ENVIRONMENTAL ASSESSMENT

For Issuing an Exempted Fishing Permit for the Purpose of Testing Salmon Excluder Devices in the Eastern Bering Sea Pollock Fishery

April 2005

Lead Agency: National Marine Fisheries Service
Alaska Regional Office
Juneau, Alaska

Responsible Official: James W. Balsiger
Regional Administrator
Alaska Regional Office

For Further Information Contact:
Melanie Brown, Alaska Regional Office
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802
(907) 586-7228

Abstract: This Environmental Assessment (EA) provides an analysis of alternatives to issue an exempted fishing permit (EFP) for the purpose of further development and testing of salmon excluder devices in the pollock trawl fishery of the Bering Sea. The experiment would be conducted in the fall of 2005 and in the spring of 2006 with a possible modification to the permit to allow for an additional year of testing. The EFP would provide exemptions to certain groundfish fisheries regulations to support the activities necessary to conduct the research. In 2004, the pollock trawl industry exceeded the chinook salmon and non-chinook salmon bycatch limits and the incidental take statement for Endangered Species Act listed chinook salmon in the Bering Sea and may exceed these limits in the future, unless changes in fishing practices are made. Exceeding the salmon bycatch limits in the pollock trawl fishery can affect the locations available to pollock fishing vessels that may result in additional costs to the industry. The successful development of a salmon excluder device for pollock trawl gear may result in reductions of salmon bycatch and potentially reduce costs associated with the harvest of pollock. The proposed action is not expected to have significant impacts on the human environment.

Table of Contents

List of Figures and Tables

EXECUTIVE SUMMARY

The purpose of this action is to allow further development and testing of salmon excluder devices in the eastern Bering Sea pollock trawl fishery. Chinook salmon *Oncorhynchus tshawytscha* and non-chinook salmon (primarily chum salmon *O. keta)* are caught incidentally in Alaska groundfish fisheries, primarily in the walleye pollock *Theragra chalcogramma* trawl fishery. Salmon are a prohibited species in the groundfish fisheries (50 CFR 679.21) with annual limits placed on the number of chinook salmon and non-chinook salmon taken in the Bering Sea and Aleutian Islands (BSAI) trawl fisheries. The chinook salmon prohibited species catch (PSC) limit for the BSAI trawl fisheries is 29,000 fish and the non-chinook salmon PSC limit in the Catcher Vessel Operational Area (CVOA) is 42,000 fish between August 15 and October 14. Exceeding these limits triggers the closing of salmon savings areas (50 CFR part 679, Fig. 8 and Fig. 9) for certain time periods to allow for protected areas for the salmon. Pollock also occurs in the salmon savings areas, and closure of these areas may result in added expense to the pollock fishing industry. In 2004, the pollock trawl fishery exceeded the chinook salmon PSC limit and the incidental take statement of 55,000 fish for Endangered Species Act (ESA) listed chinook salmon in the BSAI. Based on historical bycatch rates, the PSC limit for chinook salmon will likely continue to be exceeded, resulting in the closure of the Chinook Salmon Savings Area. A salmon excluder device would lessen the potential for exceeding the PSC limits and would reduce the potential for constraints being placed on the trawl fisheries due to exceeding salmon PSC limits.

In order to conduct the salmon excluder device development and testing, an exempted fishing permit (EFP) is required. The applicants for the EFP have worked with the Alaska Fisheries Science Center to develop a scientifically sound experiment to test the excluder devices. Exemptions from fishery regulations regarding total allowable catch (TAC) and PSC limits; closures of the salmon savings areas, Steller sea lion conservation area (SCA), and CVOA; and observer requirements are needed to permit the collection of data required to successfully complete the tests. Based on the need to conduct the work in a scientifically acceptable manner, the alternatives for this proposed action are limited to the status quo (Alternative 1) and issuing the EFP (Alternative 2, preferred alternative).

The analysis of implementing both alternatives determined that there would be no significant impacts on the human environment. The impact of future actions under Alternative 2 could potentially be beneficial economically to those involved in the pollock fishery. However, the amount of future use of the salmon excluder devices cannot be determined, and therefore, the significance of future impacts cannot be determined. Alternative 2 is preferred because it will allow for the testing of the salmon excluder devices in a scientifically acceptable manner, potentially leading to the reduction of salmon bycatch in the pollock trawl fishery.

1.0 PURPOSE AND NEED FOR ACTION

The purpose of this action is to allow the further development and testing of salmon excluder devices in the eastern Bering Sea pollock trawl fishery. Chinook salmon *Oncorhynchus tshawytscha* and non-chinook salmon (primarily chum salmon *O. keta)* are caught incidentally in Alaska groundfish fisheries, primarily in the walleye pollock *Theragra chalcogramma* trawl fishery. Salmon are a prohibited species in the groundfish fisheries (50 CFR 679.21) with annual limits placed on the number of chinook salmon and non-chinook salmon taken in the BSAI trawl fisheries. The chinook salmon prohibited species catch (PSC) limit for the BSAI trawl fisheries is 29,000 fish and the non-chinook salmon PSC limit in the Catcher Vessel Operating Area (CVOA) is 42,000 fish between August 15 and October 14. Exceeding these limits triggers the closing of salmon savings areas (50 CFR part 679, Fig. 8 and Fig. 9) for certain time periods to allow for protected areas for the salmon. Pollock also occurs in the salmon savings areas, and closure of these areas may result in added expense to the pollock fishing industry. Based on historical bycatch rates, the chinook salmon PSC amount will likely be exceeded, resulting in the closure of the Chinook Salmon Savings Areas. A salmon excluder device would lessen the potential for exceeding the PSC limits and reduce the potential for constraints being placed on the trawl fisheries due to exceeding salmon PSC limits.

EFPs are an effective way to develop bycatch reduction gear allowing for systematic testing under a rigorous experimental design. In the experience of the fishing industry, informal efforts to test net modifications in an *ad hoc* manner are not efficient because a fisherman working independently typically does not necessarily subject his modification ideas to systematic testing. While fishermen often possess a strong grasp of technical aspects of fishing gear in combination with outstanding ingenuity for adaptation, the coordinated and systematic approach of testing gear modifications through an EFP collaboration of science and industry is a more productive way to develop bycatch reduction devices (BRDs).

EFPs offer advantages given the relatively high cost of research charters on the scale of vessels primarily used in the BS pollock fishery. Because harvest limits are typically set below the acceptable biological catch (ABC) limits in the Federal fisheries off Alaska, additional fishing opportunities can be used to help fund research and development costs of conservation engineering without biological effects on stocks. In addition, there are benefits to evaluating gear modifications under the most realistic fishing scale and conditions. Research charters can potentially be a more expensive and less effective way to recreate actual fishing conditions compared to an EFP test. The EFP also allows for the collection of data in context of the experimental design that would not be otherwise allowed under the groundfish regulations. For these reasons, an EFP is considered the best method for developing a salmon excluder device.

The EFP is necessary to allow for the continued development and testing of the salmon excluder devices developed under an EFP issued in 2003 and 2004. The goal of using such a device is the reduction of salmon bycatch without significantly lowering pollock catch rates. Further development and testing is not possible without an EFP.

1.1 Project Area

The experiment is limited to the Eastern Bering Sea management area in the portions commonly used by catcher vessels to harvest pollock. Areas where the experiment will be conducted include locations in the CVOA, the Chum Salmon Savings Area (Figure 1.1) and the Bering Sea portion of the Chinook Salmon Savings Areas. (Figure 1.2). One of the reasons for the need for the EFP for this experiment is to permit the experimental trawling in the salmon savings areas and CVOA, regardless of closure status.

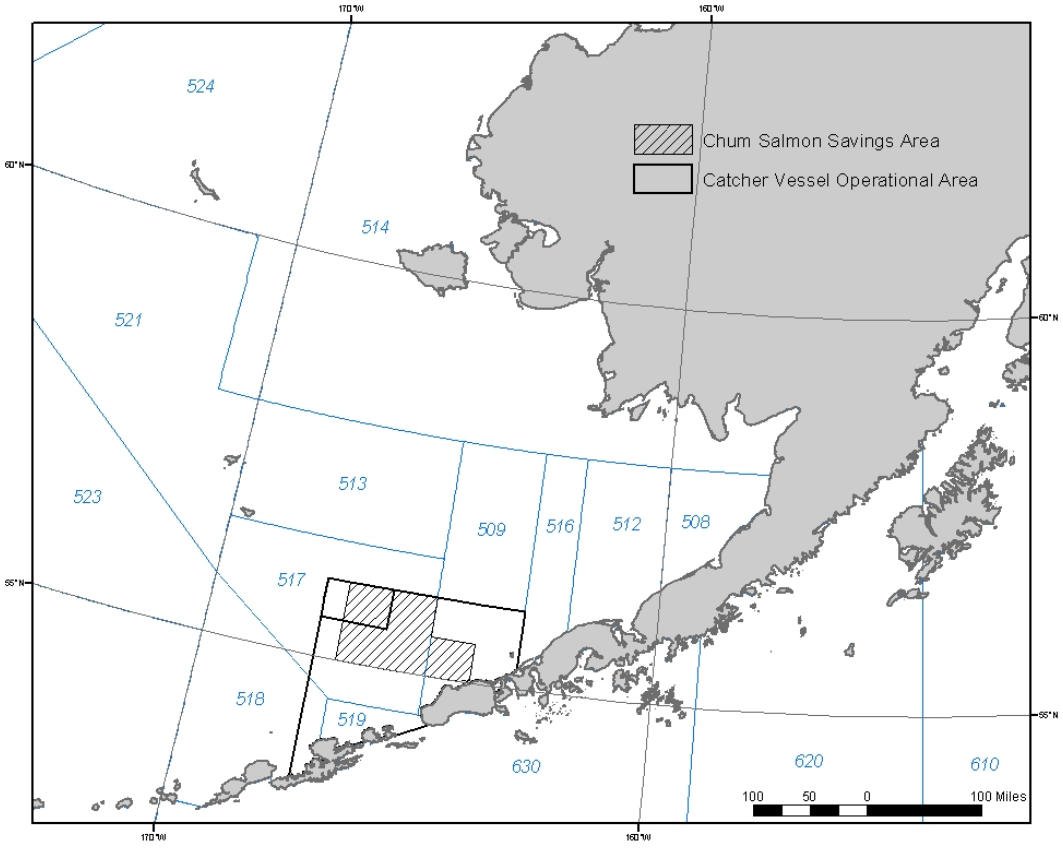

Figure 1.1 Chum Salmon Savings Area

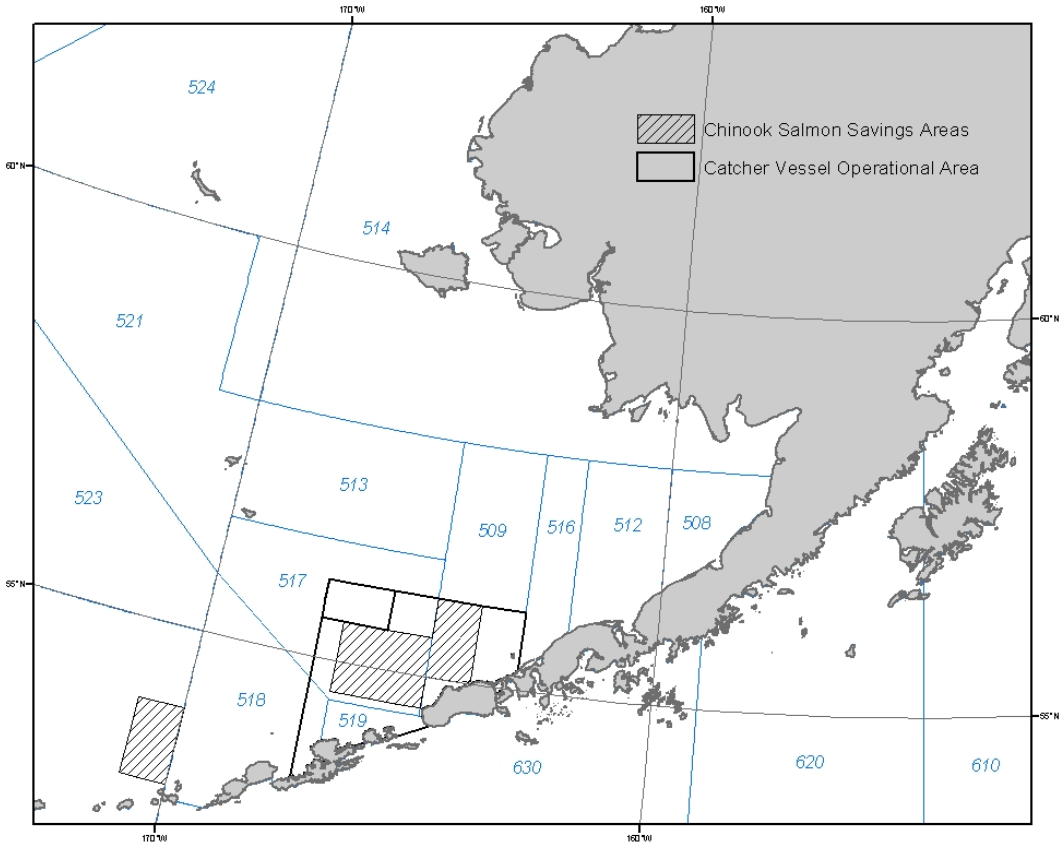

Figure 1.2 Chinook Salmon Savings Areas

1.2 Background

This section provides historical information regarding salmon bycatch in the pollock trawl fishery and provides the basis for the need to develop methods for reducing salmon bycatch. Most of the text in section 1.2.1 and 1.2.3 through 1.2.5 is from the EA developed for the previous salmon excluder device EFP (NMFS 2003).

1.2.1 Historical Salmon Bycatch Information

From 1990-2004, a 10-year average of 41,348 chinook salmon and 73,909 non-chinook salmon species (> 95% are chum salmon) were incidentally caught annually in BSAI groundfish trawl fisheries (Table 1.1). Bycatch is primarily juvenile salmon that are one or two years away from returning to the river of origin as adults.

Table 1.1 Bycatch of Pacific Salmon in the BSAI Groundfish trawl fisheries

	Number of Fish	
Year	**Chinook**	**Chum**
1990	14,085	16,202
1991	48,873	29,706
1992	41,955	40,090
1993	45,964	242,895
1994	44,380	95,978
1995	23,079	20,901
1996	63,205	77,771
1997	50,218	67,349
1998	58,966	69,237
1999	14,586	47,204
2000	8,219	59,306
2001	40,303	60,460
2002	37,507	78,739
2003	54,989	94,479
2004	62,408	163,647
10 year average	41,348	73,909

Source: NMFS Alaska Region website

Pacific salmon support large commercial, recreational, and subsistence fisheries throughout Alaska. In 1999 through 2003, chinook and chum salmon runs in western Alaska were at relatively low levels compared to runs observed over the last 20 years. Although these reduced salmon runs appear to be attributable to changes in ocean conditions (Hare and Francis 1995; Kruse 1998), considerable public concern has been raised as to the effect of low salmon returns on fishery dependent communities in western Alaska. Responding to the crisis in the salmon industry, the Governor of Alaska declared a state emergency on several occasions from 1999 through 2003. In response to the Governor's concerns, the Council has reviewed the bycatch management measures in place to reduce salmon bycatch to the extent practicable, as required by the Sustainable Fisheries Act of 1996 (NPFMC 1999c), on several occasions.

In 2002, the Council reviewed a retrospective analysis of salmon bycatch trends and estimated effects of Alaska groundfish trawl fisheries on salmon returns in Alaska (Witherell et al. 2002). This evaluation of the possible bycatch effects concluded that bycatch in groundfish fisheries reduced western Alaska chinook salmon runs by less than 2.7%. Salmon taken incidentally in these fisheries are known to originate from Alaska and Pacific northwest runs, as well as Asia and Russia. While this is clearly a small percentage effect on fish bound for Alaskan river systems, the effect is nonetheless considered to be slightly greater than the estimated effect of Alaskan groundfish fisheries on other prohibited species in Federal fisheries off Alaska, such species as Pacific halibut and several species of king and tanner crabs (Witherell et al. 2002).

In addition, the Council has initiated a review of the current salmon bycatch measures based on information presented at the December 2004 Council meeting that indicated that the closure of the salmon savings areas may have actually resulted in more salmon bycatch than if the areas had been left open. The Council is currently analyzing alternatives to the current salmon bycatch measures.

1.2.2 Existing Fishery Management Bycatch Reduction Measures

Salmon are listed as a prohibited species in the groundfish fishery management plans, meaning that they cannot be retained and sold. Regulations implemented in 1994 prohibited the discard of salmon taken as bycatch in BSAI groundfish trawl fisheries until the number of salmon has been determined by a NMFS certified observer (59 FR 18757, April 20, 1994). Subsequent regulations allowed for voluntary retention and processing of salmon for donation to NMFS qualified distributors of food to underprivileged individuals (50 CFR 679.26).

Bycatch of chinook salmon in Alaska groundfish fisheries is generally higher in the winter and chum salmon bycatch is higher in the summer although this trend is not without exceptions. Based on this seasonal pattern, the Council has adopted extensive seasonal cap and closure measures to control bycatch of salmon in trawl fisheries (Witherell and Pautzke 1997). Regulations establish closures for several areas with historically high bycatch of salmon if the seasonal cap (number) of salmon is taken as bycatch. Beginning in 1994, the Chum Salmon Savings Area (CSSA) (Fig. 1.1) has been closed to all trawling from August 1 through August 31 (50 CFR 679.22(a)(10)). Additionally, the area re-closes after August 31 if a bycatch threshold limit of 42,000 non-chinook salmon is caught incidentally in the CVOA between August 15 to October 14 (50 CFR 679.21(e)(7)(vii)). The CSSA will close immediately if fishermen reach a non-CDQ threshold of 38,850 fish in the CVOA between August 15 and October 14.[1]

From 1996 through 1999, regulations were in place to prohibit trawling in the Chinook Salmon Savings Areas (Fig. 1.2) through April 15, if and when, a bycatch limit of 48,000 chinook salmon was attained in the BSAI trawl fisheries (50 CFR 679.21(e)(7)(viii)). More than 48,000 chinook salmon were taken as bycatch annually from 1996 through 1998, but closures were not triggered because bycatch limits were not exceeded before April 15.

In 2000, new regulations to reduce chinook salmon bycatch in BSAI trawl fisheries were implemented (65 FR 60587, October 12, 2000). The regulations incrementally reduced the bycatch limit for the pollock fishery from 48,000 to 29,000 chinook salmon over a 4-year period and implemented year-round accounting of chinook salmon bycatch in the pollock fishery (50 CFR 679.21(e)(1)(vii)). Additionally, the boundaries of the Chinook Salmon Savings Areas were modified. Under these modifications, in the event the limit is triggered before April 15, the Chinook Salmon Savings Area (CHSSA) closes

[1] The chum PSC cap is 42,000 fish, 7.5% of which is allocated to the CDQ groups, and the remainder of which (38,850 fish) is allocated to the AFA-qualified vessels.

immediately. The closure would be removed on April 16, but would be reinitiated September 1 and continue through the end of the year. If the limit were reached after April 15, but before September 1, then the areas would close on September 1. If the limit were reached after September 1, the areas would close immediately through the end of the year (50 CFR 679.21(e)(7)(viii)). The bycatch limit for the BS pollock fishery is 29,000 chinook salmon. The non-CDQ chinook PSC cap is 26,825 chinook starting in 2004.[2]

1.2.3 Costs Associated with Salmon Bycatch

Salmon PSC caps have the potential to impose significant costs on pollock fishermen operating in the BS. There are, first of all, the costs imposed by potential closures of the chinook and chum salmon savings areas, described above. Second, there are the costs imposed on the industry as it takes steps to control its salmon PSC. In addition, salmon PSC itself creates costs for inshore fisheries.

Potential closures of chinook and chum savings areas[3]

As noted above, pollock fishermen are subject to separate savings area closures for chinook and chum salmon. The separate closures reflect differences in the PSC patterns for the two species. Chinook PSC tends to be higher in the winter and late fall and lower in the summer. Non-chinook (chum) bycatch tends to be higher in the summer. The non-CDQ chinook salmon PSC cap of 26,825 fish in 2004 was exceeded by over 35,000 fish. The CHSSA was closed, forcing catcher vessels to fish elsewhere. The principal impact of the closure falls on catcher vessels rather than catcher processors, because a large part of the CHSSA lies within the CVOA from which catcher processors are already excluded by regulation from June 10 through November 1 (50 CFR 679.22(a)(5) and 679.23(e)(2))[4]. The portion of the CHSSA that lies in the Aleutian Islands has not historically been used for pollock fishing and the closure of this area is not likely to have a large impact on the harvest of pollock.

In 2001, the pollock fleet harvested a total of about 30,100 chinook salmon in the BSAI. The fleet exceeded the 26,825 chinook salmon limit during the statistical week ending on October 27. The cap would have stopped fishing in the CHSSA during the following week (ending November 3). However, no catcher vessels reported harvests after the

---

[2] The total BS chinook cap is 29,000 fish. This is divided between the CDQ fishermen and the AFA fishermen. The CDQ fishermen receive 7.5% of the cap. The discussion in this analysis pertains to the AFA fishermen. Development of a successful excluder device would undoubtedly help CDQ operations deal with their bycatch problems as well.

[3] The following discussion focuses on the years 2001 and 2002. This period differs from earlier periods in the introduction of the American Fisheries Act regulations and the Seller sea lion protection measures. The years 1999 and 2000 are not included because of the unusually small salmon PSC harvests in those years (see Table 1.1).

[4] Part of the chinook savings area lies outside of the CVOA in the Aleutian Islands where pollock fishing was opened in 2004.

week of October 27, and catcher processors would not have been affected by the closure of the CHSSA during that season (NMFS, Alaska Region).

As noted, the pollock fishery also has to operate within a non-chinook (chum) salmon cap of 38,850 fish in the CVOA between August 15 and October 14 (50 CFR 679.21). NMFS in-season managers must make "real time" projections of salmon PSC based on relatively limited information from observers. Not all the vessels in the fleet are observed, so the managers know they have incomplete information. Moreover, in order to avoid exceeding the cap, the managers must project an expected date on which the cap will be taken and close the CSSA at the time specified in the regulations (50 CFR 679.21). This projection is based on apparent PSC rates as the cap is approached, and takes account of the existence of known unobserved harvests.[5] In 2002, from the week ending August 17 to the week ending September 21, the fleet took about 38,000 non-chinook salmon in its pollock operations in the CVOA. On September 19, NMFS in-season managers published a notice closing the CSSA from noon on September 21 until noon on October 14. (NMFS information bulletins are at www.fakr.noaa.gov). Catcher vessel pollock harvests in the BS and in the CSSA are shown in Table 1.2.

Table 1.2 2002 AFA catcher vessel harvest

Week ending date	BS catcher vessel harvest	CSSA catcher vessel harvest
Sep 21	34954	7575
Sep 28	19776	58
Oct 5	27646	91
Oct 12	15959	0
Oct 19	12054	3878
Oct 26	7510	3427
Source: NMFS-SF-AKR blend data. Note: CSSA data is based on observer data; this is probably not a complete accounting of harvest from CSSA.		

The CSSA falls completely inside the CVOA. Since no catcher-processors are allowed to fish in the CVOA during the B season (June through October) the restriction on savings area fishing would have fallen entirely on the catcher vessel portion of the fleet. In all of 2001, the pollock fleet harvested a total of 27,186 non-chinook salmon, and thus would not have triggered the closure in the savings area.

The conclusions from this analysis are: (1) the pollock fleet is operating in ranges where it could, plausibly, reach either the chinook or chum salmon PSC cap in a year and trigger the closure of one or both of the savings areas; (2) closures are likely to be triggered during the second half of the year; and (3) the closures are most likely to affect the

[5] Furuness, Mary. NMFS, 709 W. 9th St., Juneau, AK 99802-1668. NMFS in-season manager. Personal communication, 5-20-03.

catcher vessel component of the pollock fleet, since both savings areas are predominately in the CVOA, and catcher processor vessels are kept out of this area by regulation during the second half of the year.

By forcing catcher vessels off the grounds they would prefer, PSC closures can reduce revenues or increase costs. Even if catcher vessels can continue to harvest as many pollock as before, they may face increased travel costs if the closure forces them to move to new fishing grounds (which may be further from their delivery ports), they may have to fish for pollock in areas where catch per unit of effort (CPUE) is lower, or they may be forced to fish on pollock stocks of lower quality (maybe on smaller sized fish). CPUE may be particularly affected by closure of the CHSSA since this reaches further south and affects the north side of the productive horseshoe fishing grounds. Pollock quality, and its ex-vessel price, can be reduced if fishermen in catcher vessels are forced by closures to fish further from delivery ports. Increased running time and increased time between harvest and processing can reduce the desirability of pollock. Surimi grades for shoreside processed pollock begin to decline as the time between harvest and delivery increase. Processors producing fillets prefer larger pollock than processors producing surimi. A vessel fishing for a processor with a size preference may be forced off of desirable sized pollock and forced to fish for unsuitably sized pollock by an area closure.[6]

Ongoing PSC control efforts

Reductions in salmon PSC rates during normal fishing activities (prior to closures) may also serve to reduce fishing costs for the industry.

The pollock fleet has developed its own private-sector arrangements to monitor vessel PSC rates and feed the information back to the fishing vessels while they are at sea. In this program, observer data and other reports are transmitted to analysts associated with the private firm, Sea State, Inc. Some of these reports are transmitted from sea in almost real time; some are transmitted at the time catcher vessels make their shoreside deliveries. Sea State processes the data, identifying locations with high salmon PSC rates, and provides the information to the fishing vessels. Vessels are then able to change their trawling operations to avoid areas with high salmon PSC rates. Irrespective of Sea State reports, vessel operators will often conduct "test fishing" on entering new areas. Test fishing involves taking short tows to see if salmon PSC is high. Test fishing adds to the cost of fishing activity. Fishermen vary greatly in the extent to which they participate in voluntary avoidance.[7]

The pollock cooperatives formed under the AFA have also entered into two formal contractual arrangements to avoid areas of high PSC. One agreement covers chinook

[6] Gruver, John. Intercoop Manager, United Catcher Boats. Fisherman's Terminal, 4005 20th Ave. W - Suite 110, Seattle, WA 98199. Personal communication, May 29, 2003.

[7] Haflinger, Karl. Sea State, Inc. Vashon Island, WA. Personal communication, May 21, 2003; Gruver, op. cit.

salmon, and the other covers chum salmon. Sea State, in cooperation with the Intercooperative Manager of United Catcher Boats, is authorized by the agreement to restrict fishing operations in high PSC areas if salmon PSC exceeds a threshold level (there are limits on the total area that may be restricted in a week). Fishing operations are required, by the terms of their contract in the intercooperative agreement, to limit their fishing activity in an area that is closed. The limitations differ among the cooperatives; cooperatives whose skippers have been fishing with little salmon PSC are limited less than those that have had higher PSC. Cooperatives with high salmon PSC may be prohibited from fishing in the restricted areas for a full week.[8] These agreements are contracts imposing binding obligations on the cooperatives.[9]

Voluntary or contractually obligated changes in fishing patterns will impose costs on pollock fishermen similar to those involved in the closures of chinook and chum salmon savings areas (borne by both catcher processors and catcher vessels). Reductions in salmon PSC rates associated with successful development of the salmon excluder device will reduce the costs of this system and make it more effective. Excluder devices would reduce the PSC harvests associated with initial inadvertent discovery of hot spots. Excluder devices will also slow the rate of PSC harvest in hot spots in the interval between the time the hot spot is identified, and the time the fleet can be notified of its existence and directed away from it or restricted in fishing on it. It may be possible to fish in areas that would otherwise have to be closed if the excluder device lowers salmon PSC rates sufficiently. Finally, some salmon PSC would take place in normal fishing operations outside of hot spots. Successful development of an excluder device would reduce PSC associated with these operations.[10]

Cost of lost salmon to inshore fisheries

Salmon caught by the pollock fleet will not return to their natal waters and will not become available to the fisheries exploiting those waters. Returning salmon are used in

[8] While substantially similar, the two 2003 agreements differ in some respects. The chinook closures kick in after chinook PSC reaches a threshold level, while the chum closures kick in continuously throughout the fishery. The chinook agreement treats the Bering Sea as a whole and can lead to two weekly closures of 500 to 1,000 square miles. The chum agreement divides the BS in half and can lead to two weekly closures in the same area range in each half. The 2003 chum agreement imposes penalties on coops that violate the fishing restrictions in a closed area. A first offense is penalized 50% of the ex-vessel value of the pollock caught in the restricted area, while a subsequent offense is penalized 100%. Gruver, op. cit.

[9] Haflinger, op. cit.; Gruver, op. cit.

[10] Development of the excluder device is part of a larger pollock industry effort to find ways to reduce salmon PSC. As noted later in this EA, data on fish behavior being collected in connection with the experiment are being analyzed to provide insights into fishing tactics that might reduce salmon PSC. Other techniques, such as modifications of the excluder design (perhaps incorporating strobe lights to prompt salmon to the exits), and experiments with alternative net colors, are under consideration. Successful development of a range of salmon PSC reduction methods might, in the long term, justify more fundamental changes in regulatory restrictions than are considered here. One instance might be a relaxation of the automatic August closure of the CSSA. Gruver, op. cit.

subsistence, commercial, and recreational fisheries and for escapement and investment in future stocks. Changes in trawl technology that reduce bycatch rates increase the possibility that the pollock trawl fleet will not take the full PSC cap, and will increase the numbers of salmon returning to these uses.

Reductions in salmon PSC in the pollock fishery will not translate directly into one-to-one increases in salmon available for U.S. inshore uses for two reasons: (1) the increased return to U.S. fisheries will be less than the reduction in trawl PSC harvest since many of the fish originate in Canada or Asian waters; and (2) because many of the salmon may die from natural causes between the time they escape the trawl and the time they would otherwise have returned to those waters. Chum salmon studies in the 1990s suggested that about 38% to about 50% of the chum salmon taken as bycatch in the Bering Sea may originate in Asia. Data are not complete for chinook salmon, but suggests a much lower percentage originating in Asia (Witherall, et al., pages 59-60). Witherall *et al.* found that chinook salmon were one to two years away from returning to spawn when taken as bycatch; they assumed chinook natural mortality rates of 10% to 20% a year (Witherall, *et al.*, page 61).[11]

1.2.4 Fishing Industry Initiatives To Control And Reduce Salmon Bycatch In Groundfish Fisheries

Over the last ten years, the pollock industry has developed voluntary controls on bycatch of salmon and initiatives to collect and analyze samples for genetic analysis to improve information on country of origin. Efforts have also been undertaken to evaluate temperature and other environmental data collected routinely by industry for information on how these variables are associated with salmon bycatch (Mikol 1997).

Starting in the early 1990s, several programs employing location-specific bycatch avoidance data exchanges between fishermen were implemented by the pollock industry. These programs use fishery observer data on a fast-turn-around basis so fishermen can more effectively avoid bycatch "hotspot" locations. These early efforts were formally adopted into agreements between pollock fishing cooperatives that were established through the AFA. The individual incentives and accountability through internal private contracts within pollock fishing cooperatives established under the AFA have likely increased the effectiveness of industry bycatch management systems (NMFS 2002). See section 1.2.3 for more information.

Industry efforts to control and reduce salmon bycatch have resulted in tangible improvements in fishery performance. The nature of the bycatch problem with salmon, however, is exceedingly complex and inherently difficult due to the unpredictable nature of salmon locations, population cycles, and movements. From a practical perspective, the pollock industry believes that one of the biggest problems with salmon avoidance is that hotspots are often transitory. By the time such concentrations are identified, a relatively large number of salmon may have already been taken and salmon may have already moved to other locations. Overall, hotspot avoidance and other approaches have

[11] Age specific information was not as good for chum salmon.

provided some success, but these efforts can only achieve success to the degree that salmon movements (and hence bycatch) follow some sort of predictable pattern (UCBA 2003).

The challenges of salmon bycatch avoidance itself, particularly in the context of the restrictive bycatch management measures in place in the BSAI fishery management plan (FMP) create a significant problem for the pollock industry. This situation will undoubtedly be even more acute if salmon populations increase or environmental conditions change in the future to increase the overlap of chinook and chum salmon feeding and migration routes with fishing grounds used for pollock fishing. The potential effects of existing management controls on salmon bycatch can be seen in the fact that the analysis prepared in support of the decision to reduce the chinook bycatch cap determined that had the cap of 36,000 salmon (an amount far in excess of the current cap) been in place during the 1994-1997 period, such a cap would have been triggered three of the four years for which data were available. This would have been expected to reduce the pollock catch in those years by 7-28% (NPFMC 1999c).

One further complication is that salmon avoidance is not the only constraint facing the pollock industry. The decision of where to fish is affected by other constraints. An important constraint on where pollock vessels might fish in order to avoid salmon are regulations governing pollock removals and fishing locations so as to minimize potential competition with Steller sea lions. To avoid harvesting more than the allowable amount of pollock in Steller sea lion protection areas, fishing areas must be selected outside of Steller sea lion protection areas, even when salmon bycatch was relatively low in those areas. In some cases, this tradeoff can mean higher incidental catch rates of salmon.

1.2.5 Evolution Of The Concept Of A Salmon Excluder Device For The Pollock Fishery

Design of bycatch reduction devices (BRDs) necessitates information of fish behavior in response to different stimuli such as the change in water pressure and direction associated with a bycatch reduction device. Development of a salmon BRD for pollock nets would require observation of how salmon behave in a pelagic pollock net relative to pollock, and lacking this, development of concepts for excluders would likely not be productive. Observations of differences in location, swimming ability, or response to stimuli have been critical to the development of effective BRDs (Glass and Wardle 1995).

Given the information obtained from some preliminary video footage of chum salmon behavior in a pelagic pollock trawl, behavioral differences between the target species and salmon may allow for the development of an effective BRD.[12] The first step in the development of prototype salmon BRDs has been to tap into the fishing industry's ideas on how such an excluder might function. A meeting that attempted to accomplish this goal was held by the United Catcher Boat Association (UCBA) in the spring of 2002. The product of the meeting was strong support for development of an excluder device; however, none of the participants had any existing designs for such an excluder.

[12] Dr. Craig Rose, Alaska Fisheries Science Center, personal communication, March 2003.

Following that meeting, Dr. Craig Rose of the Alaska Fisheries Science Center (AFSC) carried out a research charter on a pollock vessel in the summer of 2002 to deploy low light camera equipment and a new technology called "acoustic video" to obtain images of how salmon and pollock behave in the portion of a trawl net called the tapered intermediate. Dr. Rose was also able to perform some basic net modifications (cutting an escapement portal) to get some idea of how salmon react to such an escapement opportunity. This preliminary work suggests that, as would be expected, salmon are strong swimmers compared to pollock. In addition, it appears that salmon may prefer to swim in the upper (furthest from the seafloor) portion of the trawl intermediate.

Dr. Rose's video and digital footage from work in 2003 and 2004 are currently under review by trawl skippers and gear manufacturers. While still preliminary, some concrete ideas for excluder designs have emerged.[13] A depiction of potential prototype devices is seen in Figure 1.3 of the 2003 salmon excluder device EFP EA (NMFS 2003). The device depicted in the drawing is based upon a funnel of smaller mesh webbing placed within the mid section portion of the trawl. The funnel would attempt to create an eddy in the water flow at the aft section of the device where escapement portals would be used to provide salmon an egress opportunity (See Appendix A of NMFS 2003).

1.3 Related NEPA Documents

The Affected Environment and Environmental Impacts of the Alternatives sections of this environmental assessment (EA) adopt much of the information in the following environmental analyses.

Final Environmental Impact Statement for American Fisheries Act Amendments 61/61/13/8. February 2002. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

Steller sea lion protection measures Supplemental Environmental Impact Statement. November 2001. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

Programmatic Supplemental Environmental Impact Statement (PSEIS) For Alaska Groundfish Fisheries June 2004. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802 or through the NMFS web site at http://www.fakr.noaa.gov.

Environmental Assessment for the Total Allowable Catch Specifications for the Year 2005 and 2006 Alaska Groundfish Fisheries. January 2005. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

[13] John Gruver, Catcher Vessel Inter-cooperative Manager, personal communication, March 2003, United Catcher Boats Association, 4005 20th Ave. Ste. 116, Fisherman's Terminal, Seattle, WA 98199.

1.4 Public Participation

The application for the exempted fisheries permit was noticed in the Federal Register on March 18, 2005 (70 FR 13173). Comments regarding the application were solicited at the Council's April 2005 meeting. The applicant presented the project to the Council at its April 2005 meeting and the Council recommended the issuance of an EFP to authorize the work for the project.

2.0 ALTERNATIVES CONSIDERED

The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) require a range of alternatives to be analyzed for a federal action. The alternatives analyzed may be limited to a range of alternatives that could reasonably achieve the need that the proposed action is intended to address. Section 1.0 of this document described the purpose and need of the proposed action.

The purpose of this action is to allow the testing of salmon excluder devices on pollock trawl gear in the eastern Bering Sea. The applicant has worked closely with the AFSC in the development of the experimental design, and this design has been approved by the AFSC (DeMaster 2005). The experimental design requires the applicant's exemption from several groundfish regulations at 50 CFR part 679 including:

§ 679.7(a)(2): Persons are prohibited from conducting any fishing contrary to notification of inseason actions, closures or adjustments under §§ 679.20, 679.21, 679.22, and 679.25. Groundfish taken under the EFP will not be applied to the total allowable catch (TAC) limit specified in the annual harvest specifications (§ 679.20(a)). The EFP would allow for the harvest of up to 5,000 mt of groundfish. The EFP will allow for the harvest of salmon in the salmon savings areas, even though they may be closed, and the salmon harvested will not count towards that annual PSC limits (see below). As the Council and NMFS have approved for past EFP experiments dedicated to bycatch reduction, groundfish and prohibited species taken during the experiment should not be counted against the annual total allowable catch and prohibited species bycatch caps (65 FR 55223, September 13, 2000).

§679.21(e)(1)(vii) and (viii): Salmon taken during the experiment will not be counted against the bycatch limits established for chinook and non-chinook salmon. The EFP would allow for the take of up to 5,000 non-chinook salmon and 2,000 chinook salmon, the maximum amount of salmon that may be taken, estimated by the applicants. Taking salmon during the experiment is crucial for determining the effectiveness of the device. The potential exists that the amount of pollock trawl salmon bycatch taken by the industry during the EFP period will approach or exceed the salmon bycatch limits. The additional salmon taken during the experiment would create an additional burden on the pollock trawl industry, if the EFP salmon are counted toward the salmon bycatch limits and trigger closure of the salmon savings areas.

§ 679.21(e)(7)(vii) and (e)(7)(viii) and § 679.22(a)(5)(ii) and (a)(10): The applicants have also requested an exemption from closures of the Chinook Salmon Savings Area, the Chum Salmon Savings Area, and the Catcher Vessel Operational Area. The experiment must be conducted in areas of salmon concentration to ensure a sufficient sample size. These areas have high concentrations of salmon and provide an ideal location for conducting the experiment and ensuring the vessel encounters enough salmon to support the experiment.

§ 679.22(a)(7)(vii): The closure of the Steller Sea Lion Conservation Area (SCA) is based on sector specific limits of no more than 28 percent of the annual TAC taken before April 1. This section also requires the closure of the SCA to vessels greater than 99 feet length overall (LOA) to provide for harvesting by vessels in the inshore sector under 99 feet LOA. Large portions of the Chinook Salmon Savings Area and the Chum Salmon Savings Area occur in the SCA. In order to conduct the experiment where salmon are likely to occur, the EFP will include an exemption from closure of the SCA, as long as the total amount of pollock harvested by all sectors remains below the 28 percent annual TAC amount before April 1.

§ 679.50: Vessels harvesting pollock are required to have NMFS certified observers for harvest sampling and monitoring purposes. The EFP would be conducted using "sea samplers" who are NMFS trained observers but who will be performing sampling and monitoring duties for purposes of the EFP. The sea samplers would account for the groundfish and salmon catch to ensure compliance with the amounts of groundfish and PSC specified in the EFP. Whole haul sampling would be used. Because the observer duties under the EFP differ from those duties normally used by NMFS observers under § 679.50, the EFP would include an exemption from observer regulations.

To accomplish the purpose of this proposed action, within the boundaries of the groundfish regulations (50 CFR part 600 and 679) and ensuring the use of the carefully developed experimental design, an EFP pursuant to 50 CFR 679.6 must be issued. Therefore, the alternatives for this action are limited to:

Alternative 1 No EFP is issued. (Status Quo): The experiment for the salmon excluder devices would not be permitted due to potential violation of regulations, as detailed above.

Alternative 2: An EFP is issued (Preferred Alternative). The testing of the salmon excluder devices would be permitted with exemptions from §§ 679.7(a)(2) (regarding 679.20(a); 679.21(e)(1)(vii) and (viii), and (e)(7)(vii) and (viii); and 679.22(a)(10)); 679.21(e)(1)(vii) and (viii) and (e)(7)(vii) and (viii); and 679.22(a)(5)(ii), (a)(7)(vii) and (a)(10); and 679.50. The EFP would allow the applicant to conduct the experiment as designed in cooperation with the Alaska Fisheries Science Center. Details of the experiment are contained in Appendix A.

The EFP would allow for two types of testing of the salmon excluder device in fall 2005, and spring 2006. In the first experiment, a catcher vessel would be used to test minor

adjustments to the current excluder device design to improve performance. The second experiment would be conducted using a catcher/processor for the paired-tow experiment to validate the performance of the excluder device. Depending on the results from the work in 2005 and 2006, the EFP may need to be modified to allow for an additional year of testing.

Analysis will primarily focus on the estimation of the proportions of pollock and salmon excluded from the catch through the device. The experiment is designed to estimate these values for the combination of all tows, representing the value of the device in ordinary fishery conditions. Variability of escape rates between tows will be examined for indications of conditions affecting excluder performance. Combined size composition data will be tested for differences between retained and escaping fish. Groundfish harvested by the charter vessel will be retained for sale to the extent allowed under § 679.20(e) and (f) with pollock designated as the target species. If the salmon is of acceptable quality, it will be donated under the Prohibited Species Donation Program (PSDP) (§ 679.26), otherwise it will be discarded as required by § 679.21(b). Results will be presented by the applicant in preliminary and final reports made available to managers, trawlers, scientist, and the public. Details of the experimental design are in Appendix A to this document.

3.0 AFFECTED ENVIRONMENT

Information provided by the applicant for the EFP indicates that harvesting of target groundfish species and prohibited species (salmon) during the experiment would occur. Potential effects on the environment can occur with the removal of target and prohibited species during groundfish harvest. Pollock and salmon are also prey species of marine mammals, including Steller sea lions, warranting further analysis of potential effects on marine mammals. Even though this action alone has no impact socioeconomically on the pollock industry, there is the potential that the successful development of a salmon excluder device may affect the efficiency of the pollock fisheries to avoid bycatch and prosecute a fishery with less restrictions. Because of the limited amounts of harvest, manner of testing, and the short duration of the testing, other components of the environment are not likely to be impacted and further analysis is not needed. The impacts will be examined in Section 4.0.

Table 3.1 shows the components of the human environment and whether Alternative 2 may have an impact on the component beyond status quo, or Alternative 1, and require further analysis. Analysis is included for those environmental components on which Alternative 2 may have an impact beyond impacts analyzed for Alternative 1 in previous NEPA analysis (NMFS 2004 and 2005a).

Table 3.1 Resources potentially affected by Alternative 2 beyond Status Quo

Potentially Affected Component							
Physical	Benthic Comm.	Groundfish	Marine Mammals	Seabirds	Other Species	Prohibited Species	Socioeconomic
N	N	Y	Y	Y	N	Y	Y

N = no impact anticipated by the alternative on the component.
Y = an impact is possible if the alternative is implemented.

The PSEIS (NMFS 2004) provides a complete detailed description of the environment that may be affected by groundfish fishing activities in the following sections:
Ecosystem, section 3.10
Physical Oceanography of the Fisheries Management Units section 3.3
Habitat, section 3.6
Target Groundfish Species section 3.5
Marine mammals, section 3.8
Seabirds, section 3.7
Social and Economic Conditions, section 3.9
Bycatch and Incidental Catch Restrictions, Appendix F, section 5

This EA adopts the recent, detailed environmental status description in the PSEIS. Additionally, the current, detailed status of each target species category, biomass estimates, and ABC specifications for the BSAI are presented annually both in summary and in detail in the EA/IRFA for the 2005-2006 harvest specifications and the 2005 SAFE Reports (NPFMC 2004, NMFS 2005a). These documents are available through the Council's home page at http://www.fakr.noaa.gov/npfmc.

3.1 Status of Managed Groundfish Species

Designated target groundfish species and species groups in the BSAI are walleye pollock, Pacific cod, yellowfin sole, Greenland turbot, arrowtooth flounder, rock sole, other flatfish, flathead sole, sablefish, Pacific ocean perch, other rockfish, Atka mackerel, squid, and other species. This EA cross-references and summarizes the status of the stock information in the SAFE reports (NPFMC 2005a). For detailed life history, ecology, and fishery management information regarding groundfish stocks in the BSAI, see Physical Oceanography of the Fisheries Management Units (section 3.3) and Target Groundfish Species (section 3.5) in the PSEIS (NMFS 2004a) and the 2005-2006 groundfish fishery EA (NMFS 2005a).

For those stocks where enough information is available, none are considered overfished or approaching an overfished condition. The 2004 BSAI SAFE report shows the Council's ABC and OFL recommendations for 2005-2006 (NPFMC 2004). Table 3.2 below is reproduced from the 2004 SAFE Report to show the 2005-2006 ABC, OFL and TAC amounts recommended for the BSAI groundfish fisheries.

Table 3.2 2005-2006 Overfishing Level (OFL), Acceptable Biological Catch (ABC), and Total Allowable Catch (TAC) in the BSAI [Amounts are in mt]

Species	Area	2004				Recommended 2005			Recommended 2006			
		OFL	ABC	TAC	Catch**	OFL	ABC	TAC	OFL	ABC	TAC	
Pollock	EBS	2,740,000	2,560,000	1,492,000	1,248,817	2,100,000	1,960,000	1,478,500	1,944,000	1,617,000	1,487,756	
	Aleutian Islands	52,600	39,400	1,000	1,128	39,100	29,400	19,000	39,100	29,400	19,000	
	Bogoslof District	39,600	2,570	50	0	39,600	2,570	10	39,600	2,570	10	
Pacific cod	BSAI	350,000	223,000	215,500	166,776	265,000	206,000	206,000	226,000	195,000	195,000	
Sablefish	BS	4,020	3,000	2,900	748	2,950	2,440	2,440	2,690	2,310	2,310	
	AI	4,620	3,450	3,100	912	3,170	2,620	2,620	2,880	2,480	2,480	
Yellowfin sole	BSAI	135,000	114,000	86,075	68,822	148,000	124,000	90,686	133,000	114,000	90,000	
Greenland turbot	Total	19,300	4,740	3,500	2,136	19,200	3,930	3,500	11,100	3,600	3,500	
	BS	—	3,162	2,700	1,730		2,720	2,700		2,500	2,500	*
	AI	—	1,578	800	406		1,210	800		1,100	1,000	*
Arrowtooth flounder	BSAI	142,000	115,000	12,000	17,130	132,000	108,000	12,000	103,000	88,400	12,000	
Rock sole	BSAI	166,000	139,000	41,000	47,875	157,000	132,000	41,500	145,000	122,000	42,000	
Flathead sole	BSAI	75,200	61,900	19,000	16,611	70,200	58,500	19,500	56,100	48,400	20,000	
Alaska plaice	BSAI	258,000	203,000	10,000	7,624	237,000	189,000	8,000	115,000	109,000	10,000	
Other flatfish	BSAI	18,100	13,500	3,000	4,669	28,500	21,400	3,500	28,500	21,400	3,000	
Pacific Ocean perch	BSAI	15,800	13,300	12,580	11,032	17,300	14,600	12,600	17,408	14,600	12,600	
	BS	—	2,128	1,408	701		2,920	1,400		2,920	1,400	
	AI total	—	11,172	11,172	10,331		11,680	11,200		11,680	11,200	
	WAI	—	5,187	5,187	4,998		5,305	5,085		5,305	5,085	
	CAI	—	2,926	2,926	2,970		3,165	3,035		3,165	3,035	
	EAI	—	3,059	3,059	2,363		3,210	3,080		3,210	3,080	
Northern rockfish	BSAI	8,140	6,880	5,000	4,166	9,810	8,260	5,000	9,480	8,040	5,000	
Shortraker rockfish	BSAI	701	526	526	207	794	596	596	794	596	596	
Rougheye rockfish	BSAI	259	195	195	189	298	223	223	298	223	223	
Other rockfish	BSAI					1,870	1,400	1,050	1,870	1,400	1,050	
	BS	1,280	960	460	304		810	460		810	460	
	AI	846	634	634	309		590	590		590	590	
Atka mackerel	Total	78,500	66,700	63,000	54,789	147,000	124,000	63,000	127,000	107,000	63,000	
	WAI	—	24,360	20,660	17,341		46,620	20,000		40,230	20,000	
	CAI	—	31,100	31,100	27,832		52,830	35,500		45,580	35,500	
	EAI/BS	—	11,240	11,240	9,616		24,550	7,500		21,190	7,500	
Squid	BSAI	2,620	1,970	1,275	814	2,620	1,970	1,275	2,620	1,970	1,275	
Other species	BSAI	81,150	46,810	27,205	21,795	87,920	53,860	29,000	87,920	57,870	29,200	
Total	BSAI	4,193,736	3,620,535	2,000,000	1,676,853	3,509,332	3,044,769	2,000,000	3,093,360	2,547,259	2,000,000	

*TECHNICAL CORRECTION: The Council recommendation for the Bering Sea Greenland turbot TAC for 2006 was reduced from 2,700 mt to 2,500 mt to comply with the Council's policy to not have TAC exceed ABC; 200 mt was added to the Aleutian Islands TAC so the total Greenland turbot TAC remained the same at 3,500 mt.

3.2 Status of Prohibited Species Stocks

Prohibited species taken incidentally in groundfish fisheries include: Pacific salmon (chinook, coho, sockeye, chum, and pink salmon), steelhead trout, Pacific halibut, Pacific herring, and Alaska king, Tanner, and snow crabs. In order to control bycatch of prohibited species in the BSAI groundfish fisheries, the Council annually specifies

halibut and other PSC limits. The status of the prohibited species in the BSAI is detailed in Appendix F, section 5 of the PSEIS entitled: "Bycatch and Incidental Catch Restrictions" (NMFS 2004a) and in the EA/IRFA for the 2005-2006 harvest specifications (NMFS 2005a). During haul sorting, these species or species groups are to be returned to the sea with a minimum of injury except when their retention is required by other applicable law.

With the proposed action, salmon and herring are the only PSC species expected to be taken in any appreciable amounts, so additional status information regarding salmon and herring is provided in this section. Salmon and herring are the most common PSC species taken in the midwater trawl pollock fishery (NMFS 2002).

3.2.1 Salmon

See section 3.7 of this document for a description of the status of ESA listed salmon. Table 3.3 shows the bycatch of salmon in the BSAI trawl fisheries in 2004.

Table 3.3 Incidental Take of Salmon in BSAI Pelagic Trawl (Pollock) and Non-pelagic Trawl Fisheries (non-pelagic trawls mostly targeting flatfish and cod) (values are in numbers of fish), Year 2004 data are from January 20, 2004 through December 31, 2004.

BSAI Trawl Fishery Group			
	Chinook	Other Salmon	Total
Midwater Pollock	51,131	436,543	487,674
Non-pelagic Trawl	8,301	9,505	17,806
Total Trawl	59,432	446,048	505,480

Chinook salmon incidental catch (excluding CDQ) through December 31, 2004, in the BSAI was 59,432 fish, of which 51,131 were taken in the pollock trawl fishery (86%). Incidental catch of chinook salmon in the BSAI (non-CDQ) was well above its annual limit of 26,825 for 2004 for the pollock trawl fishery (191%). Additionally, the Chum Salmon Savings Area was closed again in 2004 due to attainment of its seasonal bycatch limit. This occurred from September 14 through October 14, 2004. NMFS' prohibited species reports indicate that 163,674 non-chinook salmon were taken in the CVOA in 2004 (421% of the 38,850 cap for the CVOA). Because the bycatch limit for chinook salmon that triggers closure of the Chinook Salmon Savings Area was also attained in 2004 (non-CDQ catch of 51,134 of the 26,825 cap for non-CDQ fishing), the Chinook Salmon Savings Area was closed to the pollock fishery on September 5, 2004.

Evidence suggests that these chinook salmon are derived from stocks from many areas. For example, Myers, *et al.* found, on the basis of scale analysis of BSAI observer samples, "stock composition estimates for the five brood-year strata (1991-1995)

averaged 56% Western Alaska, 31% Cook Inlet, 8% Southeast Alaska-British Columbia, and 5% Kamchatka chinook salmon." Pacific Northwest chinook salmon would have been included in the Southeast Alaska-British Columbia grouping.[14]

Through April 16, 2005, the bycatch of chinook salmon in the AFA pollock fishery is 25,783 fish. This is 96% of the annual limit of 26,825 chinook salmon. Hence, the AFA pollock fishery is approaching its 2005 chinook salmon PSC limit, and it appears likely that the Chinook Salmon Savings Areas will need to be closed for the fall of 2005 (NMFS inseason data at http://www.fakr.noaa.gov).

3.2.2 Pacific Herring

Pacific herring bycatch rates in the midwater pollock trawl fishery have decreased somewhat since the early 1990's although incidental catches of herring taken in the pollock fishery have occasionally approached the PSC limit for that species. The Pacific herring PSC limit in 2004 was 1,456 mt and a total of 965 mt of Pacific herring was taken in the BSAI trawl fisheries last year (66%). In 2003, herring bycatch in the BSAI pollock fishery was approximately 87% of its annual limit for that fishery (1,028 mt out of a limit of 1,184). The Herring Savings Areas are shown figure 4 to 50 CFR part 679. Only the Summer savings areas 1 and 2 are located in the area where the EFP activities would be conducted. Closures of these areas are specified in 50 CFR 679.21(e)(7)(vi). As of April 16, 2005, 0 percent of the PSC limit for herring has been taken in the pelagic pollock trawl fishery.

3.3 Forage Species and Nonspecified Species

Forage fish species are abundant fishes that are preyed upon by marine mammals, seabirds and other commercially important groundfish species. The following forage species are included in the forage fish category established in 1998: Osmeridae (which includes capelin and eulachon), Myctophidae (lanternfishes), Bathylagidae (deep sea smelts), Ammodytidae (sand lances), Trichodontidae (sandfishes), Pholididae (gunnels), Stichaeidae (pricklebacks), Gonostomatidae (bristlemouths), and the Order Euphausiacea (krill). For further detailed discussion of forage fish species, see section 3.10 of the PSEIS (NMFS 2004) or section 4.4 of the EA/IRFA for the 2005-2006 harvest specifications (NMFS 2005a). Nonspecified species are fish and invertebrate species that are not managed under the FMPs, such as jellyfish and sea stars. Detailed information on nonspecified species may be found in section 3.10 of the PSEIS (NMFS 2004a) and section 4.4 of the 2005-2006 harvest specification EA/RFA (NMFS 2005a)

3.4 Status of Marine Habitat

The adjacent marine waters outside the exclusive economic zone, adjacent State of Alaska waters, shoreline, freshwater inflows, and atmosphere above the waters,

[14] Meyers, Katherine W. School of Aquatic and Fisheries Science, University of Washington. Personal communication, 11-16-04.

constitutes habitat for prey species, other life stages, and species that move in and out of, or interact with, the target species in the management areas (NMFS 2001a). Distinctive aspects of the habitat include water depth, substrate composition, substrate infauna, light penetration, water chemistry (salinity, temperature, nutrients, sediment load, color, etc.), currents, tidal action, phytoplankton and zooplankton production, associated species, natural disturbance regimes, and the seasonal variability of each aspect. Substrate types include bedrock, cobbles, sand, shale, mud, silt, and various combinations of organic material and invertebrates that may be termed biogenic or "living" substrate. Biogenic substrates present in these management areas include corals, tunicates, mussel beds, tube worms. These substrates have the aspect of ecological state (from pioneer to climax) in addition to the organic and inorganic components. Ecological state is heavily dependant on natural and anthropogenic disturbance regimes.

The recently completed EIS for the Identification and Conservation of Essential Fish Habitat (NMFS 2005b) as well as the FMPs (NPFMC 1999a, 1999b) contain descriptions of habitat requirements and life histories of the managed species. All the marine waters and benthic substrates in the management areas comprise the habitat of the target species. Much remains to be learned about habitat requirements for most of the target species. A detailed discussion of habitat and potential effects of fishing on habitat can be found in Appendix B of the recent EFH EIS (NMFS 2005b).

3.5 Status of Marine Mammal Populations

Marine mammals not listed under the Endangered Species Act (ESA) that may be present in the Gulf of Alaska (GOA) and BSAI include cetaceans, [minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Dall's porpoise *(Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and the beaked whales (e.g., *Berardius bairdii* and *Mesoplodon spp*.)] as well as pinnipeds [northern fur seals (*Callorhinus ursinus*), and Pacific harbor seals (*Phoca vitulina*)] and the sea otter (*Enhydra lutris*). The sea otter has been identified as a candidate for listing under the ESA, and the US Fish and Wildlife Service (USFWS) is conducting a formal review. For further information on marine mammal population status, see Section 3.8 of the PSEIS (NMFS 2004a) as well as section 4.6 of the EA/IRFA for the 2005-2006 annual groundfish harvest specifications (NMFS 2005a).

3.6 Seabird Species Population Status and Raptor Interactions with Groundfish Fisheries

Seabirds by definition spend the majority of their life at sea rather than on land. Alaska's extensive estuaries and offshore waters provide breeding, feeding, and migrating habitat for approximately 100 million seabirds. Thirty-four species breed in the BSAI and GOA regions numbering 36 million and 12 million individuals in each respective area. Another 6 species breed at other locations in Alaska. In addition, up to 50 million shearwaters and 3 albatross species feed in Alaskan waters during the summer months but breed farther south. The current world population of short-tailed albatross is approximately 1200 birds. Detailed seabird information on species population status, life

history, ecology, and bycatch is contained in section 3.7 of the PSEIS (NMFS 2004a) and section 3.7 of the Steller sea lion SEIS (NMFS 2001b).

The Bald Eagle Protection Act (16 U.S.C. 668(a)) and the Migratory Bird Treaty Act (16 U. S. C. 703-712) prohibit the taking of bald eagles. Taking includes causing the injury or death of an eagle. In February 2001, the USFWS surveyed the pollock shoreside fish processing facilities in Unalaska regarding interactions with Bald Eagles.[18] Anecdotal information indicated that eagles were attracted to the pollock vessels delivering shoreside, with birds entering the ship holds, and becoming caught in the hoppers as fish is being delivered. It was determined that the covering of fish totes on deck, cleaning the decks of fish parts and dragging the trawl nets through the water to remove fish parts were key to reducing the food source attraction for the eagles. It is not known what percentage of the fishing industry uses these practices. Occasionally an injured bird would be sent to the Bird Treatment and Learning Center (BTLC) in Anchorage, Alaska for rehabilitation. The BTLC maintains a database recording information about the nature and cause of each birds injury, but many birds received from Unalaska are not accompanied by information on the cause of the injury. The current database contains no birds reported as injured by groundfish fishing activities.[19] The BTLC staff also reported that they received an owl that had head injuries from flying into lights on a fishing vessel and have had an eagle injured by being stuck in a crab pot. It is believed that the incident of raptor injury or death from interactions with the groundfish fisheries is rare, (one or two per year).

NMFS, the USFWS, and an AFA pollock fishing cooperative called the Pollock Conservation Cooperative (PCC) are jointly working to better understand and reduce seabird interactions with trawl vessels. For trawl gear, interaction centers on potential strikes with the vessel's "third wire" (net sounder) cable and perhaps the trawl cables (warps) themselves. A recent study underway is evaluating this interaction and developing potential mitigation measures for trawl vessels and particularly for catcher/processors that release offal as part of processing operations (Melvin, et al. 2004). These measures remain under study and have not been considered for regulation at this time. Additionally, the current detailed status of information on environmental effects of harvest specifications on ESA-listed seabirds can be found in the Biological Opinion on the effects of the TAC-setting process for the Gulf of Alaska and Bering Sea/Aleutian Islands groundfish fisheries to Short-tailed albatross and Steller's Eider (United States Fish and Wildlife Service 2003).

[18]Michael Jacobson, Wildlife Biologist, Personal Communication, April 22, 2003, USFWS 3000 Vintage Blvd. Ste. 201, Juneau, AK 99801.

[19]Ferg Fergeson, Volunteer, Personal Communication, April 22, 2003, The Bird Treatment and Learning Center, 6132 Nielson Way, Anchorage, AK.

3.7 Status of Endangered or Threatened Species

The Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*; ESA), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by the NMFS for most marine mammal species, marine and anadromous fish species, and marine plants species, and by the USFWS for bird species, and terrestrial and freshwater wildlife and plant species.

The designation of an ESA-listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus and sea otter) and anadromous fish species. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species is designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from undertaking actions that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

Federal agencies have an affirmative mandate to conserve listed species. One assurance of this is Federal actions, activities or authorizations (hereafter referred to as Federal action) must be in compliance with the provisions of the ESA. Section 7 of the ESA provides a mechanism for consultation by the Federal action agency with the appropriate expert agency (NMFS or USFWS). Informal consultations, resulting in letters of concurrence, are conducted for Federal actions that may affect, but are not expected to adversely affect, listed species or critical habitat. Formal consultations, resulting in biological opinions, are conducted for Federal actions that may have an adverse affect on the listed species. Through the biological opinion, a determination is made as to whether the proposed action is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification). If the determination is that the action proposed (or ongoing) will cause jeopardy, reasonable and prudent alternatives may be suggested which, if implemented, would modify the action to avoid the likelihood of jeopardy to the species or destruction or adverse modification of designated critical habitat. A biological opinion with the conclusion of no jeopardy may contain conservation recommendations intended to further reduce the negative impacts to the listed species. These conservation recommendations are advisory

to the action agency [50 CFR 402.25(j)]. If a likelihood exists of any taking[20] occurring during promulgation of the action, an incidental take statement may be appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action.

Twenty-four species occurring in the GOA and/or BSAI groundfish management areas are currently listed as endangered or threatened under the ESA (Table 3.4). The group includes great whales, pinnipeds, Pacific salmon and steelhead, and seabirds.

Table 3.4 ESA listed and candidate species that range into the BSAI or GOA groundfish management areas and whether Reinitiation of Section 7 Consultation is occurring

.

Common Name	Scientific Name	ESA Status	Whether Reinitiation of ESA Consultation is occurring
Blue Whale	*Balaenoptera musculus*	Endangered	No
Bowhead Whale	*Balaena mysticetus*	Endangered	No
Fin Whale	*Balaenoptera physalus*	Endangered	No
Humpback Whale	*Megaptera novaeangliae*	Endangered	No
Right Whale	*Balaena glacialis*	Endangered	No
Sei Whale	*Balaenoptera borealis*	Endangered	No
Sperm Whale	*Physeter macrocephalus*	Endangered	No
Steller Sea Lion (Western population)	*Eumetopias jubatus*	Endangered	No
Steller Sea Lion (Eastern Population)	*Eumetopias jubatus*	Threatened	No
Chinook Salmon (Puget Sound)	*Oncorhynchus tshawytscha*	Threatened	Yes
Chinook Salmon (Lower Columbia R.)	*Oncorhynchus tshawytscha*	Threatened	Yes
Chinook Salmon (Upper Columbia R. Spring)	*Oncorhynchus tshawytscha*	Endangered	Yes
Chinook Salmon (Upper Willamette)	*Oncorhynchus tshawytscha*	Threatened	Yes
Chinook Salmon (Snake River Spring/Summer)	*Oncorhynchus tshawytscha*	Threatened	Yes
Chinook Salmon (Snake River Fall)	*Oncorhynchus tshawytscha*	Threatened	Yes
Sockeye Salmon (Snake River)	*Oncorhynchus nerka*	Endangered	No
Steelhead (Upper Columbia River)	*Onchorynchus mykiss*	Endangered	No
Steelhead (Middle Columbia River)	*Onchorynchus mykiss*	Threatened	No
Steelhead (Lower Columbia River)	*Onchorynchus mykiss*	Threatened	No
Steelhead (Upper Willamette River)	*Onchorynchus mykiss*	Threatened	No
Steelhead (Snake River Basin)	*Onchorynchus mykiss*	Threatened	No

[20] The term "take" under the ESA means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct" [16 U.S.C. § 1538(a)(1)(B)].

Common Name	Scientific Name	ESA Status	Whether Reinitiation of ESA Consultation is occurring
Kittlitz Murrelet[1]	*Brachyramphus brevirostris*	Candidate	No
Steller's Eider [1]	*Polysticta stelleri*	Threatened	No
Short-tailed Albatross [1]	*Phoebaotria albatrus*	Endangered	No
Spectacled Eider[1]	*Somateria fishcheri*	Threatened	No
Northern Sea Otter[1]	*Enhydra lutris*	Candidate	No

[1]The Kittlitz murrelet, Steller's eider, short-tailed albatross, spectacled eider, and Northern sea otter are species under the jurisdiction of the U.S. Fish and Wildlife Service. Critical habitat has been established for the Steller's eider (66 FR 8850, February 2, 2001) and for the spectacled eider (66 FR 9146, February 6, 2001). The northern sea otter has been proposed by USFWS as a candidate species (November 9, 2000; 65 FR 67343). The Kittlitz murrelet has been proposed as a candidate species by USFWS (69 FR May 4, 2004).

Section 7 consultations with respect to actions of the federal groundfish fisheries have been done for all the species listed in Table 3.1, either individually or in groups. An FMP level biological opinion was prepared pursuant to Section 7 of the ESA on all NMFS listed species present in the fishery management areas for the entire groundfish fisheries program. This comprehensive biological opinion (FMP BiOp) was issued November 30, 2000 (NMFS 2000). The Steller sea lion was the only species to be determined to be in jeopardy or risk of adverse modification of its habitat based upon the FMPs. NMFS has implemented protection measures for the groundfish fisheries that avoid the likelihood of posing jeopardy or adverse modification of critical habitat for the western distinct population segment of Steller sea lions (NMFS 2001b, appendix A and 68 FR 204, January 2, 2003). Consultations prepared subsequent to 1998 are summarized below.

Steller sea lions and other ESA-listed marine mammals.

In compliance with the ESA, NMFS developed a reasonable and prudent alternative (RPA) for the BSAI and GOA groundfish fisheries to avoid jeopardy to endangered Steller sea lions and adverse modification of their critical habitat. The RPA is based on the following three main principles: (1) temporal dispersion of fishing effort, (2) spatial dispersion of fishing effort, and (3) sufficient protection from fisheries competition for prey in waters adjacent to rookeries and important haulouts. The RPA focused on three fisheries that posed the most concern for competition with Steller sea lions for prey; the BSAI and GOA pollock and Pacific cod fisheries, and the BSAI Atka mackerel fishery. Neither the conclusions of the FMP BiOp (NMFS 2000) nor the RPA were adopted by the Council at its December 2000 meeting for numerous reasons, including lack of confidence in the scientific premises supporting the biological opinion, lack of public and Council input during its development, and general disagreement about the efficacy of the RPA measures. Subsequently, the Alaska congressional delegation sponsored a rider to the 2001 appropriations bill (Section 209 of Pub. L. 106-554) that provided direction for a one-year phase-in of the RPA and opportunity for the Council to assess and potentially modify the RPA prior to full implementation in 2002 based on independent scientific reviews or other new information.

The protection measures in the emergency rule (66 FR 7276, January 22, 2001) reflect the first year implementation phase of the RPA. In January 2001, the Council established an RPA Committee to make recommendations on Steller sea lion protection measures for the second half of 2001 and to develop Steller sea lion protection measures for 2002 and beyond. The RPA Committee was composed of 21 members from the fishing community, the environmental community, NMFS, the Council's Science and Statistical Committee, the Council's Advisory Panel, and ADF&G. In April 2001, the RPA Committee presented its recommendations to the Council for fishery management measures for the second half of 2001. These recommendations were then forwarded by the Council to NMFS and were implemented by amendment to an emergency interim rule (66 FR 37167, July 17, 2001). In June 2001, the RPA Committee recommended Steller sea lion protection measures for 2002 and beyond, and the Council modified and forwarded these recommendations to NMFS in October 2001. ESA consultation was requested on these protection measures and a biological opinion (2001 BiOp) was prepared by the Protected Resources Division (NMFS 2001b, Appendix A). The final 2001 BiOp concluded that the proposed Steller sea lion protection measures were not likely to jeopardize the continued existence of either the eastern or western distinct population segment of Steller sea lions or adversely modify their critical habitat. These protection measures were implemented by final rule in 2003 (68 FR 204, January 2, 2003). Detailed analysis of the Steller sea lion protection measures is contained in the SEIS for Steller sea lion protection measures (NMFS 2001b).

On December 18, 2002, the United States District Court for the Western District of Washington remanded to NMFS the 2001 BiOp for the groundfish fisheries managed pursuant to the Steller sea lion protection measures published on January 2, 2003 (68 FR 204). Greenpeace, et al. v. National Marine Fisheries Service, No.C98–492Z (W.D. Wash.). The Court held that the biological opinion's findings of no jeopardy to the continued existence of endangered Steller sea lions and no adverse modification of their critical habitat were arbitrary and capricious. On December 30, 2002, the Court issued an Order declaring that the 2001 BiOp "shall remain effective until June 30, 2003," while NMFS completes the response to the remand. NMFS' response therefore evaluated the effects of fishing activities authorized pursuant to the Steller sea lion protection measures final rule on listed species and critical habitat. The response was completed and accepted by the court on June 19, 2003 and may be found at http://www.fakr.noaa.gov/protectedresources/stellers/biop2002/final.htm.

ESA-Listed Pacific Salmon and Steelhead

Using the year 2000 proposed harvest specifications, NMFS reinitiated consultations for ESA listed Pacific salmon for twelve ESUs of Pacific salmon and steelhead that are thought to range into Alaskan waters. The consultation for the Pacific salmon and steelhead species was issued December 22, 1999, and contained a determination of not likely to jeopardize their continued existence. No critical habitat has been designated for these species within the action area, therefore, none will be affected by the groundfish fisheries. The biological opinion reviewed the status of 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, the environmental baseline for the action area, the effects of the proposed fishery and the cumulative effects. The opinion was accompanied by an Incidental Take Statement (ITS) that states the catch of listed fish will be limited specifically by the measures proposed to limit the total bycatch of chinook salmon. Bycatch should be minimized to the extent possible and in any case should not exceed 55,000 chinook per year in the BSAI fisheries or 40,000 chinook salmon per year in the GOA fisheries. The FMP BiOp (NMFS 2000) stated that ESA listed Pacific salmon and steeelhead are not in jeopardy or risk of adverse modification of their habitat by the groundfish fisheries in the BSAI or GOA, and reaffirmed the ITS in the previous opinion.

NMFS has conducted a code wire tag study on surrogate stocks of ESA listed salmon for the Upper Willamette and Lower Columbia rivers nearly annually since 1984. For all the years data have been collected, no more than 3 tagged fish in a year was estimated taken in the BSAI groundfish fisheries[21].

Chinook salmon incidental catch in the BSAI in 2004 was 59,432 fish in the BSAI groundfish fisheries. NMFS has requested reinitiation of formal Section 7 consultation of the ESA-listed chinook salmon incidental takes in the BSAI groundfish fishery because the groundfish fisheries exceeded the amount stated in the incidental take statement in 2004 (Balsiger 2004). Approximately 86 percent of the 2004 incidental catch of chinook salmon was taken in the pelagic trawl fisheries targeting pollock in the BSAI.

Regulations at 50 CFR 679.21(e)(1)(vii) authorize the incidental catch of no more than 29,000 chinook salmon, annually, in the Chinook Salmon Savings Area of the BS by trawl vessels targeting pollock for 2004, and future years. The incidental catch of chinook salmon in the BS pollock trawl fishery exceeded the 29,000 fish limit and as a result the Chinook Salmon Savings Areas were closed to pollock trawling September 5, 2004. On September 14, 2004, the Chum Salmon Savings Area was also closed, due to the trawl fishery reaching the 42,000 non-chinook salmon PSC limit in the Catcher Vessel Operating Area (CVOA).

According to the EA/RFA for 2005-2006 harvest specifications, the high incidental catch of salmon in the BSAI in 2004 may well have been exacerbated by the closure of the salmon savings areas (NMFS 2005a). Following these closures, the pollock fleet apparently moved into areas where they experienced higher incidental catch rates of salmon. It is not known if 2004 was an anomalously high year for the incidental catch of salmon in the BSAI or if similar rates of incidental take of salmon during the 2005 and 2006 groundfish fisheries can be expected.

[21]Adrian Celewycz, NMFS, Auke Bay Lab, Personal Communication regarding CWT database, November 14, 2002.

The ESA incidental take statement for listed salmon is 55,000 chinook salmon in the BSAI and 40,000 chinook salmon in the GOA (NMFS, 1999). On December 1, 2004, NMFS requested reinitiation of formal Section 7 consultation of the ESA listed chinook salmon incidental takes in the BSAI groundfish fishery because the groundfish fisheries exceeded the amount stated in the incidental take statement in 2004. The Council is in the process of considering changes to the measures in place to reduce salmon bycatch in the BSAI pollock fishery. One measure under consideration is modeled after the salmon bycatch management contracts implemented by the AFA pollock cooperatives. Another is the bycatch hot spot avoidance program used by the pollock cooperatives in conjunction with a third-party data collection and analysis contractor called Sea State. Additionally, further research to develop an effective salmon bycatch reduction device is cited as a potentially important area of focus for improving salmon bycatch control measures (NMFS 2005a).

ESA-Listed Seabirds

The only new information on seabirds since 1998 concerns the taking of short-tailed albatross and subsequent Section 7 consultations on listed seabird species. It is summarized below:

On 22 October 1998, NMFS reported the incidental take of 2 endangered short-tailed albatrosses in the hook-and-line groundfish fishery of the BSAI. The first bird was taken on 21 September 1998, at 57 30' N, 173 57' W. The bird had identifying leg bands from its natal breeding colony in Japan. It was 8 years old. In a separate incident, one short-tailed albatross was observed taken on September 28, 1998, at 58 27' N, 175 16' W. A second albatross was also taken on 28 September 1998, but the species could not be confirmed (3 species of albatross occur in the North Pacific). Both vessels were using seabird avoidance measures when the birds were hooked.

The USFWS listed the short-tailed albatross as an endangered species under the ESA throughout its United States range (65 FR 46644, July 31, 2000). Under terms of the 1999 biological opinion ITS, a take of up to 4 birds is allowed during the 2-year period of 1999 and 2000 for the BSAI and GOA hook-and-line groundfish fisheries (USFWS 1999). NMFS Regional Office, NMFS Groundfish Observer Program, and the USFWS Offices of Ecological Services and Migratory Bird Management are actively coordinating efforts and communicating with each other in response to the 1998 take incidents and are complying to the fullest extent with ESA requirements to protect this species. Regulations at 50 CFR 679.24(e) and 679.42(b)(2) contain specifics regarding seabird avoidance measures. In February 1999, NMFS presented an analysis on seabird mitigation measures to the Council that investigated possible revisions to the currently required seabird avoidance methods that could be employed by the long-line fleet to further reduce the take of seabirds.

The Council took final action at its April 1999 meeting to revise the existing requirements for seabird avoidance measures. The Council's preferred alternative would: 1) explicitly specify that weights must be added to the groundline; 2) the offal discharge

regulation would require that prior to any offal discharge, embedded hooks must be removed; 3) streamer lines, towed buoy bags and float devices could both qualify as bird scaring lines; 4) towed boards and sticks would no longer qualify as seabird avoidance measures; 5) the use of bird scaring lines would be required in conjunction to using a lining tube; and 6) night-setting would continue to be an option and would not require the concurrent use of a bird scaring line. These revised seabird avoidance measures were implemented in 2004 (69 FR 1930, January 13, 2004). The avoidance measures affect the method of harvest in the hook-and-line fisheries, but are not intended to affect the amount of harvest.

A biological opinion on the BSAI hook-and-line groundfish fishery and the BSAI trawl groundfish fishery for the ESA-listed short-tailed albatross was issued March 19, 1999, by the USFWS for the years 1999 through 2000 (USFWS 1999). The conclusion continued a no jeopardy determination and the ITS expressing the requirement to immediately reinitiate consultations if incidental takes exceed four short-tailed albatross over two years time. In September 2000, NMFS requested re-initiation of consultation for all listed species under the jurisdiction of the USFWS, including the short-tailed albatross, spectacled eider, and Steller's eider for the BSAI and GOA FMPs and 2001-2004 TAC specifications. Based on NMFS' review of the fishery action and the consultation material provided to USFWS, NMFS concluded that the BSAI and GOA groundfish fisheries are not likely to adversely affect either the spectacled eider or the Steller's eider or destroy or adversely modify the critical habitat that has been proposed for each of these species. Critical habitat has now been established for both the Steller's eider and the spectacled eider (66 FR 8850, February 2, 2001 and 66 FR 9146, February 6, 2001, respectively).

The USFWS new biological opinion on the effects of the groundfish fisheries on listed seabirds was issued in 2003. The USFWS's Biological Opinion details the status of information on environmental effects of harvest specifications on sea birds in Alaska (USFWS 2003). Additionally, the Pollock Conservation Cooperative, NMFS, and USFWS are jointly working to better understand and reduce seabird interactions with trawl vessels. For trawl gear, interaction centers on potential strikes with the vessel's "third wire" (net sounder) cable or the trawl cables (warps) themselves. A field project study started in 2003 is evaluating this interaction developing potential mitigation measures for trawl vessels and particularly for catcher processors which may release offal as part of processing operations (Melvin, et al. 2004). These measures remain under study and have not been considered for regulation at this time.

3.8 Ecosystem Considerations

Ecosystem considerations for the BSAI and GOA groundfish fisheries are detailed in the Ecosystem section (section 3.10) of the PSEIS (NMFS 2004a). That document provides updated information on biodiversity, essential fish habitats, consumptive and non-consumptive sustainable yields, and human considerations. This information is intended to be incorporated into ecosystem-based management decisions such as establishing ABC and TAC levels.

3.9 The Human Environment

The operation of the groundfish fishery in the BSAI and the GOA is described by gear type in the PSEIS (NMFS 2004a). General background on the fisheries with regard to each species is given in the BSAI and GOA groundfish FMPs (NPFMC 1999a and 1999b). The pollock trawl and State salmon fishery sectors are the only sectors that may be affected by this proposed action.

3.9.1 Fishery Participants

For detailed information on the fishery participants including vessels and processors in the pollock fishery see sections 3.3 of the Final Environmental Impact Statement for the American Fisheries Act Amendments 61/61/13/8 (NMFS 2002). Additional information regarding fishery participants can be found in the 2004 annual SAFE report (NPFMC, 2004).

3.9.2 Economic Aspects of the Fishery

The most recent description of the economic aspects of the groundfish fishery is contained in the 2003 Economic SAFE report (Hiatt, Felthoven, and Terry, 2004). This report, incorporated herein by reference, presents the economic status of groundfish fisheries off Alaska in terms of economic activity and outputs using estimates of catch, bycatch, ex-vessel prices and value, the size and level of activity of the groundfish fleet, the weight and value of processed products, wholesale prices, exports, and cold storage holdings. The catch, fleet size, and activity data are for the fishing industry activities that are reflected in Weekly Production Reports, Observer Reports, fish tickets from processors who file Weekly Production Reports, and the annual survey of groundfish processors. External factors that, in part, determine the economic status of the fisheries are foreign exchange rates, the prices and price indices of products that compete with products from these fisheries, and fishery imports.

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

The environmental impacts generally associated with fishery management actions are effects resulting from (1) harvest of fish stocks which may result in changes in food availability to predators and scavengers, changes in the population structure of target fish stocks, and changes in the marine ecosystem community structure; (2) changes in the physical and biological structure of the marine environment as a result of fishing practices, e.g., effects of gear use and fish processing discards; and (3) entanglement/entrapment of non-target organisms in active or inactive fishing gear. A recent summary of the effects associated with groundfish harvest on the biological environment is discussed in the 2003 groundfish fishery EA (NMFS 2003). The PSEIS (NMFS 2004a) analyzes the impacts of fishing over a range of TAC specifications.

As described in Section 3, Table 3.1, the proposed action may impact only certain components of the environment: groundfish target species, prohibited species, marine mammals, seabirds, and socioeconomic components. This section will focus on only these components of the environment.

The criteria used to evaluate the significance of impacts on each component of the environment are adopted by reference from the 2005 and 2006 Harvest specifications EA/IRFA (NMFS 2005a).

4.1 Groundfish Target Species

The potential direct and indirect effects of the groundfish fisheries on target species are detailed in section 3.5 of the PSEIS (NMFS 2004a). Direct effects include fishing mortality for each target species and spatial and temporal concentration of catch. Indirect effects include the changes in prey composition and changes in habitat suitability. Indirect effects are not likely to occur with either alternative because the proposed action does not change overall fishing practices that indirectly affect prey composition and habitat suitability.

Alternative 1: Status Quo

All direct, indirect and cumulative effects under this alternative would be insignificant for the same reasons as explained in sections 4.2 and 5.0 of the 2005 and 2006 Harvest Specifications EA/IRFA (NMFS 2005a).

Because the amount of pollock and other groundfish harvested under the proposed experiment (5,000 mt in 2005-2006 and 2,500 mt in 2006-2007) and in the directed pollock fishery (TAC 1,478,500 mt for 2005 and 1,487,756 in 2006) is well below the pollock ABC for 2005 and 2006 (1.9 million mt for 2005 and 1.6 million mt for 2006), it is unlikely that not harvesting groundfish under the status quo compared to Alternative 2 would have any beneficial effect for the groundfish stocks.

Alternative 2: Issue the EFP

Temporal and spatial concentration of harvest is not likely to occur under Alternative 2. Temporal concentration of harvest is not likely because the experiments will occur during two seasons and over the time period of approximately 30-40 days for one vessel and 15 days with the other vessel. Spatial concentration also is not likely because the harvest during the experiment occurs in various locations that are known for high chum and chinook salmon bycatch rates but are also common pollock trawling areas. These potential areas cover many square miles, (Fig. 1.1 and 1.2) and harvest will be done by two vessels. By comparison, the overall number of active trawl vessels targeting pollock in the Bering Sea is approximately 120 vessels.

The only potential direct effect on target species is groundfish fishing mortality during the testing of the salmon excluder devices. The applicants for the EFP have requested a

total of 5,000 mt of allocated groundfish in 2005-2006 (September 2005 through March 2006) and 2,500 mt of groundfish during 2006-2007 September 2006 through March 2007. This overall quantity of groundfish will be used in the following manner. The requested groundfish allocation for the first year of research will be used to conduct two separate experiments. The first experiment will be conducted in fall 2005 only and will utilize 2,500 mt of groundfish in addition to approximately 5,500 mt of the EFP applicant's own AFA groundfish. This test will evaluate the performance of the current excluder design on an at-sea processor. A "ground truth" experiment is necessary to evaluate the potential influence on escapement that occurred from the use of a recapture net in previous experiments. The EFP groundfish allocation of 2,500 for this experiment is needed for the portion of the EFP test conducted inside the Salmon Savings Areas and CVOA. The second experiment during the first year will utilize 2,500 mt of groundfish starting in the fall of 2005 and possibly continuing into the winter of 2006 (September 2005 through March 2006). The objective of this test is to continue design and development work to improve the performance of the salmon excluder. This latter study will be conducted on an AFA-qualified catcher vessel.

Additionally, the applicant has requested permission for EFP testing during a second year (September 2006 through March 2007). The requested allocation of 2,500 mt of groundfish for the second year would be used to continue development work on the salmon excluder aboard an AFA catcher vessel should such additional design improvement work be necessary.

The expected total harvest of allocated groundfish species for the two experiments during the first year (fall 2005 to winter 2006) is 5,000 mt. Should the second year of design improvement work be necessary, a maximum of 2,500 mt of allocated groundfish species starting in the fall of 2006 and possibly continuing through the winter of 2007 would be harvested. Groundfish catches during all phases of the proposed research are expected to be approximately 98% pollock, and 2% is expected to be other groundfish species such as Pacific cod and flatfish. The pollock TAC for the Eastern Bering Sea is 1,478,500 mt for 2005 and 1,487,756 mt for 2006 (assuming 2006 TAC remains as currently specified). The acceptable biological catch is 1,960,000 in 2005 and 1,617,000 in 2006. The potential harvest of pollock under this proposed action is less than one-third of one percent of the TAC for the first year and one-sixth of one percent the following year. The combined harvest of the TAC and the groundfish that would be allowed under the EFP is well below the pollock ABC in each year. The harvest of other groundfish (Pacific cod and other flatfish) under the proposed action is also far less than one percent of the TACs for the other groundfish species.

Issuing the EFP will allow for the additional removal of approximately 5,000 mt of groundfish (primarily pollock) from the BSAI in 2005 and 2,500 mt in 2006 above the TACs for the Eastern Bering Sea. As described above, this amount of harvest is far less than one percent of the pollock TAC and ABC. Additionally, the expected additional catch of Pacific cod and flatfish, if the EFP is approved, is a relatively small fraction of the TACs and ABCs in the Bering Sea/ Aleutian Islands for those species. Because the amount of groundfish anticipated to be harvested during the experiment is very small and

well below the ABCs, it is not likely that harvesting groundfish under Alternative 2 will have any effect on fishing mortality for groundfish stocks and is therefore insignificant.

The only potential cumulative effect on the target species identified is the implementation of the groundfish fisheries under the annual harvest specifications. As explained above the combined effects of harvest under the annual harvest specification and harvest under this EFP is well below the ABC for pollock and negligible for other groundfish species. Therefore, no additional cumulative effect is expected on target species.

4.2 Effects on Prohibited Species in Groundfish Fisheries Harvest

Catches of Pacific halibut, crabs, salmon, and herring are controlled by PSC limits for the BSAI that are established in regulations as part of the annual specification process. Appendix F, section 5 of the PSEIS (NMFS 2004a) analyzes the impacts of fishing over a range of TAC specifications and compares them to impacts of status quo fishing on prohibited species. Potential direct and indirect effects include: the impact of incidental catch of prohibited species in the groundfish fisheries on stocks of prohibited species, the impact of incidental catch of prohibited species in the groundfish fisheries on the harvest levels of those species in their respective directed fisheries, and the effect on levels of incidental catch of prohibited species in the groundfish fisheries. An indirect effect of the groundfish fisheries is a potential change to the prey composition for PSC species. This action is not likely to affect PSC prey because any changes to the habitat or prey composition during the experiment is not expected.

Alternative 1: Status Quo

All direct, indirect, and cumulative effects under this alternative would be insignificant or unknown for the same reasons as explained in sections 4.5 and 5.0 of the 2005 and 2006 Harvest Specifications EA/IRFA (NMFS 2005a).

If the EFP is not issued, an effective salmon excluder device is less likely to be developed, and the pollock fisheries may continue to experience rates of salmon bycatch that could potentially result in the restriction of pollock fishing. Less pollock may be taken under this alternative when the Chum and/or Chinook Salmon Savings Areas and the CVOA are closed. For instance, the PSC limits for the Chinook and Chum Salmon Savings Areas were reached in 2004 and negative effects on the Bering Sea pollock fishery were experienced (NMFS 2005a). These impacts included higher operating costs for shoreside delivery vessels fishing outside the Salmon Savings Areas and a failure to reach the 2004 pollock TAC (NMFS 2005a). Of additional concern here is that there is some evidence that salmon bycatch rates were actually higher for the fishing that occurred outside the Salmon Savings Areas once the savings areas closed, therefore possibly increasing salmon bycatch in the pollock fishery over what might have otherwise occurred. This suggests that Alternative One, even if it does reduce pollock and salmon catches by small amounts relative to the TAC and overall salmon bycatch caps (by the amount of groundfish and salmon bycatch proposed for the research) is

inferior to Alternative 2 because with Alternative 1 there is a lower chance that an effective salmon excluder device will be developed.

Alternative 2: Issue the EFP

Salmon and herring are the primary PSC species of concern in the BSAI directed pollock fishery (NMFS 2002), and are potentially impacted by the proposed action. In order to have sufficient sample sizes to support the statistical analysis, the experimental design calls for salmon bycatch limits for the EFP experiments (combined) in 2005-2006 of 2,000 chinook salmon and 5,000 chum salmon that would not count towards the respective bycatch caps. For 2006-2007, the applicant has requested an allowance of 2,500 chum salmon and 500 chinook salmon that would not count against the bycatch limits that trigger closures of the respective Salmon Savings Areas. The applicant has also requested exemption from salmon bycatch management regulations establishing fishing area closures for the groundfish fisheries. The taking of salmon during the experiment is crucial for determination of the effectiveness of the excluder device. The success of the EFP work depends on the ability to conduct the experiment in areas where reasonable pollock abundance overlaps with average to high salmon bycatch rates for the EFP experiments. Based on the applicants' previous research experiments leading up to the current stage of development of the salmon excluder, such conditions are only feasibly obtained when access to the Salmon Savings Areas is allowed.

Because the harvest of salmon during the experiment will not be counted towards the salmon PSC limits for the groundfish fisheries, no effect on the level of incidental catch of salmon in the groundfish fisheries is expected. The amount of salmon taken during the proposed experiments also is not expected to have an impact on the State commercial salmon fishery. For instance, the harvest for the 2003 commercial fishery in the Central and Westward Regions of Alaska was 171,000 chinook salmon and 48,530,000 chum salmon (Eggers 2003). The expected maximum harvest of salmon during the proposed experiment is less than 1 percent of the number typically harvested in Alaska commercial salmon harvest. Therefore, Alternative 2 will likely have no impact on the harvest of salmon in the State commercial salmon fishery.

The experiment is not directly focused on changes in salmon mortality in pollock trawl interactions. The focus of the experiment is on the relative proportions of salmon and of other groundfish that escape via the excluder device. The experimental presumption is that any salmon that escape through the excluder are alive and the researchers will continue to use underwater video cameras to evaluate any effects of the excluder on expected survival of escaping salmon. Mortality in salmon-trawl interactions is likely to occur primarily through contact with the trawl, and video evidence produced in earlier experimental work on the salmon excluder suggests that escaping salmon do not contact the any part of the trawl intermediate.

Although the estimated environmental effect of salmon bycatch on salmon runs in Alaska are thought to be minimal, the reduction in these effects would create some expected benefits for commercial and recreational fishermen, Alaskan natives and tribal values

associated with salmon, and salmon management and conservation goals. In years where salmon returns are relatively low, the reduction in bycatch effects on salmon runs, however minimal those effects might be, would be avoided to the timely benefit of those runs. Therefore, the successful development of an effective salmon bycatch reduction device for the Bering Sea pollock fishery (and any other pollock or whiting fishery where the device may prove effective) could produce long term net economic and social benefits in terms of lower salmon bycatch in trawl fisheries where salmon bycatch is prevalent.

The benchmark used to determine the significance of effects on salmon stocks was whether or not salmon minimum escapement needs would be reasonably expected to be met. If the action was reasonably not expected to jeopardize the capacity of the salmon stocks to produce long term sustainable yields it was deemed insignificant. Because the expected harvest of salmon under Alternative 2 is less than one percent of the projected harvests for the Central and Westward State commercial fisheries, the proposed action is not expected to jeopardize the capacity of the salmon stocks to produce sustainable yield either in the short or long term, and is therefore, not significant.

Pacific herring are managed by the State of Alaska on a sustained yield principal. Pacific herring are surveyed each year and the Guideline Harvest Levels (GHLs) are based on an exploitation rate of 20% of the projected spawning biomass. These GHLs may be adjusted inseason based on additional survey information to insure long term sustainable yields. The ADF&G have established minimum spawning biomass thresholds for herring stocks that must be met before a commercial fishery may occur. As was described above, the amount of herring harvested overall in the pollock fishery is well below the 1 percent of biomass limit, and as of April 2005, 0 percent of the herring PSC cap has been taken in the pollock fishery. Any potential additional harvest of herring under the proposed action is likely to be well below the one percent biomass limit for herring because of the small amount of herring that is normally taken in the pollock fishery. The EFP has no exemptions from the herring PSC limit or the Herring Savings Area closures (§ 679.21(e)(7)(vi)). The benchmark used to determine the significance of effects under each alternative on herring stocks was whether minimum spawning biomass threshold levels would reasonably be expected to be met (NMFS 2005a). Much less than 1 percent of the herring biomass is expected to be harvested, and therefore, the impact is not significant.

The cumulative effects of the groundfish fisheries for PSC species are described in section 5.0 of the 2005 and 2006 Harvest Specifications EA/IFRA (NMFS 2005a). The EA/IRFA determined that the cumulative effects on salmon PSC were unknown based on the high level of bycatch in past actions combined with the future bycatch controls. For purposes of this analysis, the comparative amounts of salmon bycatch between years does not necessarily indicate the potential impact on the salmon stock from bycatch in the groundfish fisheries. It is possible that the salmon biomass in years of high salmon bycatch was also high so that higher level of removals may not necessarily lead to increased impact on the salmon population. Because the relationship of high bycatch to stock abundance is not known, it is possible that increased bycatch between years would

not affect the salmon stock capacity to produce long term sustainable yield. Large increases in chinook salmon catch were seen in the years between 2001 and 2004 in the State salmon fisheries which may indicate that chinook salmon abundance was also elevated (Alaska Department of Fish and Game Commercial Fisheries Division data at http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/history/chin1878.php).

Because past increases in salmon bycatch may reflect increases in abundance and future bycatch controls may reduce salmon bycatch, it is likely that the taking of salmon under this EFP in combination with past and future effects on salmon will not prevent the salmon stock capacity to provide long term sustainable yield. The cumulative effect of this action on PSC is therefore insignificant.

4.3 Effects on Endangered Species

Alternative 1: Status Quo

All direct, indirect, and cumulative effects under this alternative would be insignificant for the same reasons as explained in sections 4.6 and 5.0 of the 2005 and 2006 Harvest Specifications EA/IRFA (NMFS 2005a).

Alternative 2: Issue the EFP

The Steller sea lion is the only ESA-listed species under NMFS jurisdiction that has been identified as adversely affected by the groundfish fisheries (NMFS 2001b). In order to avoid jeopardy of extinction or adverse modification or destruction of critical habitat, the Council recommended and NMFS has implemented the Steller sea lion protection measures (68 FR 204, January 2, 2003, corrected (68 FR 24615, May 8, 2003)). This proposed action would be conducted in compliance with the Steller sea lion protection measures, except for the sector specific limits in the SCA (see section 2.0). Salmon and pollock have been identified as a prey species of Steller sea lions (NMFS 2001b). This proposed action will be conducted in a manner that will not likely affect prey availability for Steller sea lions. Testing will be conducted outside of protection areas (except the SCA), and the amount of groundfish and salmon harvested is expected to be very small, taken by two vessels in 2005-2006 and a single vessel in 2006-2007 over a large area, and dispersed over two seasons in the case of the EFP research on a catcher vessel.

The exemption from the sector closures of the SCA is not expected to have an impact on Steller sea lions. The goal of the Steller sea lion protection measures for harvest in the SCA is to prevent the temporal concentration of harvest before April 1. This is accomplished by limiting harvest to 28% of the annual TAC. The SCA has not been closed since 1999 since the AFA allowed for the establishment of pollock cooperatives that monitor their own fishing, generally leaving the SCA before quotas are exceeded. The SCA quota is divided between sectors for catcher vessels equal to and less than 99 ft length overall (LOA) and catcher vessels greater than 99 ft LOA. In 2004, 15,564 mt of pollock SCA quota was not harvested. The experiment will harvest approximately 1,000 mt of groundfish (mostly pollock) in the SCA during the spring. Catcher vessels over 99

ft (30.2 m) LOA harvested all of the 2003 quota available to its sector. The vessel used for the research may be a catcher vessel greater than 99 ft (30.2 m) LOA, the sector that is likely to be closed out of the SCA based on reaching its quota. Because this sector is likely to take all of their quota and could potentially be restricted from fishing in the SCA, an exemption from the sector specific quota (the research vessel may be a greater than 99 ft LOA catcher vessel) is necessary to ensure sufficient amounts of salmon can be encountered during the experiment. (Large portions of the salmon savings areas overlap with the SCA.) This exemption will only apply as long as the combined amount of pollock taken from the SCA does not exceed the 28 percent annual TAC before April 1, as specified in the Steller sea lion protection measures (§ 679.20(a)(5)(i)(B)). Because this exemption ensures that the temporal harvest of pollock remains dispersed as specified in the Steller sea lion protection measures, this exemption is not expected to have any adverse impacts.

The 2005-2006 groundfish fisheries EA established that actions within the spatial and temporal concentrations established by the Steller sea lion protection measures were not significant for ESA-listed species (NMFS 2005a). Because this proposed action will be implemented within compliance with the Steller sea lion protection measures, the potential impacts of this action are considered insignificant.

Impacts in ESA-listed salmon are very unlikely to occur in the EFP activities. Incidentally caught chinook salmon are derived from stocks from many areas. For example, Myers, *et al.* found, on the basis of scale analysis of BSAI observer samples, "stock composition estimates for the five brood-year strata (1991-1995) averaged 56% Western Alaska, 31% Cook Inlet, 8% Southeast Alaska-British Columbia, and 5% Kamchatka Chinook salmon." Pacific Northwest Chinook salmon would have been included in the Southeast Alaska-British Columbia grouping.[15]

As noted below, small numbers of salmon from some listed Pacific Northwest evolutionarily significant units (ESUs) have been taken in BSAI groundfish fishery. However, the available evidence suggests that this is an unusual event. The recently completed Alaska groundfish PSEIS, citing Healy, 1991, states that, "Chinook stocks from southeastern Alaskan/British Columbia, as well as those from Washington, Oregon, and California, are rare in the Bering Sea and western North Pacific. Their main oceanic distribution is thought to be in the eastern North Pacific, with the greatest concentrations occurring over the continental shelf waters." (NMFS, 2004, 3.5-186).

Coded wire tag (CWT) returns for surrogates of two listed Chinook salmon stocks, Lower Columbia River and Upper Willamette River have been tracked annually since 1984. Historical actual and estimated CWT returns are in Tables 1 and 2 below. Very few CWT chinook salmon have been taken in the past in the BSAI groundfish fishery, and preliminary data indicate that no CWT returns occurred in the BSAI in 2004.

[15] Meyers, Katherine W. School of Aquatic and Fisheries Science, University of Washington. Personal communication, 11-16-04.

Table 4-1. Actual Number of Coded Wire Tag (CWT) Recoveries of Two ESA-Listed Chinook Salmon ESUs from 1984-2004 from the BSAI groundfish fishery. LCR=Lower Columbia River Chinook Salmon ESU, and UWR=Upper Willamette River Chinook Salmon ESU.

	Bering Sea-Aleutian Islands	
Year	LCR	UWR
2004 (preliminary)	0	0
2003	0	0
2002	1	1
2001	1	0
2000	0	1
1999	0	1
1998	0	0
1997	0	0
1996	0	1
1995	0	0
1994	0	0
1993	0	0
1992	0	0
1991	0	0
1990	0	0
1989	0	0
1988	0	0
1987	0	0
1986	0	0
1985	0	0
1984	0	0

Source of data: NMFS, Auke Bay Laboratory, CWT database, Adrian Celewycz, pers. comm. 11/04. Fisheries before 1990 were foreign joint-venture not under management of Magnuson-Stevens Fishery Conservation Management Act.

Table 4-2. Approximate Number of Coded Wire Tags (CWTs) of Two ESA-Listed Chinook Salmon ESUs in the Total Bycatch from the BSAI groundfish fisheries from 1984 -2004. LCR=Lower Columbia River Chinook Salmon ESU, and UWR=Upper Willamette River Chinook Salmon ESU. Approximate numbers were adjusted from the actual number of CWTs recovered by multiplying the actual number of CWTs recovered (of each ESU by fishery by year) by the ratio (total number of Chinook captured by fishery by year)/(total number of Chinook examined for CWTs by fishery by year).

	Bering Sea-Aleutian Islands	
Year	LCR	UWR
2004 (preliminary)	0	0
2003	0	0
2002	2	2
2001	3	0
2000	0	2
1999	0	2
1998	0	0
1997	0	0
1996	0	3
1995	0	0
1994	0	0
1993	0	0
1992	0	0
1991	0	0
1990	0	0
1989	0	0
1988	0	0
1987	0	0
1986	0	0
1985	0	0
1984	0	0

Source of data: NMFS, Auke Bay Laboratory, CWT database, Adrian Celewycz, pers. comm. Fisheries before 1990 were foreign joint-venture not under management of Magnuson-Stevens Fishery Conservation Management Act.

Based on the rarity of occurrence of ESA-listed salmon in the Bering Sea groundfish incidental catch , it is highly unlikely that any ESA-listed salmon would be taken during the course of the EFP work, and therefore, the effects of Alternative 2 on ESA listed salmon is insignificant.

No cumulative effects on ESA-listed Steller sea lions are identified with this action. No changes to the Steller sea lion protection measures in the Bering Sea are anticipated and no changes are expected in the groundfish fisheries that may add to the effect of this action.

Cumulative effects on ESA-listed Pacific salmon may be the beneficial impact on salmon incidental take if the devices are successfully developed and deployed in the trawl fisheries and potential changes in the bycatch management measures that are currently being considered by the Council. The Council is scheduled to take final action in October 2005 to improve the current salmon bycatch measures (See the Council's April and June 2005 newsletters at www.fakr.noaa.gov/npfmc). This effect is not likely to be significant based on the rare occurrence of ESA-listed salmon incidental catch in the fisheries.

4.4 Seabirds

Direct and indirect impacts on seabirds from groundfish fishing activities may include incidental take by gear and vessel strikes, affects on prey availability and fishery wastes, and effects on benthic habitat. This proposed action is unlikely to have any affects on benthic habitat because of the use of pelagic trawl gear with is required to be operated within the trawl performance standard (50 CFR 679.7), off the ocean bottom. Prey availability is also unlikely to be affected because of the species targeted and the relatively small amount of harvest in comparison to the groundfish fisheries as a whole. The most likely potential for impacts is incidental take from vessel strikes and third wire strikes.

Alternative 1: Status Quo

All direct, indirect, and cumulative effects under this alternative would be insignificant for the same reasons as explained in sections 4.6 and 5.0 of the 2005 and 2006 Harvest Specifications EA/IRFA (NMFS 2005a).

Alternative 2: Issue the EFP

The additional groundfish harvest that would be permitted under the EFP would result in additional time for the interaction between seabirds and the vessel beyond the amount of interaction analyzed in the 2005 and 2006 harvest specifications EA/IFRA (NMFS 2005a). Because the amount of harvest under the EFP is a small fraction of the overall harvest of the groundfish fisheries TACs, it is likely that the additional interaction overall with seabirds would be minimal. A minimal addition of interaction is not likely to increase incidental take of seabirds to the point of having population level effects or

adversely impact ESA-listed seabird species. Therefore, the effects of this action on seabirds are insignificant.

4.5 Socioeconomic Effects

The potential socioeconomic effects of this proposed action primarily are future benefits that may result from the use of a salmon excluder device in the pollock trawl fisheries. Pollock taken during the testing will be sold to help offset the costs to the vessel operations during the experimental work. Salmon harvested during the testing will be donated for distribution under the PSDP (50 CFR 679.26) or disposed of in accordance with 50 CFR 679.21(b).

Alternative 1: Status Quo

If the EFP is not issued, the development of an effective salmon excluder device may be more difficult, if not impossible. The pollock fishery is experiencing salmon bycatch rates that have exceeded and are likely to continue to exceed salmon bycatch limits for chum and chinook salmon as occurred in 2004. The economic impact to the pollock fishery is the potential closure of salmon savings areas, limiting the fishing area choices for pollock harvest. Limited fishing grounds can result in additional expenses associated with finding other areas with sufficient catch rates and quality of fish. Alternative 1 would not facilitate the development of a salmon excluder device, eliminating the potential for future socioeconomic benefits identified under Alternative 2.

Alternative 2: Issue the EFP

The knowledge gained from this experiment may make it possible to reduce the costs of salmon bycatch in the pollock trawl fisheries. However, there are several caveats. The experiment may not be successful; the excluder may fail to increase salmon escapement over the levels achieved in EFP development and testing to date (43% for chinook and 9-13% for chums). Additionally, the ground truth experiment conducted on a catcher processor may be successful, but this may indicate that the escapement rates detected through the previous EFP work with recapture devices may overstate salmon escapement (a highly unlikely outcome) or underestimate pollock loss (now thought to be 2-3% from previous EFP tests). One byproduct of the experiment may be particularly valuable. The video technologies used in the experiment are expected to produce a lot of information about the behavior of salmon in trawls. This information is likely to lead to new insights into fishing strategies that may reduce salmon bycatch at low operational cost. Preliminary work with the video in preparation for the experiment has already generated considerable information. For example, there is evidence that the trawls are capturing much of the salmon in the upper mid-water parts of the water column. Persons involved with the experiment have already been able to advise skippers on fishing tactics that may reduce salmon bycatch, for example, by launching their nets in ways that minimize the time they spend in the water column. Other insights are expected.[23]

[23]Gruver, op. cit.

Under Alternative 2, the proposed action may allow for the development of an effective salmon excluder device for trawl gear. If such a device were available, trawl vessels could use this device to lower the bycatch of salmon, resulting in less potential for exceeding the PSC limits. By not exceeding the PSC limits, pollock and other trawl fisheries would have more locations available for selecting fishing grounds, potentially leading to less harvesting expense and higher quality product. Benefits to consumers and the country overall from the pollock fishery could also increase under the expectation that the benefits of efficiency gains and increased product quality would accrue to consumers and the nation.

These environmental benefits are based on the assumption of minimal injury to salmon utilizing the escapement device. Any evaluation of the performance of salmon bycatch reduction device, and its costs and benefits would clearly need to explicitly evaluate the question of long term survival in order to assess actual benefit/cost tradeoffs. The expectation of benefits from a BRD also assumes that changes in fishing behavior as a result of widespread use of the device would not increase some other potential environmental costs associated with the fishery. It is also not possible to predict the level of acceptance of using such a device in the pollock trawl fishery.

4.6 Coastal Zone Management Act

Implementation of either alternative would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Management Program within the meaning of Section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

5.0 SUMMARY AND CONCLUSIONS

Context: The action is to issue an EFP to allow for additional testing of salmon excluder devices for pollock trawl gear in the Bering Sea. Any effects of the action are limited to areas commonly used by the pollock trawl fishery. The effects on society within these areas are on individuals directly and indirectly participating in the pollock fisheries, those participating in the experiment, and those who may receive the small amount of salmon through the Prohibited Species Donation Program (PSDP). Because this action may affect the efficiency of pollock fishing and the bycatch of salmon in the future, this action may have impacts on society as a whole or regionally.

Intensity: Listings of considerations to determine intensity of the impacts are in 40 CFR § 1508.27 (b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in order as it appears in the regulations.

> **Adverse or beneficial impact determinations for marine resources, including sustainability of target and nontarget species, damage to ocean or coastal habitat or essential fish habitat, effects on biodiversity and ecosystems, and**

marine mammals: The components of the environment that were identified to possibly be affected by the action were groundfish target species, prohibited species, marine mammals, seabirds, and socioeconomic components. The analysis in section 4.0 determined that none of these components were likely to be significantly impacted by the action. Future actions that may result from the successful development of a salmon excluder device may affect the socioeconomic component, but enough information to determine the significance of such future actions is not available at this time.

Public health and safety would not be affected in any way by the action which is limited to the use of a pollock catcher vessel and catcher/processor to test a bycatch reduction device.

Cultural resources and ecologically critical areas: This action will take place in the geographic area of the Bering Sea in locations commonly used by pollock catcher vessels. The land adjacent to these areas contain cultural resources and ecologically critical areas. The marine waters where the fisheries occur contain ecologically critical area. Effects on the unique characteristics of these areas are not anticipated to occur with this action because fishing practices are not affected and the gear type used is not likely to affect ecologically critical areas.

Controversiality: This action is initiated by industry in cooperation with NMFS, and would reduce the potential for salmon bycatch. Because it could potentially further the goals to reduce bycatch in the groundfish fisheries and does not affect current fishery regulations, it is not considered controversial.

Risks to the human environment, **including social and economic effects** are not expected with this action. The experiment is limited in scope and does not change current fishing practices. Harvest taken by the vessel would be sold to offset the cost of the experiment. When possible, salmon taken will be provided to the PSDP to feed underprivileged individuals. The amount of harvests of groundfish and salmon is very small in relation to annual harvests and is not likely to have an impact socially or economically.

Future actions related to this action may result in beneficial economic impacts. See section 4.7. If the testing of the salmon excluder device allowed by this action is successful, the use of such a device by pollock trawl vessels could result in economic advantages for the pollock industry. Fewer restrictions on pollock fishing may occur if the amount of salmon bycatch is kept under the prohibited species catch limits. Economic benefits will depend on the effectiveness of the device and participation by trawl vessel owners

In 2004, the Council initiated a process to consider modifications to salmon bycatch control measures in the Bering Sea. Salmon bycatch reduction measures are also currently under consideration for GOA groundfish trawl fisheries in conjunction with GOA rationalization. These measures may include bycatch

limits that when attained, would trigger closures in areas with the historically highest bycatch rates. Use of an effective salmon excluder device developed for the BSAI fishery may allow Bering Sea pollock fishermen to more feasibly adapt to the new bycatch measures for the Bering Sea (when effective). Additionally, the salmon excluder may lessen the impact of or even remove the need for future salmon bycatch reduction measures in the GOA.

Cumulatively significant impacts, **including those on target and nontarget species**, are not expected with this action. No significant impacts on the components of the environment were identified, and no past, present, or reasonably foreseeable future actions are known to combine with this action to cause a significant impact on the environment. The significance of the future action identified above regarding the use of a salmon excluder device cannot be determined because of the uncertainty of the extent of use of such a device in the pollock fishery and its effectiveness.

Districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places: This action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. This consideration is not applicable to this action.

Impact on Endangered Species Act (ESA) listed species and designated critical habitat: ESA listed species that range into the fishery management areas are listed in Table 3.4 of this EA. The status of Section 7 consultations is summarized in section 3.7. Based on the coded wire tag surrogate study, very few ESA listed salmon have been taken in the BSAI fishery. Because of the small amount of groundfish and salmon harvest, this action is not likely to take ESA-listed salmon.

This action will not likely have an effect on Steller sea lions due to the very low amount of harvest of prey species by two vessels, short duration of the action, and location of harvest outside of most Steller sea lion protection areas and maintenance of the temporal dispersion of harvest. Consultations for ESA-listed marine mammals or Pacific salmon are not being reinitiated for this action because changes in fishing activities would not occur that would result in effects sufficient to trigger reinitiation. Those triggers include: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; and (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, the action agency must

immediately reinitiate formal consultation. No adverse impacts on ESA-listed species or on critical habitat are likely for this action.

There is no known violation of Federal, state, or local law for environmental protection with the implementation of this action.

No introduction or spread of non-indigenous species is expected with this action because the experiment is limited to approximately three pollock vessels in areas normally used by pollock trawl vessels.

Comparison of Alternatives and Selection of a Preferred Alternative

Alternative 1 does not meet the need or the purpose of this action, to allow for implementing the experiment for salmon excluder devices on trawl gear to reduce the amount of salmon bycatch in the pollock trawl fishery. Alternative 2 would provide an EFP that permits the testing of such a device in a scientifically valid manner and within groundfish regulations (50 CFR parts 679 and 600), meeting the need and purpose of this action. Without the EFP, the testing would not be conducted following the carefully conceived experimental design, potentially resulting in no development of the bycatch reduction device. The potential result of Alternative 2 to reduce the current level of salmon bycatch is more beneficial to the environment than the status quo. Therefore, Alternative 2 is the preferred alternative.

6.0 LIST OF PREPARERS

Melanie N. Brown, NMFS Alaska Region, Sustainable Fisheries Division
Kristin Mabry, Analytical Team, NMFS Alaska Region,
John Gauvin, Gauvin and Associates, LLC. 2104 SW 170th St., Burien, WA 98166

7.0 LIST OF PERSONS CONSULTED

NMFS Alaska Region, Sustainable Fisheries Division
Andrew Smoker
Mary Furuness

NMFS Alaska Fisheries Science Center
Dr. Craig Rose

NOAA GC, Alaska Region, Jonathan Pollard and Chris McNulty

United Catcher Boats Association
John Gruver

Paul McGregor, Mundt McGregor LLP

8.0 LITERATURE CITED

Balsiger, Dr. James W. 2004. Memorandum from Dr. James Balsiger, Regional Administrator, Alaska Region National Marine Fisheries Service, to Robert Lohn, Administrator Northwest Region, National Marine Fisheries Service. Request to reinitiate consultation on Bering Sea and Aleutian Islands groundfish fishery incidental catches of Chinook salmon. December 1, 2004.

DeMaster, D. 2005. Memorandum to James W. Balsiger regarding review of Exempted Fishing Permit to Test Salmon Excluder, March 31, 2005. Alaska Fisheries Science Center, 7600 Sand Point Way N. E., Seattle, WA 98115-0070.

Egger, D. M. ed. 2003. Run Forecast and Harvest Projections for 2003 Alaska Salmon Fisheries and Review of the 2002 Season. Regional Information Report No. 5J03-01. Alaska Department of Fish and Game, Division of Commercial Fisheries, P. O. Box 25526, Juneau, AK 99802-5526.

Glass, C. and C. Wardle. 1995. A review of fish behavior in relation to species separation and bycatch reduction. Pages 243-250 in: Solving Bycatch: Considerations for Today and Tomorrow. Alaska Sea Grant College Program Report No. 96-03, University of Alaska Fairbanks.

Haflinger, K. 2004. Presentation to the North Pacific Fishery Management Council regarding Chum and Chinook Salmon in the Pollock Trawl Fishery. October 2004.

Hare, S.R., and R. C. Francis. 1995. Climate change and salmon production in the Northeast Pacific Ocean. Pages 357-372 in R. J. Beamish, editor. Climate change and northern fish populations. Canadian Special Publication of Fisheries and Aquatic Sciences 121.

Healy, M.C. 1991. "The life history of Chinook salmon." In *Pacific Salmon Life Histories*. C. Groot and L. Margolis (eds). U.B.C. Press. Pages 311-393.

Hiatt, T. , R. Felthoven, and J. Terry. 2004. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries Off Alaska, 2003. November 2004. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

Kruse, G. H. 1998. Salmon run failures in 1997-1998: A link to anomalous ocean conditions? Alaska Fishery Research Bulletin: 5(1):55-63.

Melvin, Edward F., Kimberly S. Dietrich and Tim Thomas. 2004. Pilot Tests of Techniques to Mitigate Seabird Interactions with Catcher Processor Vessels in the Bering Sea Pollock Trawl Fishery: Final Report. November 19, 2004.

Washington Sea Grant Program University of Washington 3716 Brooklyn Ave NE Seattle, WA 98103.

Meyers, Katherine W., Robert V. Walker, Janet L. Armstrong, and Nancy D. Davis. 2004. "Estimates of the Bycatch of Yukon River Chinook Salmon in the U.S. Groundfish Fisheries in the Eastern Bering Sea, 1997-1999." Final Report to the Yukon River Drainage Fisheries Association. School of Aquatic and Fishery Sciences, University of Washington. Seattle; March, 2004.

Mikol, R. A. 1997. Temperature Directed Fishing: How to Reduce Bycatch and Increase Productivity. Alaska Sea Grant Marine Advisory Bulletin. MAB-48, University of Alaska Fairbanks.

National Marine Fisheries Service (NMFS). 2005a. Environmental Assessment/Final Regulatory Flexibility Analysis for the Harvest Specifications for the Years 2005-2006 Alaska Groundfish Fisheries Implemented Under the Authority of the BSAI and GOA Groundfish Fishery Management Plans. February 2005. DOC, NOAA, National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS. 2005b. Preliminary Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. January 2005. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS, Protected Resources Division, Pacific Northwest Region 1999. "Endangered Species Act – Reinitiated Section 7 Consultation. BIOLOGICAL OPINION. Take of Listed Salmon in Groundfish Fisheries Conducted under the Bering Sea and Aleutian Islands and Gulf of Alaska Fishery Management Plans."

NMFS, Protected Resources Division, Pacific Northwest Region. 1994. "Endangered Species Act – Section 7 Reinitiation of Consulation. BIOLOGICAL OPINION. Groundfish Fisheries Conducted under the Bering Sea and Aleutian Islands and Gulf of Alaska Fishery Mangement Plans of the North Pacific Fishery Management Council."

NMFS. 2004a. Programmatic Supplemental Environmental Impact Statement For Alaska Groundfish Fisheries Implemented Under the Authority of The Fishery Management Plans for the Groundfish Fishery of the Gulf of Alaska and the Groundfish of the Bering Sea and Aleutian Islands Area. June 2004. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS. 2003. Environmental Assessment for Issuing an Exempted Fishing Permit for the Purpose of Testing Salmon Excluder Devices in the Eastern Bering Sea Pollock Fishery. May 2003. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS. 2002. Final Environmental Impact Statement for American Fisheries Act Amendments 61/61/13/8. February 2002. National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS. 2001. Steller sea lion protection measures supplemental environmental impact statement. November 2001. DOC, NOAA National Marine Fisheries Service, P.O. Box 21668, Juneau, Alaska 99802.

NMFS 2000. ESA Section 7 Consultation Biological Opinion and Incidental Take Statement. Activities Considered: Authorization of Bering Sea/Aleutian Islands groundfish fisheries based on the Fishery Management Plan for the Bering Sea/Aleutian Islands Groundfish and Authorization of the Gulf of Alaska groundfish fisheries based on the Fishery Management Plan for Groundfish of the Gulf of Alaska. November 30, 2000. NMFS Alaska Region, P. O. Box 21668, Juneau, Alaska 99802. Also available at http://www.nmfs.noaa.gov/steller/fmp_sec07-NOV30_2000_FINAL.pdf.

North Pacific Fishery Management Council (NPFMC). 2004. Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions. November 2004. NPFMC, 605 W. 4th St., Suite 406, Anchorage, AK 99501. 1093 pp. and appendices.

NPFMC. 1999a. Fishery Management Plan for the Bering Sea/Aleutian Islands Groundfish (updated). June 1999. NPFMC, 605 W. 4th St., Suite 406, Anchorage, AK 99501, 410 pp.

NPFMC. 1999b. Fishery Management Plan for the Gulf of Alaska Groundfish (updated). July 1999. NPFMC, 605 W. 4th St., Suite 406, Anchorage, AK 99501, 325 pp.

NPFMC. 1999c. Environmental Assessment / Regulatory Impact Review for Amendment 58: An amendment to further reduce chinook salmon bycatch in groundfish trawl fisheries of the Bering Sea and Aleutian Islands. NPFMC, 605 W. 4th St., Suite 406, Anchorage, AK 99501.

Rose, C. 2001. Development and testing of halibut excluders for Alaska cod trawling. Available from http://www.iphc.washington.edu/halcom/research/bycatch/halexcl.pdf. Alaska Fisheries Science Center, NMFS, 7600 Sand Point Way NE, Seattle, WA 98115.

United Catcher Boats Association (UCBA). 2003. An Exempted Fishing Permit Application to Test A Salmon Excluder Device for Pollock Trawls, March 2003. United Catcher Boats, 4005 20th Ave. W. Ste. 116, Fisherman's Terminal, Seattle, WA 98199.

University of Washington Sea Grant 2004. Pilot Tests of Techniques to Mitigate Seabird Interactions with Catcher Processor Vessels in the Bering Sea Pollock Trawl

Fishery. Issued November 2004. Available from: Washington Sea Grant Program, University of Washington 3716 Brooklyn Ave NE Seattle, WA

United States Fish and Wildlife Service (USFWS). 2003. Biological Opinion on the Effects of the Total Allowable Catch (TAC)-Setting Process for the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI) Groundfish Fisheries to the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and Threatened Steller's Eider (*Polysticta stelleri*). Issued May, 2003. U.S. Department of the Interior, Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska 99503-6199.

USFWS. 1999. Endangered Species Act Formal Section 7 Consultation for 1999-2000 Hook-and-Line Groundfish Fisheries of the Gulf of Alaska and Bering Sea and Aleutian Islands Area (Short-tailed Albatross.) Issued March 19, 1999. U.S. Department of the Interior, Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska 99503-6199. 36pp + Tables and Figures.

Witherell, D. and C. Pautzke. 1997. A brief history of bycatch management measures for the Eastern Bering Sea groundfish fisheries. Marine Fisheries Review 59 (4): 15-22.

Witherell, D., D. Ackley, and C. Coon. 2002. An overview of salmon bycatch in Alaska groundfish fisheries. Alaska Fishery Research Bulletin. Vol. 9, No. 1, Summer 2002.

Appendix A: EFP Application

Mbrown 4/1/05
Kmabry: 4/1/05
Cmcnulty: 6/22/05
G:\FMGROUP\EFP\salmon EFP\salmon efp 2005\salmon efp EA 2005 combined.doc
R:\region\2005\sf\mar\salmon efp EA 2005 combined.doc