



**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration**

*National Marine Fisheries Service*

*P.O. Box 21668*

*Juneau, Alaska 99802-1668*

June 2, 2006

MEMORANDUM FOR: Robert Lohn  
Administrator, Northwest Region

FROM: *for Sue Salverson*  
Robert D. Mecum  
Acting Administrator, Alaska Region

SUBJECT: Continuation of Endangered Species Act (ESA) Section 7  
Consultation on Incidental Catches of Pacific Salmon and  
Steelhead in the Bering Sea and Aleutian Islands (BSAI) and  
Gulf of Alaska (GOA) Groundfish Fisheries and Amendment  
84a

We are providing to you updated information regarding ESA-listed Pacific salmon and steelhead and the impacts of the BSAI and GOA groundfish fisheries, including proposed Amendment 84a. In October 2005, the North Pacific Fishery Management Council recommended changes to salmon bycatch management in the BSAI in Amendment 84a to the Fishery Management Plan (FMP) for groundfish of the BSAI. This amendment is expected to reduce salmon incidental catch in the pollock trawl fishery of the BSAI.

In a memorandum dated December 1, 2004, we requested reinitiation of consultation on ESA-listed salmon and the groundfish fisheries. Two biological opinions (BiOps) have been considered applicable to this consultation. The December 22, 1999 BiOp on the Take of Listed Salmon in the Groundfish Fisheries Conducted under the BSAI and GOA FMPs was developed by NMFS Northwest Region. A subsequent November 30, 2000 BiOp on the groundfish FMPs was developed by NMFS Alaska Region. Both BiOps contain similar analysis and have the same incidental take statement of 55,000 Chinook salmon for the BSAI groundfish fisheries. Though the conclusions of the two documents are the same, the 2000 BiOp incidental take statement has an additional reasonable and prudent measure (RPM) that is not in the 1999 BiOp. This additional RPM may conflict with the implementation of Amendment 84a, which is further explained in the attachment.

As requested in your memorandum dated July 27, 2005, we have attached updated information on the impacts of the groundfish fisheries on ESA-listed salmon and steelhead. The North Pacific Fishery Management Council supported an analysis of the coded-wire tag coast-wide database, and we have provided the analysis for your consideration. This analysis identifies those ESA-listed ESUs that have been taken in the Alaska groundfish fisheries and focuses the consultation on only those ESUs that may be impacted. We are also providing a review of the 2000 and 1999 BiOps to clarify the similarities and differences in the analysis section of the documents. The attachment includes potential impacts of Amendment 84a on ESA-listed salmon for consideration in



this consultation. Our goal is to update the consultation for all ESA-listed salmon and steelhead in light of the most recent information on the groundfish fisheries. As part of this update, we would like your concurrence on the following determination:

- The BSAI groundfish fisheries are **not likely to adversely affect** ESA-listed ESUs of chum salmon.
- The GOA groundfish fisheries have **no effect** on ESA-listed ESUs of chum salmon.
- The Alaska groundfish fisheries have **no effect** on ESA-listed ESUs of coho salmon, sockeye salmon, and steelhead.
- The BSAI and GOA groundfish fisheries are **not likely to adversely affect** ESA-listed Chinook salmon.

We also would like to work with you to review the BSAI and GOA incidental take statements (ITSs) for ESA-listed Chinook salmon. Considering the not likely to adversely affect determinations, the ITSs for the BSAI and GOA groundfish fisheries may not be necessary. If the take of ESA-listed Chinook salmon in the Alaska groundfish fisheries warrants an ITS, we would like to work with you to develop an ITS that is a more meaningful trigger for Section 7 consultation based on the take of ESA-listed Chinook salmon rather than overall salmon bycatch. We also would like to review the 2000 BiOp RPMs to ensure Amendment 84a can be implemented within any RPMs that may result from this consultation.

Attachments

**Assessment of ESA-listed Salmon and Steelhead Interactions with the Alaska  
Groundfish Fisheries**

**Prepared by NMFS Alaska Region, Sustainable Fisheries Division**

**May 2006**

**Description of Action**

NMFS manages the groundfish fisheries in the exclusive economic zone (EEZ) off Alaska under the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Areas (BSAI) and under the FMP for Groundfish of the Gulf of Alaska (GOA). The North Pacific Fishery Management Council (Council) prepared the FMPs, under the authority of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801, *et seq.* Regulations governing Alaskan fisheries and implementing the FMPs are at 50 CFR parts 600 and 679.

The proposed action is the implementation of the fishery regulations for the BSAI and GOA groundfish fisheries developed in accordance with the FMPs for fisheries in the EEZ off Alaska and the proposed implementation of Amendment 84a to the BSAI groundfish FMP. This amendment is further described below. The objective of this biological assessment is to determine whether fisheries conducted in conformance with these regulations are likely to adversely affect ESA-listed salmon and steelhead evolutionary significant units (ESUs) or adversely modify or destroy designated critical habitat for ESUs that may occur in Alaskan waters.

Groundfish Fisheries as Managed Under the FMPs: Two management areas apply to the groundfish fisheries, the BSAI and the GOA. Harvest specifications for each management areas are specified each year. These specifications include total allowable catch amounts (TACs) for targeted groundfish species. TACs are determined annually based on scientific reviews of biological status of groundfish stocks and appropriate application of fishery management principals. The TACs of individual species or groups may be set anywhere from an amount to support incidental catch only to the acceptable biological catch amount (ABC) for the species or species group.

The BSAI groundfish FMP and its management regime governs all stocks of finfish and marine invertebrates, except salmonids, shrimps, scallops, snails, king crab, Tanner crab, Dungeness crab, corals, surf clams, horsehair crab, lyre crab, Pacific halibut, and Pacific herring. The FMP separates the species into five categories: prohibited species (e.g., crab, halibut, herring, salmon), target species (e.g., pollock, cod), other species (e.g., sharks, skates, sculpins, and octopus), forage fish species (e.g., smelts, euphausiids), and nonspecified species (e.g., eelpouts, lampreys).

The GOA groundfish FMP and its management regime govern all stocks of finfish (including squid and octopus), except salmon, steelhead, halibut, herring, and tuna. The GOA groundfish FMP separates the species into four categories: prohibited species (e.g.,

crab, halibut, herring, salmon), target species (e.g., pollock, cod), other species (e.g., sharks, sculpins), and forage fish species (e.g., smelts, euphausiids).

A description of the scientific foundation used to set TACs and related groundfish fishing specifications is in section 2.5 of the Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (NMFS 2004a). In general, the stock assessment process results in the Stock Assessment and Fishery Evaluation (SAFE) reports. These SAFE reports are produced annually for each management area by the Council's BSAI and GOA Groundfish Plan Teams. The Guidelines for Fishery Management Practices (602 Guidelines) published by NMFS require that a SAFE report be prepared and reviewed annually for each FMP. The SAFE reports are summaries of the best available scientific information concerning the past, present, and projected condition of the stocks and fisheries under federal management. The FMPs for the groundfish fisheries require that drafts of the SAFE reports be produced in time for the Council meetings. The GOA and BSAI Groundfish Plan Teams compile the SAFE reports from chapters contributed by staff from the NMFS Alaska Fisheries Science Center and the Alaska Department of Fish and Game. The SAFE reports include an Ecosystems chapter that addresses salmon catch and incidental catch trends.

TAC specifications for target groundfish are based on ABCs, as modified by ecological, social and economic factors and, in some cases, to accommodate uncertainty in the stock assessment in accordance with Amendments 56 to the GOA and BSAI groundfish FMPs (adopted in 1999). The ABC specifications, in turn, are developed under a precautionary approach which provides a risk-adverse means of specifying ABCs and overfishing levels (OFLs) based on the best available scientific information. The ABC specifications are based on definitions that were developed to safeguard against overly aggressive harvest rates, particularly under conditions of high uncertainty or low stock size. The guidelines are robust enough to provide adequate protection to stocks even when recruitment is highly variable or when instances of low recruitment tend to occur in a series. The differences between ABC and OFL maintain an appropriate buffer between the fishing mortality rates associated with ABC and OFL.

The incidental catch of prohibited species such as salmon are managed in the groundfish fisheries by a variety of measures which may include prohibited species catch (PSC) limits and closure areas. Salmon incidental catch management is done by a combination of regulations and harvest specifications. Regulations at § 679.21(e)(1)(vii) specify a Chinook salmon PSC limit for the Bering Sea pollock fishery at 29,000 fish. Amendment 82 to the BSAI groundfish FMP established an Aleutian Islands Chinook salmon limit of 700 fish (70 FR 9856, March 1, 2005). Since 2001, the PSC limit for Chinook salmon bycatch in the Bering Sea has been reduced from 41,000 fish to 29,000 fish. When the 1999 and 2000 BiOps were developed for Chinook salmon, the PSC limit was 55,000 fish, and this value was considered appropriate for the incidental take statement for both consultations.

The PSC limit for salmon is allocated to different participant in the groundfish fisheries. Over the past several years, the Regulations at § 679.21(e)(1)(i) allocate 7.5 percent, or 2,175 Chinook salmon, as the Prohibited Species Quota (PSQ) for the Community Development Quota (CDQ) program and the remaining 26,825 Chinook salmon to the non-CDQ fisheries. Section 679.21(e)(1)(i) allocates 7.5 percent of the Aleutian Islands Chinook salmon PSC, or 53 Chinook salmon, to an Aleutian Islands PSQ for the CDQ program. The remaining 647 Chinook salmon are allocated to the non-CDQ fisheries. Section 679.21(e)(1)(viii) specifies a non-Chinook salmon PSC limit of 42,000 fish for the BSAI. Section 679.21(e)(1)(i) allocates 7.5 percent or 3,150 non-Chinook salmon as the PSQ for the CDQ program and the remaining 38,850 non-Chinook salmon to the non-CDQ fisheries.

Closure areas intended to control the incidental take of salmon in the groundfish fisheries are at § 679.21. These regulations include the chum and Chinook Salmon Savings Areas in the BSAI. These areas close to certain trawl fisheries at specific times when the limits described above are likely to be exceeded. A detailed description of these management measures is in section 3.2 of the enclosed environmental assessment (EA) for Amendment 84a. The Chinook Salmon Savings Area was triggered on February 15, 2006. This is the first time this area has closed during the A season fishery. Chinook salmon bycatch as of March 25, 2006 was 58,650. This is more than double the amount of Chinook salmon bycatch at this time in 2005. Chinook salmon bycatch is anticipated to increase again per a predictable pattern throughout the B season.

Since the 1999 BiOp, several FMP amendments have been implemented or proposed that may impact salmon incidental catch in the groundfish fisheries. These are summarized below. The analyses for each of these actions are available from the NMFS Alaska Region website at [www.fakr.noaa.gov](http://www.fakr.noaa.gov).

Amendment 58 to the BSAI groundfish FMP revised the Chinook Salmon Savings Areas management measures (65 FR 60587, October 12, 2000). Amendment 58 and its final rule implemented the following regulatory changes to trawl Chinook salmon PSC limitations: (1) The chinook salmon bycatch limit was reduced from 48,000 to 29,000 chinook salmon over a 4-year period; (2) year-round accounting of Chinook salmon bycatch was established for the pollock fishery, beginning on January 1 of each year; (3) the boundaries defining the Chinook Salmon Savings Areas were revised; and (4) new Chinook Salmon Savings Areas closure dates were established. This action was intended to reduce Chinook salmon bycatch.

Amendments 61/61: These amendments changed the management of the pollock fisheries in the BSAI as required by the American Fisheries Act (AFA) (67 FR 79692, December 30, 2002). This rule provided for the formation of pollock cooperatives in the Bering Sea. This change in the management of the fishing for pollock was not expected to increase salmon bycatch (NMFS 2002, section 4.3.11). The cooperatives provide a means of controlling salmon bycatch in the pollock fisheries as further explained below under the Amendment 84 discussion. Considering most of the salmon incidental take is from the

pollock fishery, this action can have a substantial influence on the management of salmon incidental catch for the groundfish fisheries.

Steller sea lion protection measures: This rule for the Alaska groundfish fisheries was implemented in 2003 (68 FR 204, January 3, 2003). The analysis of the impacts of these protection measures on ESA-listed salmon determined that any effects would be below the level at which ESA consultation should be reinitiated (NMFS 2001). The level of Chinook salmon bycatch in the BSAI was expected to decrease by 9 % and increase in the GOA by 6% (Section 4.6.4 of NMFS 2001). Chinook salmon bycatch levels resulting from the protection measures were not expected to exceed the incidental take statements in the 1999 or 2000 BiOps.

Amendments 81/74: In 2004, Amendments 81 and 74 were added to the BSAI and GOA groundfish FMPs, respectively (69 FR 31091, June 2, 2004). These amendments revised the goals and objectives of the FMPs to implement a new management policy for the groundfish fisheries. The new management policy includes consideration of community-based or rights-based management and ecosystem-based management principles that protect managed species from overfishing, and where appropriate and practicable, increase habitat protection and bycatch constraints. All management measures are based on the best scientific information available. The fishery management goals are: (1) sound conservation of the living marine resources, (2) socially and economically viable fisheries and fishing communities, (3) minimal human-caused threats to protected species, (4) healthy marine resource habitat, and (5) ecosystem-based considerations in management decisions. To meet these goals and to focus the Council's consideration of potential management measures, Amendments 81 and 74 identify 45 objectives that are grouped under the following nine subjects: prevent overfishing; promote sustainable fisheries and communities; preserve the food web; manage incidental catch and reduce bycatch and waste; avoid impacts to seabirds and marine mammals; reduce and avoid impacts to habitat; promote equitable and efficient use of fishery resources; increase Alaska native consultation; and improve data quality, monitoring, and enforcement. The new management policy is applied to ongoing and future groundfish fisheries management. The new management policy also includes adaptive management with regular and periodic reviews, including annual review of the objectives. This ecosystem approach to management will ensure salmon incidental catch is considered in changes to fisheries management, resulting in reduced salmon incidental take over time.

Amendment 82: Effective in 2005, this amendment to the BSAI groundfish FMP established a pollock allocation to the Aleut Corporation in the Aleutian Islands subarea for purposes of economic development in Adak, Alaska. As part of the action, the amendment included Chinook salmon bycatch measures to separately manage Chinook salmon bycatch in the Bering Sea and Aleutian Islands. Chinook salmon bycatch in the Aleutian Islands pollock fishery does not count against the Bering Sea Chinook salmon bycatch cap of 29,000 fish. The AI Chinook salmon bycatch cap of 700 fish applies to the AI Chinook salmon savings area closure only. If the 29,000 Bering Sea cap is met,

Chinook Salmon Savings Areas located in the Bering Sea and Aleutian Islands would be closed.

Amendment 84: In October 2005, the Council took final action on Amendment 84a to the BSAI groundfish FMP. This proposed action is intended to reduce salmon incidental take in the pollock trawl fisheries. If approved, Amendment 84a would provide exemptions from the salmon savings closure areas to certain trawl vessels participating in a cooperative with voluntary rolling hot spot (VRHS) management of incidental catch of salmon. Vessels in this program would move fishing effort into areas with less salmon incidental take as tracked by the cooperatives in near real time. The vessel cooperatives must participate in the VRHS system in order to be exempt from the closure, while cooperatives not participating will be subject to the savings area closures, if triggered (and to the annual chum closure). The Chum Salmon Savings Area closure would be applied to just the pollock fishery, similar to the Chinook Salmon Savings Areas closure, such that vessels targeting Pacific cod and flatfish will not be subject to the closures.

Regulations promulgated from this action are anticipated to go into effect by early 2007. The Council continues to develop a subsequent FMP amendment (Amendment 84b) which could impose additional management tools to reduce salmon incidental catch if Amendment 84a proves ineffective at reducing salmon bycatch. These include altering the Chinook and chum salmon savings areas based on current incidental catch rates, and allocating individual bycatch quotas. The Council reiterated their intention to move forward with Amendment 84b as a priority with the timeline for the analysis allowing for the inclusion of new information as it becomes available on the genetics of stock origin for incidentally caught salmon species. An update to the Council of the 2006 B season salmon bycatch as well as a more detailed review of the alternatives for Amendment 84b will be provided in October 2006.

Amendments 73/65, 78/65, and 7/8 Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPCs). These amendments to the groundfish and salmon FMPs were approved by the Secretary on May 3, 2006. The amendments identify EFH and HAPCs and provide conservation measures to minimize the potential adverse effects of fishing on certain EFH and HAPC sites within the GOA and Aleutian Islands. EFH for salmon is described in the salmon FMP. The environmental effects are described in the EIS for EFH Identification and Conservation and in the Environmental Assessment for HAPC (NMFS 2005 and NPFMC 2005). These amendments and analyses are available from the NMFS AK Region website at [www.fakr.noaa.gov](http://www.fakr.noaa.gov). The method of fishing that is most likely to take salmon in the Bering Sea (pollock pelagic trawl) is not affected by these amendments.

These amendments are not expected to have a major impact on the incidental take of salmon in the groundfish fisheries in either the GOA or the BSAI. The conservation measures for EFH in the Aleutian Island would displace bottom trawl fisheries from closed areas and increase fishing effort slightly in the remaining open areas. Although the

effort would likely be similar to the status quo, any concentration of fishing effort could increase bycatch of salmon in the region. ESA-listed species of salmon and steelhead would be comingled with non-ESA listed stocks and would be susceptible to take in these fisheries. Under the salmon PSC limits in the Aleutian Islands, salmon must be discarded when taken in groundfish fisheries, and the Salmon Savings Area in the Aleutians would close if the limit is reached; thus, there is an incentive to avoid fishing in areas of high rates of salmon bycatch. Under the EFH management areas, the groundfish fisheries in the Aleutian Islands likely would continue to be prosecuted in a manner that would minimize salmon bycatch, which would continue to minimize the chance of incidental take of an ESA-listed species. Furthermore, coded-wire tagged (CWT) fish data indicate that very few ESA-listed salmonids are taken in BSAI as detailed later. Displaced bottom trawl fishing under the EFH management measures would not measurably affect the prey field for ESA-listed salmonids. The final rule to implement the EFH and HAPC measures is scheduled for publication by August 13, 2006.

### **Description of Area Affected by the Action:**

#### *Bering Sea/Aleutian Islands Groundfish*

The action area for the federally managed BSAI groundfish fisheries effectively covers all of the Eastern Bering Sea under U.S. jurisdiction, extending southward to include the waters south of the Aleutian Islands west of long. 170° W, to the border of the U.S. EEZ. The northern boundary of the EBS is the Bering Strait, defined as a straight line from Cape Prince of Whales to Cape Dezhneva. The BSAI area is further divided into 2 sub-areas (eastern Bering Sea and Aleutian Islands) and 19 reporting areas. See enclosed Figure 1 to 50 CFR part 679.

#### *Gulf of Alaska Groundfish*

The GOA Groundfish FMP and its management regime apply to the U.S. EEZ of the North Pacific Ocean, exclusive of the EBS, between the eastern Aleutian Islands at long. 170° W and Dixon Entrance at long. 132°40' W, and includes the Western, Central, and Eastern regulatory areas. See enclosed Figure 3 to 50 CFR part 679.

### **Description of Listed Species**

The ESA-listed ESUs of salmon and steelhead managed by NMFS NW Region and that may occur in Alaska waters are listed in the enclosed table titled “Endangered Species Act Status of West Coast Salmon and Steelhead.” The latest, detailed status information for each ESU is in the Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead (Good, et al. 2005). The Biological Review Team reviewed the latest information available on each ESU and determined whether the ESU is in danger of extinction, likely to become extinct, or not likely to become endangered. As explained below, the only ESUs that are documented to be taken in the groundfish fisheries are the Upper Willamette River Chinook salmon, Lower Columbia River Chinook salmon, Hood Canal Summer-run chum salmon, and the Upper Columbia River spring Chinook salmon. The Upper Willamette River Chinook salmon, Lower Columbia River Chinook salmon



and Hood Canal summer-run chum salmon ESUs are listed as threatened. These ESUs are determined to be likely to become endangered in Good et al. 2005. The Upper Columbia River spring run Chinook salmon is listed as endangered. Additional recent status information for ESA-listed Chinook salmon taken in the Pacific groundfish fisheries is also in the supplemental BiOp for reinitiation of consultation on these stocks (NMFS 2006a).

Designated critical habitat for ESA-listed salmon and steelhead does not occur in the action area and will not be impacted by the proposed action.

### **Impacts of Groundfish Fisheries Including Cumulative Effects on Salmon and Steelhead ESUs**

#### *Incidental Take of Salmon and Steelhead in the AK Groundfish Fisheries*

Data from the observed fisheries provide an indication of the relative amounts and species of salmon incidentally taken in the AK groundfish fisheries. Most of the salmon taken are chum salmon followed by Chinook salmon in the BSAI. Chinook salmon are the dominate species taken in the GOA followed by chum salmon. Very small amounts of sockeye salmon, coho salmon, pink salmon and steelhead are taken in either the BSAI or the GOA groundfish fisheries. Table 1 provided the observed incidental catch of salmon and steelhead species in the Alaska groundfish fisheries between 2001 and 2005.

**Table 1 Incidental Take of Salmon Species in the Observed AK Groundfish Fisheries 2001-2005**

		Species						
area	year	Chinook	Sockeye	Coho	Pink	Chum	Steelhead	Grand Total
BSAI	2001	32785	12	173	9	51001		83980
	2002	32249	2	80	43	66244		98618
	2003	45241	29	24	72	138772		184138
	2004	47502	13	139	107	352783		400544
	2005	54422	12	38	134	497439		552045
BSAI Total		212199	68	454	365	1106239		1319325
GOA	2001	4034	46	174		1147		5401
	2002	3742		65	2	1524		5333
	2003	5182	2	110	38	2856	1	8189
	2004	4635		42	57	866		5600
	2005	7802		96	51	2800		10749
GOA Total		25395	48	487	148	9193	1	35272
Grand Total		237594	116	941	513	1115432	1	1354597

Source: NMFS AK Region Inseason Management, observer data, 12/6/05

*GOA and BSAI Groundfish Fisheries Incidental Catch of Chinook Salmon and the Incidental Take Statement*

Table 2 below shows the incidental take of Chinook salmon in the GOA trawl fisheries for the past 5 years.

Table 2 GOA Trawl Fisheries Incidental Take of Chinook Salmon

Year	Number of Chinook Taken
2005	31,896
2004	18,072
2003	15,652
2002	12,900
2001	15,104
total	93,624

Source: NMFS inseason data at [www.fakr.noaa.gov](http://www.fakr.noaa.gov)

The remainder of the discussion in this section is limited to the BSAI because the incidental take statement (ITS) for Chinook salmon in the GOA (40,000 fish) has not been exceeded and Amendment 84 is limited to the BSAI. The ITS for Chinook salmon in the BSAI groundfish fisheries (55,000 fish) has been exceeded in 2004, 2005, and 2006, and needs further examination.

Except in recent years, the BSAI Chinook salmon incidental catch amounts have been below the amount in the incidental take statement. Table 3 below provides Chinook salmon incidental catch amounts by gear for the years 1999-2005 in the BSAI for the groundfish fisheries.

**Table 3 BSAI Groundfish Fisheries Chinook Salmon Incidental Catch Amounts 1999-2006**

Year	Gear Type	Groundfish (mt)	Chinook salmon (#'s)
2006*	Trawl	563,913	60,737
	Hook and Line	5,264	5
	Pot Gear	14,071	0
	Jig	0	0
	TOTAL	583,248	60,742
2005	Trawl	1,814,263	74,772
	Hook and Line	127,159	33
	Pot Gear	18,817	0
	Jig	123	0
	TOTAL	1,960,842	74,805
2004	Trawl	1,818,690	60,090
	Hook and Line	143,162	56
	Pot Gear	18,867	0
	Jig	232	0
	TOTAL	1,980,950	60,146
2003	Trawl	1,807,391	54,898

Year	Gear Type	Groundfish (mt)	Chinook salmon (#'s)
2002	Hook and Line	138,441	13
	Pot Gear	23,594	0
	Jig	156	0
	TOTAL	1,969,582	54,911
	Trawl	1,787,189	36,360
2001	Hook and Line	131,365	25
	Pot Gear	16,398	0
	Jig	0	0
	TOTAL	1,934,952	36,385
	Trawl	1,658,935	40,531
2000	Hook and Line	137,128	17
	Pot Gear	17,858	0
	Jig	0	0
	TOTAL	1,813,921	40,548
	Trawl	1,461,212	8,219
1999	Hook and Line	126,200	4
	Pot Gear	20,136	0
	Jig	0	0
	TOTAL	1,607,548	8,223
	Trawl	1,295,548	14,583
	Hook and Line	112,107	7
	Pot Gear	17,096	9
	Jig	0	0
	TOTAL	1,424,751	14,599

\*Data through May 6, 2006. Numbers were generated using blend reports, CDQ catch reports, and queries on the catch accounting data bases. Estimates prepared by NMFS, Sustainable Fisheries, Alaska Region, 5-15-06.

By May 6, 2006, the BSAI groundfish fisheries exceeded the ITS amount as established by the 1999 and 2000 BiOps by 5,742 salmon. The ITS also was exceeded in 2004 and 2005. On August 4, 2005, NMFS closed the Chinook Salmon Savings Areas from September 1 through December 31, 2005, to pollock trawling based on 29,000 Chinook salmon limit being approached. In 2006, the Chinook Salmon Savings Areas also were closed February 15 through April 15 and September 1 through December 31 to non CDQ pollock trawl. These closures are intended to prevent the 29,000 fish limit from being exceeded.

In section 4.1.2.3 of the enclosed environmental assessment for Amendment 84a, the temporal and spatial distribution of Chinook salmon incidental catch in the pollock cooperative and CDQ fisheries is analyzed. In 2004, the Chinook salmon incidental catch rates for the pollock cooperative fleet were higher outside of the Chinook salmon savings area in the Bering Sea than experienced by CDQ vessels fishing for pollock inside the Chinook salmon savings area. Because the current management measures are not effective at meeting the goal to reduce salmon bycatch, the Council has proposed Amendment 84 to the BSAI groundfish FMP.

Abundance of Chinook salmon in Alaskan waters was discussed in section 3.6 of the EA for Amendment 84a. Juvenile Chinook salmon abundance was described as “much higher.” Western Alaska Chinook salmon stocks are mostly declining except for Bristol

Bay, which experienced a large increase (section 3.4 of the EA). Information on abundance does not provide an explanation for the high quantity of Chinook salmon incidental catch in the BSAI pollock trawl fisheries.

*ESA-Listed Salmon and Steelhead ESUs Occurrence in Alaska and Potential Incidental Take in the AK Groundfish Fisheries*

To determine the potential impact of the AK groundfish fisheries on ESA-listed salmon and steelhead, each ESU was reviewed for occurrence in Alaskan waters and evidence of take in the groundfish fisheries. Two types of tagging studies have been conducted for salmon species from the Pacific Northwest which may give an indication of the potential for occurrence of Pacific NW salmonids in Alaska waters, high seas tags and coded-wire tags (CWTs). The CWT recoveries of ESUs were used to identify ESA-listed ESU that may occur in Alaskan waters and have been recovered in groundfish fisheries. All ESA-listed ESUs have hatcheries that participate in the CWT program. The CWT fish are a surrogate for the wild fish in the ESUs. CWT fish are tagged at the hatchery and released to migrate to the ocean. Hatchery programs in the Pacific Northwest use CWTs to track returns of hatchery fish, and the hatchery fish for each ESU are included in the ESA-listed ESU. High seas tag recoveries are discussed under Additional Relevant Information below.

*Determination of ESA-listed ESU CWT Release Groups*

The Council contracted with Cramer Fish Sciences (CFS) to compile a database of CWT release groups of ESA-listed west coast salmonids. This database was based on CWT records in the Pacific States Marine Fisheries Commission/Regional Mark Information Systems (PSMFC/RMIS) database as of February 4, 2006. The PSMFC/RMIS CWT database is dynamic, with frequent revisions made to existing records. Several criteria were used to determine whether a release group qualified as listed under ESA (Ackerman 2006).

First, the release group had to originate within the geographic boundaries of an ESU listed under ESA, as defined on the NMFS Northwest Region website (<http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm>). A few release groups were of mixed origin (natural and hatchery fish) tagged and released from the mainstem Columbia River, where the basin of origin could not be ascertained because these release groups represented a mix of upriver fish. Because it was uncertain whether these groups originated from within an ESA-listed ESU, no recoveries of CWTs from this group (there was only one) were included in the results.

Second, for hatchery-reared fish, the release group had to be from an artificial propagation program designated as part of the ESU by NMFS, as determined by 50 CFR Parts 223 and 224, Endangered and Threatened Species: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids; Proposed Rule (<http://www.nwr.noaa.gov/Publications/FR-Notices/2005/upload/70FR37160.pdf>), NMFS reports on artificial propagation programs

in ESA-listed ESUs (SSHAG 2003, NMFS 2004b, NMFS 2006b), Hatchery Genetic Management Plans (HGMPs) published by state resource agencies, and the Northwest Region of NMFS (pers. comm., Scott Rumsey, 2/6/2006). Artificial propagation programs are considered to be part of the ESU, as long as these artificially-propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU (NMFS 2006b). Releases associated with terminated hatchery programs were not considered to be listed (pers. comm., Scott Rumsey, 2/6/2006). Additionally, if a group was released in a basin other than those to which the program released into at the time the program was determined to be within the ESU, the group was not considered listed (pers. comm., Scott Rumsey, 2/6/2006).

Third, the release group must not have returned to spawn prior to listing of the ESU under ESA. The listing date of each ESU was determined based on information provided on the NMFS Northwest Region website (<http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm>). For fish released within an ESA-listed ESU, we determined if the release group returned to spawn prior to listing based on whether the brood year of the release group was greater than  $x$  years prior to the year the ESU was listed, where  $x$  represented the typical maximum lifespan of each species in the northwest United States and was different for each species (Table 4).

Table 4. Age values used to determine whether a CWT release group returned prior to listing of an ESU under the ESA. Values based on Groot and Margolis (1991) and Chilcote (2001).

<b>Species</b>	<b>Typical Maximum Age of Return (x)</b>
Chinook	6
Coho	3
Steelhead	6
Sockeye	5
Chum	4

Results are presented in two categories: pre-listing and post-listing. Post-listing refers to those release groups that satisfied all three conditions above and were thus considered as officially listed under the ESA. Pre-listing refers to those release groups that satisfied condition one and two, but not three. Although CWT recoveries in the pre-listing category are not considered officially listed under the ESA, these results were included to show occurrence and catch pattern trends of various ESUs both before and after official listing.

*Recovery Estimation Technique*

The actual numbers of CWTs recovered in the GOA and BSAI provide only a partial accounting of the impacts of these fisheries on ESA-listed ESUs for two reasons:

- 1) Only a subsample of the total salmon bycatch is examined for CWTs by observers,
- 2) Only a fraction of a CWT release group may actually contain CWTs.

Total estimated contribution provides a more complete measure of the total harvest impacts on ESA-listed ESUs. Total estimated contributions of ESA-listed salmon ESUs caught in the GOA and BSAI groundfish fisheries for each year were estimated in a two-step process (Johnson 2004). The first step was to calculate a sampling expansion factor ( $a$ ) for each fishery in each year:

$$a = (\text{total catch of each species by fishery by year}) / (\text{sampled catch of each species by fishery by year}).$$

The estimated total recoveries of tags for each release group from each ESU by fishery and year were calculated:

$$R_{Ti} = aR_{Oi};$$

$R_{Ti}$  = estimated total recoveries of tags for the  $i^{\text{th}}$  release group;

$R_{Oi}$  = observed number of tags for the  $i^{\text{th}}$  release group;

$a$  = sampling expansion factor for each fishery in each year.

The second step was to account for the fraction of each release group of interest that was tagged:

$$C_T = \sum_{i=1}^n b_i R_{Ti};$$

$C_T$  = the total estimated contribution for a given ESU;

$b_i$  = a marking expansion factor for the  $i^{\text{th}}$  release group = (total fish released) / (total fish marked) for the  $i^{\text{th}}$  release group;

$R_{Ti}$  = estimated total recoveries of tags for the  $i^{\text{th}}$  release group.

These are the simplest forms of recovery expansion equations (Johnson 2004).

#### *Occurrence of ESA-listed salmon and steelhead in GOA and BSAI trawl fisheries*

Of the ESA-listed ESUs, the Upper Willamette River (UWR) Chinook salmon ESU was the most abundant in both GOA and BSAI trawl fisheries, followed by the Lower Columbia River (LCR) Chinook salmon ESU (Table 5). Summed over all years (1984-2005), bycatch of these ESUs (both pre-listing and post-listing) was at least an order of magnitude higher in the GOA than the BSAI. In the GOA, UWR Chinook salmon have been about 4-5 times more abundant than LCR Chinook salmon both pre-listing and post-listing. The UWR ESU occurred in the GOA and the BSAI both pre-listing and post-

listing. The LCR ESU occurred in the GOA and BSAI post-listing, but only in the GOA pre-listing. One Upper Columbia River (UCR) Spring Chinook salmon was also recovered in the GOA post-listing, and one Hood Canal summer-run chum salmon was recovered in the BSAI pre-listing. None of the other ESA-listed salmon ESUs have ever been captured in either the GOA or BSAI fisheries, 1984-2005.

When examined by year, UWR Chinook salmon have occurred more frequently and in consistently higher numbers in the GOA and BSAI trawl fisheries than any other ESA-listed ESU (Table 6). UWR Chinook salmon have occurred in the GOA every year since 1990. UWR Chinook salmon have been captured less frequently and in lower numbers in the BSAI than in the GOA. LCR Chinook salmon have been captured less frequently in both the GOA and the BSAI than the UWR Chinook salmon. In the GOA, LCR Chinook were recovered in 12 out of 22 years total, whereas in the BSAI, LCR Chinook have only been recovered in three recent years, 2001-2003. The only other evidence of ESA-listed ESUs in the GOA and BSAI fisheries was the capture of one UCR Spring Chinook salmon in 1998 and one Hood Canal summer-run chum salmon in 1984 (pre-listing).

The number of CWT recoveries of ESA-listed ESUs in the GOA and BSAI trawl fisheries is only a small fraction (< 0.2%) of the total number of CWT recoveries of these ESUs from all fisheries and research programs coastwide (fresh water and salt water) to which the fish are exposed, summed over all years post-listing (Table 7). For the UWR ESU, 0.139% of the total coastwide CWT recoveries of these fish have occurred in the GOA, and only 0.016% have occurred in the BSAI. For the LCR ESU, 0.023% of the total coastwide CWT recoveries of these fish have occurred in the GOA and 0.010% have occurred in the BSAI. The one recovery of a UCR Spring Chinook comprises 0.011% of the total coastwide CWT recoveries of this ESU.

#### *Occurrence of ESA-listed salmon and steelhead in GOA and BSAI research*

Very few CWTs of ESA-listed salmon ESUs have been recovered in GOA research cruises, and none have been recovered in BSAI research (Table 8). As with the GOA and BSAI trawl fisheries, UWR Chinook salmon were the most abundant ESU in GOA research, with smaller numbers of LCR Chinook salmon and UCR Spring Chinook salmon also recovered. GOA research has also found evidence of the occurrence of the Snake River Spring/Summer Chinook salmon ESU, Snake River Basin steelhead ESU, and Lower Columbia River coho salmon ESU in the GOA, albeit in small numbers.

When examined by year, the occurrence of ESA-listed ESUs in GOA research has been sporadic with no evidence of occurrence in most years (Table 9).

The number of CWT recoveries of ESA-listed ESUs in GOA research is only a small fraction (< 0.05%) of the total number of CWT recoveries of these ESUs from all fisheries and research programs coastwide (fresh water and salt water) to which these fish are exposed, summed over all years post-listing (Table 10).

## Conclusions

No CWTs have ever been recovered in the GOA or BSAI fisheries or research programs for the Snake River sockeye salmon ESU, the Ozette Lake sockeye salmon ESU, the Sacramento River Winter Chinook salmon ESU, the Central Valley Spring Chinook salmon ESU, the California Coastal Chinook salmon ESU, the Puget Sound Chinook salmon ESU, the Snake River Fall Chinook salmon ESU, the Central California Coast coho salmon ESU, the Southern Oregon/Northern California Coast coho salmon ESU, or the Columbia River chum salmon ESU. Therefore, the BSAI and GOA fisheries have no effect on these ESUs.

Very low numbers of CWTs have been recovered in GOA research for the Lower Columbia River coho salmon ESU (pre-listing only) and the Snake River Basin steelhead ESU. No CWTs have ever been recovered in the GOA or BSAI fisheries for these ESUs. Because the recovery of a CWT fish in the research cruise but not in the fisheries indicates only the potential for occurrence in Alaska waters, any potential for take in the GOA and BSAI fisheries is extremely unlikely and therefore discountable. The BSAI and GOA fisheries are not likely to adversely affect these ESUs.

Only one Hood Canal Summer chum salmon CWT has been recovered in the BSAI fishery in 1984 (pre-listing). Because there has been only one occurrence of a CWT recovery of this ESU in the BSAI and GOA fisheries, the take of this ESU is extremely unlikely to occur, and the effects are discountable. Therefore, the BSAI and GOA fisheries are not likely to adversely affect this ESU.

For the Upper Columbia River (UCR) Spring Chinook salmon ESU, only one CWT has been recovered in the GOA fishery, with none in the BSAI fishery and four CWTs in GOA research. This total of five CWT recoveries for the UCR ESU comprises less than 0.06% of the total number of CWT recoveries of these ESUs from all fisheries and research programs coastwide to which the fish are exposed. Because only one CWT recovery of this ESU in the GOA fisheries has occurred and none in the BSAI, the take of this ESU is extremely unlikely to occur, and the effects are discountable. Therefore, the BSAI and GOA fisheries are not likely to adversely affect this ESU.

For the Lower Columbia River (LCR) Chinook salmon ESU, the total estimated contribution (post-listing only) in the fisheries summed over all years equals 128.2 fish in the GOA and 10.3 fish in the BSAI. LCR Chinook salmon have been recovered in only about half the years in the GOA and in only three years in the BSAI. Of the total number of CWT recoveries of the LCR ESU in all fisheries and research programs coastwide, recoveries in the GOA fishery comprise 0.023% of the total, and recoveries in the BSAI fishery comprise 0.010% of the total. The percentage of recoveries in the BSAI and GOA are so low that the effects on the ESU are likely insignificant and not possible to evaluate. Because the insignificant effects cannot be evaluated, the effects are discountable. Therefore, the BSAI and GOA fisheries are not likely to adversely affect the LCR Chinook salmon ESU.



For the Upper Willamette River (UWR) Chinook salmon ESU, the total estimated contribution (post-tagging only) in the fisheries summed over all years equals 641.3 fish in the GOA and 53.3 fish in the BSAI. UWR Chinook salmon have occurred every year since 1990 in the GOA but only in five out of nine years post-listing in the BSAI. Of the total number of CWT recoveries of the UWR ESU in all fisheries and research programs coastwide, recoveries in the GOA fishery comprise 0.139% of the total, and recoveries in the BSAI fishery comprise 0.016% of the total. The percentage of recoveries in the BSAI and GOA are so low that the effects on the ESU are likely insignificant and not possible to evaluate. Because the insignificant effects cannot be evaluated, the effects are discountable. Therefore, the BSAI and GOA fisheries are not likely to adversely affect the UWR Chinook salmon ESU.

Impacts of Amendment 84a: Future salmon incidental take in the BSAI groundfish fisheries is expected to decrease with the proposed Amendment 84a. The environmental analysis for Amendment 84a is enclosed. Alternative 3 with option 2 and its suboption are the preferred alternative implemented by Amendment 84a. Section 3.10.1 describes the interaction of the pollock fisheries with ESA-listed salmon. Section 4.3.6 describes the impact of the preferred alternative on ESA-listed salmon. No significant impacts on the human environment have been identified for this proposed action. The action is expected to be beneficial to ESA-listed salmon species by reducing the take of salmon by the pollock trawl fisheries. Because this action overall is intended to reduce salmon bycatch, a beneficial impact is expected from this action. Therefore, Amendment 84a is not likely to adversely affect ESA-listed ESUs of salmon and steelhead.

#### *Present and Future Federal Actions*

Future Incidental Take: We are unable to predict with precision the future level of incidental take of salmon in the trawl fisheries because of fluctuations in the salmon populations and distribution and proposed changes in bycatch management (Amendment 84a).

Catch Accounting: Starting in 2003, NMFS implemented a new catch accounting system for the groundfish fisheries. The new system replaced the Blend system that had been used for quota accounting for about 10 years. The Blend system which was in place at the time of the 1999 BiOp was based on weekly data from processors and was not capable of accounting for some management programs implemented in recent years - including pollock cooperatives, American Fisheries Act sideboards, complex seasonal allocations, Harvest Limit Area quotas, and quotas assigned to vessels of a particular size class. The new groundfish catch accounting system utilizes the same data sources as the Blend - observer data, shoreside processor landings data, and processor weekly production report data, but where the Blend aggregated all data to the level of processor and week, the new system accounts for data at the haul (observer) and delivery (shoreside landings) level and

can track all the current quotas, including the salmon incidental catch. The new system is also more adaptable for anticipated future changes.

Salmon Excluder Device for Trawl Gear: The pollock trawl industry experiences the majority of the salmon incidental catch in the groundfish fisheries. Working with the fishing industry to reduce the amount of salmon incidentally taken, NMFS has issued an exempted fishing permit in 2003, 2004, and 2005 to support the development of a salmon excluder device for pollock trawl gear. The device was developed in 2003 and has been tested in 2004 and 2005 with some success. The device is based on the difference in behavioral responses of salmon and pollock in a trawl. In the latest trials, the device achieved less than 1 percent pollock escapement while allowing 35 percent escapement for salmon. Additional testing is needed to enhance salmon escapement during vessel slowdown on catcher vessels and catcher processors. The permit holder has requested an extension of the EFP to continue refinements of the device in August 2006. The pollock trawl industry is very interested in lowering its incidental catch of salmon, especially Chinook salmon, to avoid the closure of the Chinook Salmon Savings Area in the Bering Sea which is an important pollock fishing location.

Genetic Studies of Salmon Taken in Groundfish Fisheries: The North Pacific Groundfish Observer Program is working with the NMFS Auke Bay Lab to determine the origin of salmon taken in the BSAI groundfish trawl fisheries. In 2005 and 2006, each observer will be preserving tissue samples from 30 chum salmon and 30 Chinook salmon for genetic stock analysis. Approximately 3600 Chinook salmon tissue samples will be taken in the 2005 B season and the 2006 A season. DNA analysis is being conducted on the samples in 2006t. Results on chum and Chinook salmon are expected later in 2006. The baselines for both chum and Chinook salmon must first be established, and the level of detail initially will be only to the region of origin, i.e. Japan, Russia, western Alaska, Fall Yukon and Kuskokwim, Ak Peninsula, etc (pers. comm., Richard Wilmot, Auke Bay Lab, May 30, 2006). The Chinook salmon baseline work is done cooperatively by state, federal and university participants in the program. Eventually, the results should allow the origin of the salmon to be identified to the home stream. This information will provide a better understanding of the mixing of stocks in the BSAI.

CWT Database: NMFS will work with the Council to develop annual updates of the CWT database to build on the work done for this assessment. New data should be available each February that could then be analyzed and provide recent estimates of takes of ESA-listed ESUs in the Alaska groundfish fisheries and in GOA research cruises.

### *Cumulative Effects*

The most recent discussion of cumulative effects future actions is in section 4.4 of the environmental assessment for Amendment 84. This analysis covered federal, state, private, tribal, and local actions and applied to impacts on the human environment, including salmon. No additional non-federal future actions were identified that may cumulatively impact ESA-listed salmon.

Section 7 of the 2000 BiOp also contains a section on cumulative impacts on ESA-listed species (NMFS 2000). The future state, local, private, and tribal actions considered included Alaskan commercial, sport, and subsistence fisheries, oil and gas leasing, and the state population. No additional cumulative effects were identified from these future actions, and we are not aware of any additional actions that would require additional consideration. It is not likely that the State managed salmon fisheries would result on effects on ESUs of salmon that range into Alaskan waters. These fisheries are primarily conducted in State waters, outside of the action area. The only State managed commercial salmon fishery that is conducted in the EEZ is the Southeast Chinook salmon winter troll fishery. Based on a limit of 45,000 Chinook salmon, this fishery opened on October 11, 2005 and remained open until April 21, 2006. It is possible that Pacific Northwest ESUs of salmon may be taken in this fishery. The 1999 biological opinion on the Pacific Salmon Treaty has determined that the AK salmon fishery is not likely to jeopardize the continued existence nor adversely modify or destroy critical habitat for ESA-listed ESUs of salmon.

### **The 1999 and 2000 BiOps and Incidental Take Statements**

In 1999, NMFS/NWR concluded an ESA section 7 consultation on the effects of the BSAI and GOA groundfish fisheries on the following listed ESUs: Snake River fall Chinook, Snake River spring/summer Chinook, Puget Sound Chinook, Upper Columbia River spring Chinook, Upper Willamette River Chinook, Lower Columbia River Chinook, Upper Columbia river steelhead, Upper Willamette River steelhead, Middle Columbia River steelhead, Lower Columbia River steelhead, and Snake River Basin steelhead. (NMFS, 1999, page 7). That consultation found that Chinook salmon originating from these stocks were found in small numbers in the BSAI and GOA. The conclusions primarily were based on CWT returns that were limited to two listed Chinook salmon stocks, Lower Columbia River and Upper Willamette River. The following table summarizes key remarks from the 1999 BiOp regarding the incidental take of salmon ESUs.

**Summary of 1999 Biological Opinion Statements Regarding ESU Salmon Stocks and the Alaska Groundfish Fisheries**

Snake River Fall Chinook	"...existing information continues to suggest that it is unlikely that Snake River fall chinook will be caught in the BSAI fisheries."	Page 42
Upper Willamette River	"About 33 UWR CWTs, have been recovered from GOA groundfish fisheries and one in BSAI groundfish fisheries since 1986...NMFS believes that the take of UWR chinook is a relatively rare event."	Page 43
Lower Columbia River Chinook	With respect to spring stocks: "Since 1984, there have only been 9 LCR CWT recoveries in GOA groundfish fisheries, indicating that it is a relatively rare event..." With respect to tule stocks, "Since 1984, there have no reported CWT recoveries in BSAI or GOA groundfish fisheries for this ESA component." For three bright stocks, "Since 1984, there have no reported CWT recoveries in BSAI or GOA groundfish fisheries for this ESU component."	Page 44
Puget Sound Chinook	With respect to spring stocks, "There have been no reported CWT recoveries from the PS ESU in BSAI or GOA groundfish fisheries." With respect to fall stocks, "The ocean distribution of fall stocks are similar to the PS spring stocks in that they are harvested primarily in Canadian and Puget Sound fisheries with little catch occurring in Alaska."	Page 45
Snake River Spring/Summer and Upper Columbia River Spring Chinook	"There were no CWT recoveries or other information to suggest that SR spring/summer chinook are caught in the Alaskan fisheries...The State agencies concluded that there is almost no harvest of UCRS chinook in ocean fisheries...The available information suggests that UCRS chinook are rarely caught in the proposed BSAI and GOA groundfish fisheries."	Pages 45-46.
California Chinook salmon	"California chinook stocks are presumed to reside primarily off California and not migrate to British Columbia or Alaska waters..."	Page 46
Source: NMFS, Protected Resources Division, Pacific Northwest Region. 1999 Biological Opinion on the AK groundfish fisheries.		

The subsequent 2000 BiOp by the NMFS Alaska Region provides additional information on the ESUs discussed in the 1999 BiOp. The conclusion of both BiOps for each ESU is consistent or identical. California Chinook salmon were not discussed in the 2000 BiOp because they were not expected to occur in Alaska waters. The following table summarizes the findings in the 2000 BiOp.

**Summary of 2000 Biological Opinion Statements Regarding ESU Salmon Stocks and the Alaska Groundfish Fisheries**

Snake River Fall Chinook	“...it is highly unlikely that any Snake River fall chinook are taken in the BSAI groundfish fisheries.” “... the catch of Snake River fall chinook in the GOA groundfish fishery is unlikely to average not more than five per year.”	Page 178
Upper Willamette River	“”About 33 UWR CWTs, have been recovered from GOA groundfish fisheries and one in BSAI groundfish fisheries since 1986...NMFS believes that the take of these chinook is a relatively rare event.”	Page 178
Lower Columbia River Chinook	With respect to spring stocks: “Since 1984, there have only been 9 LCR CWT recoveries in GOA groundfish fisheries, indicating that it is a relatively rare event...” With respect to tule stocks, “Since 1984, there have no reported CWT recoveries in BSAI or GOA groundfish fisheries for this ESA component.” For three bright stocks, “Since 1984, there have no reported CWT recoveries in BSAI or GOA groundfish fisheries for this ESU component.”	Page 179
Puget Sound Chinook	There have been no reported Coded-wire tags recoveries from the PS ESU in BSAI or GOA groundfish fisheries.	Page 179
Snake River Spring/Summer and Upper Columbia River Spring Chinook	“There were no Coded-wire tags recoveries or other information to suggest that Snake River spring/summer chinook are caught in Alaskan fisheries. The available information suggests that UCRS chinook are rarely caught in the proposed BSAI and GOA groundfish fisheries.”	Page 179
Source: NMFS, Protected Resources Division, Alaska Region. 2000 Biological Opinion on the Groundfish Fisheries.		

The 1999 BiOp included an incidental take statement for the BSAI groundfish fishery of 55,000 Chinook salmon per year and provided for reasonable and prudent measures (RPMs) to minimize and reduce the anticipated level of incidental take associated with the BSAI groundfish fishery. The RPMs are:

- 1 The North Pacific Fishery Management Council (NPFMC) and 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 and GOA groundfish fisheries can be monitored on an inseason basis.
- 2 The NPFMC and NMFS, Alaska Region shall monitor bycatch reports inseason to ensure that the bycatch of Chinook salmon does not exceed 55,000 fish per year in the BSAI fisheries and 40,000 fish per year in the GOA fisheries.” (NMFS, 1999, page 50)

During the four years preceding the BiOp (1995-1998) Chinook salmon takes in the BSAI groundfish fisheries exceeded 55,000 salmon in 1996 and 1998, and fell below the ITS in 1995 and 1997 (NMFS, 1999, Table 1).

In 2000, NMFS, Alaska Region, completed an FMP-level BiOp which included ESA-listed salmon species. The analysis and findings in the 2000 BiOp were similar to the 1999 BiOp. One exception is the RPMs in the ITS for salmon. An additional measure beyond the two RPMs in the 1999 BiOp states:

The NPFMC and NMFS, Alaska Region shall monitor bycatch report of Chinook salmon in the Bering Sea subarea, inseason, so that the Chinook Salmon Savings Area can be closed to directed fishing for pollock with trawl gear before the limit is exceeded.

The proposed action under Amendment 84a would require changing this measure to allow for exemptions for certain vessels from the closure. The conditions for the vessel exemptions as described for Amendment 84a should be included in the RPM. This would ensure that the RPM allows the implementation of exemptions from the salmon savings areas closures for those vessels that qualify under Amendment 84a.

In light of this analysis, it appears that we may consider not having an ITS for the BSAI and GOA groundfish fisheries based on the not likely to adversely affect determination for Chinook salmon ESA-listed ESUs. Because the GOA fisheries consistently take UWR Chinook salmon, an ITS may be needed even with the unlikely to adversely affect determination. The current limit of 40,000 Chinook salmon in the GOA has not been exceeded recently and is not anticipated to be exceeded in the near future. **NMFS Alaska Region requests the NMFS NW Region’s advice on the need for an ITS and RPMs for ESA-listed salmon with very small amounts of take and a not likely to adversely affect determination.**

## **Additional Relevant Information**

In 1998, a trawl ban in eastern GOA waters went into effect, but this does not appear to have much of any impact on the overall taking of ESA-listed salmon in the GOA, based on CWT recoveries.

The Council's SSC convened a Salmon Bycatch Research workshop in April 2006 to better inform the Council regarding the current status of available information on salmon genetics, bycatch patterns, and status of AK salmon stocks. Abstracts and presentations from the workshop, as well as the SSC report summarizing their findings and recommendations are available on the Council website at [www.fakr.noaa.gov/npfmc](http://www.fakr.noaa.gov/npfmc).

High seas tagging methods tag the salmon in the high seas. The fish is then released and may be recovered in the ocean or when it returns to fresh water. If it is recovered in fresh water, the state of origin can be assumed. These tag recoveries provide only an idea of the potential state of origin but do not provide information to the detailed level of an ESU, as the CWT recoveries do. Based on personal communications with Dr. Katherine W. Myers of the University of Washington, School of Fishery Sciences, CWT and high seas tag recoveries that indicate a state of origin may be used to determine the potential for any salmon species from that state to potentially move in the same migration pattern (November 3, 2005). A difference of opinion exists as to whether the migration behavior of some salmon or steelhead stocks from a state can be assumed to be the same migration behavior as all salmon and steelhead stocks from the same state (personal communication with Peter Dygert NMFS NW Region and Adrian Celewycz NMFS Auke Bay Lab, December 2005). State aggregated recovery data may give an indication whether it may be possible that an ESU could migrate to Alaskan waters (pers. comm., Myers 2005).

We do not have a complete understanding of migration patterns for all ESA-listed salmon and steelhead ESUs and how these patterns may be the same or different from other salmon species originating from the same state. Because we do not have a full understanding of the behavior of the ESA-listed and non-listed ESUs, it is not possible to understand the potential impact the fisheries may have on ESA-listed ESUs based on the recovery of high seas tagged fish. Because the state aggregated data from high seas tagged fish does not allow the measurement of effect and the CWT recoveries can be linked to specific ESUs, this analysis focused on the CWT recoveries only. Because the CWT information provides potential occurrence and impact data to the ESU level, the CWT data are considered the best available scientific information for purposes of this analysis and the high seas tagging data was not analyzed.

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**Table 5.** Actual Number and Total Estimated Contribution of ESA-listed CWT salmon by ESU captured in GOA and BSAI trawl fisheries, summed over pre-listing and post-listing periods, 1984-2005  
(2005 data are preliminary) 5/24/2006

Listing status	ESU name	GOA		BSAI	
		Actual Number	Total estimated contribution	Actual Number	Total estimated contribution
Pre-listing	Lower Columbia River Chinook	12	315.7	0	0
	Upper Willamette River Chinook	40	773.2	2	5.3
	Hood Canal summer-run chum	0	0	1	9.8
Post-listing	Lower Columbia River Chinook	11	128.2	5	10.3
	Upper Willamette River Chinook	52	641.3	6	53.3
	Upper Columbia River spring Chinook	1	3.8	0	0

**Table 6.** Actual Number and Total Estimated Contribution of ESA-listed CWT salmon by ESU by year captured in GOA and BSAI trawl fisheries, 1984-2005  
(2005 data are preliminary)

**A. Lower Columbia River Chinook ESU**

Listing status	ESU name	run_year	GOA		BSAI			
			Actual Number	Total estimated contribution	Actual Number	Total estimated contribution		
Pre-listing	Lower Columbia River Chinook	1984	5	33.8	0	0		
		1985	1	3.4	0	0		
		1986	0	0	0	0		
		1987	1	2.6	0	0		
		1988	0	0	0	0		
		1989	0	0	0	0		
		1990	1	3.4	0	0		
		1991	0	0	0	0		
		1992	1	13.2	0	0		
		1993	1	241.9	0	0		
		1994	2	17.3	0	0		
		1995	0	0	0	0		
		1996	0	0	0	0		
		Post-listing	Lower Columbia River Chinook	1997	0	0	0	0
				1998	2	71.8	0	0
				1999	4	29.3	0	0
2000	2			8.1	0	0		
2001	2			12.9	1	2.7		
2002	0			0	1	2.0		
2003	0			0	3	5.7		
2004	1			6.0	0	0		
2005	0			0	0	0		

B. Upper Willamette River Chinook ESU

Listing status	ESU name	run_year	GOA		BSAI	
			Actual Number	Total estimated contribution	Actual Number	Total estimated contribution
Pre-listing	Upper Willamette River Chinook	1984	11	40.2	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	4	13.8	0	0
		1991	1	157.2	0	0
		1992	4	234.4	0	0
		1993	14	209.1	0	0
		1994	3	54.5	0	0
		1995	2	54.6	0	0
		1996	1	9.4	1	2.6
Post-listing	Upper Willamette River Chinook	1997	1	53.1	0	0
		1998	4	117.6	0	0
		1999	20	244.6	1	2.2
		2000	16	67.1	1	2.4
		2001	8	52.6	0	0
		2002	1	12.1	2	3.9
		2003	1	61.7	0	0
		2004	1	32.5	1	1.9
		2005	0	0	1	1.6

C. Upper Columbia River spring Chinook ESU

Listing status	ESU name	run_year	GOA		BSAI			
			Actual Number	Total estimated contribution	Actual Number	Total estimated contribution		
Pre-listing	Upper Columbia River spring Chinook	1984	0	0	0	0		
		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	0	0	0	0		
		1991	0	0	0	0		
		1992	0	0	0	0		
		1993	0	0	0	0		
		1994	0	0	0	0		
		1995	0	0	0	0		
		1996	0	0	0	0		
		Post-listing	Upper Columbia River spring Chinook	1997	0	0	0	0
				1998	1	3.8	0	0
				1999	0	0	0	0
2000	0			0	0	0		
2001	0			0	0	0		
2002	0			0	0	0		
2003	0			0	0	0		
2004	0			0	0	0		
2005	0			0	0	0		

D. Hood Canal summer-run chum ESU

Listing status	ESU name	run_year	GOA	GOA	BSAI	BSAI
			Actual Number	Total estimated contribution	Actual Number	Total estimated contribution
Pre-listing	Hood Canal summer-run chum	1984	0	0	1	9.8
		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	0	0	0	0
		1991	0	0	0	0
		1992	0	0	0	0
		1993	0	0	0	0
		1994	0	0	0	0
		1995	0	0	0	0
		1996	0	0	0	0
		1997	0	0	0	0
Post-listing	Hood Canal summer-run chum	1998	0	0	0	0
		1999	0	0	0	0
		2000	0	0	0	0
		2001	0	0	0	0
		2002	0	0	0	0
		2003	0	0	0	0
		2004	0	0	0	0
		2005	0	0	0	0

**Table 7.** Recoveries of ESA-listed CWT salmon by ESU (post-listing only) captured in GOA and BSAI trawl fisheries, actual numbers and percent of all recoveries

Listing status	ESU name	GOA	GOA	BSAI	BSAI	Total all recoveries
		Actual Number	% of all recoveries	Actual Number	% of all recoveries	
Post-listing	Lower Columbia River Chinook	11	0.023	5	0.010	48227
	Upper Willamette River Chinook	52	0.139	6	0.016	37357
	Upper Columbia River spring Chinook	1	0.011	0	0.000	8913

**Table 8.** Actual Number and Total Estimated Contribution of ESA-listed CWT salmon by ESU captured in GOA research cruises, summed over pre-listing and post-listing periods, 1984-2005

Listing status	ESU name	GOA	
		Actual Number	Total estimated contribution
Pre-listing	Lower Columbia River Chinook	1	1.5
	Lower Columbia River coho	12	89.7
Post-listing	Lower Columbia River Chinook	2	2.0
	Snake River spring/summer Chinook	4	8.1
	Upper Columbia River spring Chinook	4	4.1
	Upper Willamette River Chinook	10	71.0
	Snake River Basin steelhead	1	1.0

**Table 9.** Actual Number and Total Estimated Contribution of ESA-listed CWT salmon by ESU by year captured in GOA research cruises, 1984-2005

**A. Lower Columbia River Chinook ESU**

Listing status	ESU name	run year	GOA	
			Actual Number	Total estimated contribution
Pre-listing	Lower Columbia River Chinook	1984	0	0
		1985	0	0
		1986	0	0
		1987	0	0
		1988	0	0
		1989	0	0
		1990	1	1.5
		1991	0	0
		1992	0	0
		1993	0	0
		1994	0	0
		1995	0	0
		1996	0	0
		Post-listing	Lower Columbia River Chinook	1997
1998	0			0
1999	1			1
2000	0			0
2001	1			1.0
2002	0			0
2003	0			0
2004	0			0
2005	0			0

**B. Snake River spring/summer Chinook ESU**

Listing status	ESU name	run year	GOA			
			Actual Number	Total estimated contribution		
Pre-listing	Snake River spring/summer Chinook	1984	0	0		
		1985	0	0		
		1986	0	0		
		1987	0	0		
		1988	0	0		
		1989	0	0		
		1990	0	0		
		1991	0	0		
		Post-listing	Snake River spring/summer Chinook	1992	0	0
				1993	0	0
				1994	0	0
1995	0			0		
1996	0			0		
1997	0			0		
1998	1			2.9		
1999	0			0		
2000	0			0		
2001	0			0		
2002	0	0				
2003	3	5.3				
2004	0	0				
2005	0	0				



C. Upper Columbia River spring Chinook ESU

Listing status	ESU name	run year	GOA	GOA
			Actual Number	Total estimated contribution
Pre-listing	Upper Columbia River spring Chinook	1984	0	0
		1985	0	0
		1986	0	0
		1987	0	0
		1988	0	0
		1989	0	0
		1990	0	0
		1991	0	0
		1992	0	0
		1993	0	0
		1994	0	0
		1995	0	0
		1996	0	0
		1997	0	0
Post-listing	Upper Columbia River spring Chinook	1998	0	0
		1999	1	1.0
		2000	2	2.1
		2001	0	0
		2002	0	0
		2003	1	1.0
		2004	0	0
2005	0	0		

D. Upper Willamette River Chinook ESU

Listing status	ESU name	run year	GOA	GOA
			Actual Number	Total estimated contribution
Pre-listing	Upper Willamette River Chinook	1984	0	0
		1985	0	0
		1986	0	0
		1987	0	0
		1988	0	0
		1989	0	0
		1990	0	0
		1991	0	0
		1992	0	0
		1993	0	0
		1994	0	0
		1995	0	0
		1996	0	0
		1997	0	0
Post-listing	Upper Willamette River Chinook	1998	2	2.3
		1999	0	0
		2000	0	0
		2001	4	32.6
		2002	3	26.6
		2003	1	9.5
		2004	0	0
		2005	0	0

E. Lower Columbia River Coho ESU

Listing status	ESU name	run_year	GOA	GOA
			Actual Number	Total estimated contribution
Pre-listing	Lower Columbia River coho	1984	0	0
		1985	0	0
		1986	0	0
		1987	0	0
		1988	0	0
		1989	0	0
		1990	0	0
		1991	0	0
		1992	0	0
		1993	0	0
		1994	0	0
		1995	0	0
		1996	0	0
		1997	0	0
		1998	4	15.9
		1999	0	0
		2000	4	1.1
		2001	1	23.7
		2002	1	2.1
		2003	2	1.1
Post-listing	Lower Columbia River coho	2004	0	0
		2005	0	0

**Table 10.** Recoveries of ESA-listed CWT salmon by ESU (post-listing only) captured in GOA research cruises, actual numbers and percent of recoveries

Listing status	ESU name	GOA	GOA	Total all recoveries
		Actual Number	% of all recoveries	
Post-listing	Lower Columbia River Chinook	2	0.004	48207
	Snake River spring/summer Chinook	4	0.025	15912
	Upper Columbia River spring Chinook	4	0.045	8913
	Upper Willamette River Chinook	10	0.027	37357
	Snake River Basin steelhead	1	0.025	4004