (Table 11). No CWTs from ESA listed fish have been recovered in these fisheries. The Incidental Take Statement in the 2007 Biological Opinion will continue to define the level of expected take in 2010 for all components of the BSAI fishery. Beginning in 2011 the level of expected take in components of the BSAI groundfish fishery other than the Bering Sea pollock fishery will be defined by the range of recent observation of Chinook bycatch with a maximum of 8,745 Chinook (the maximum observed in one year), and the absence of CWT recoveries of ESA listed fish.

3.2. Effect of the Take

In the accompanying biological opinion, NMFS determined that UWR Chinook and LCR Chinook are not likely to be jeopardized by the proposed action. There will also be no effect to designated critical habitat.

3.3. Reasonable and Prudent Measures

Reasonable and prudent measures are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). Terms and conditions implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

The following reasonable and prudent measures are provided to minimize and reduce the anticipated level of incidental take associated with Alaska groundfish fisheries:

Beginning in 2011 with implementation of Amendment 91 and each year thereafter the NMFS, Alaska Region, shall provide preseason notification of the sector specific allocations of Chinook salmon bycatch to the Bering Sea Pollock fishery.

The NMFS, Alaska Region shall determine annually whether each sector has met its multi-year performance standard and report those results.

The NMFS, Alaska Region shall monitor bycatch in the Bering Sea pollock fishery inseason to evaluate whether the bycatch of Chinook is likely to exceed the hard caps or other provisions regarding Chinook bycatch specified in Amendment 91, and take actions as required to insure compliance with all provisions of Amendment 91.

The NMFS, Alaska Region shall monitor bycatch reports inseason to evaluate whether the bycatch of Chinook is likely to exceed 8,745 fish in the BSAI groundfish fisheries other than the Bering Sea pollock fishery.

The NMFS, Alaska Region shall ensure there is sufficient NMFS-certified observer coverage such that the bycatch of Chinook salmon and "other" salmon in the BSAI groundfish fisheries can be monitored on an inseason basis. All CWTs recovered from salmonids collected in the fisheries will be analyzed and reported as described under Section 3.4.

The NMFS, Alaska Region and Alaska Fisheries Science Center shall monitor recoveries of CWTs from ESA listed salmonids to provide estimates of the total contribution of ESA listed Chinook salmon in the BSAI groundfish fishery. The estimates will distinguish between the contribution in the Bering Sea pollock fishery and the other components of the BSAI groundfish fishery.

3.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the specified agencies must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

Beginning in 2011 with implementation of Amendment 91 the NMFS, Alaska Region, shall post on their website the sector specific allocations of Chinook salmon bycatch to the Bering Sea Pollock fishery by January 19 of each fishing year. If an IPA is approved, the information posted will include the names of the IPAs, and the vessels participating in each IPA.

The NMFS, Alaska Region shall determine annually whether each sector has met its multi-year performance standard. If NMFS, Alaska Region determines that a sector has exceeded its portion of the multi-year performance standard, NMFS, Alaska Region will issue a notification in the Federal Register that the sector will be allocated a portion of the

47,591 Chinook salmon bycatch limit and reflect that reduced allocation in all future years.

The NMFS, Alaska Region shall monitor bycatch in the Bering Sea pollock fishery inseason, and take actions as required to insure compliance with all provisions of Amendment 91.

The NMFS, Alaska Region shall monitor bycatch reports inseason to evaluate whether the bycatch of Chinook is likely to exceed 8,745 fish in the BSAI groundfish fisheries other than the Bering Sea pollock fishery.

NMFS' Division of Sustainable Fisheries (Alaska Region) shall provide an annual report to the NMFS Division of Sustainable Fisheries (Northwest Region) that details the results of its monitoring of salmon bycatch in the BSAI. This report shall be submitted in writing within one month of the new fishing year (February 1), and will summarize all statistical information based on a January 1 through December 31 fishing year. This report will also include the latest available information on CWT recoveries of ESA-listed ESUs.

NMFS, Alaska Fisheries Science Center, Auke Bay Laboratories shall continue to monitor CWT recoveries for the BSAI groundfish fisheries, maintain a historical database of CWT recoveries on the high seas, and provide an updated summary of CWT recoveries from ESA-listed ESUs in the BSAI fisheries on an annual basis within ten months after the end of each fishing year.

3.5. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS believes the following conservation recommendations are consistent with these obligations, and therefore should be implemented by the NPFMC and NMFS:

The NMFS, Alaska Region should improve estimates of the region-of-origin and stock composition of the Chinook salmon bycatch by increasing CWT sampling rates as part of the mandatory salmon monitoring program, collecting and analyzing scale samples, or employing additional stock identification techniques applicable to the problem.

The NMFS, Alaska Region should use information collected during the observer monitoring program to identify times and areas of high salmon abundance that could be used to reduce salmon bycatch through regulatory action.

The NMFS, Alaska Region should continue development of other sources of information related to stock composition of the Chinook bycatch including use of use of genetic stock composition analysis procedures that could improve our understanding of the impacts to ESA listed fish and other stocks of concern.

The NMFS, Alaska Region should encourage development of incentive programs designed to reduce the bycatch of salmon in the NPFMC groundfish fisheries and cooperate with the fishing industry in identifying changes to fishing methods that improve their ability to achieve such reductions.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, NMFS, Northwest Region requests notification of the implementation of any conservation recommendations.

3.6. Reinitiation of Consultation

This concludes formal consultation on the proposed actions. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded, 2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this Opinion, 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) ("Data Quality Act") specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Biological Opinion addresses these Data Quality Act components, documents compliance with the Data Quality Act, and certifies that this Biological Opinion has undergone pre-dissemination review.

Utility: This ESA section 7 supplemental biological opinion considers new information related to the effect of the BSAI groundfish fisheries on ESA listed salmonids. In the supplemental opinion NMFS concludes that continued implementation of the BSAI fishery will either have no effect, is not likely to adversely effect, or is not likely to jeopardize any listed salmonid species. The intended users are the members of the NPFMC, and the various interested groups and communities they represent. Commercial fishing interests, associated businesses, fish buyers and related food service industries, and the general public benefit from the consultation.

Copies of the Biological Opinion will be provided to the chair of the NPFMC. This biological opinion will be posted on the NMFS NW Region web site (www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This biological opinion was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, "Security of Automated Information Resources," Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This opinion and supporting documents are clear, concise, complete, and unbiased, and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations (50 CFR 402.01 et seq.), and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) implementing regulations regarding Essential Fish Habitat (50 CFR 600.920(j)).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this Biological Opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data, and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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