

Bering Sea Aleutian Islands Salmon Bycatch

February 2005 Staff Discussion Paper

In December 2004, the Council approved a draft problem statement and preliminary alternatives to address an increasing problem with salmon bycatch in the Bering Sea and Aleutian Islands trawl fisheries. The Council directed staff to produce a discussion paper addressing the analytical components and timeline for analysis associated with the various alternatives approved by the Council.

Considerations and Decisions for this Council meeting

The Council needs to clarify the following during this Council meeting:

1. Clarify alternatives: after reviewing the discussion paper the Council may choose to bifurcate the intended analysis into short-term immediate solutions and longer-term solutions. Some of the draft alternatives would require more extended analysis and therefore would not be able to be in place for the following fishing year.
2. Review and revise Problem Statement as necessary: to ensure it is in agreement with any change to the draft suite of alternatives
3. Determine a timeline and prioritization for the analysis

Current Regulations

Regulatory salmon closure areas were established in the Bering Sea to reduce the incidental take of Chinook and chum salmon in the trawl fisheries. The Chum Salmon Savings Area was established in 1994 (Figure 1). This area is closed to all trawling from August 1 through August 31. The area remains closed if 42,000 ‘other’ salmon are caught in the CVOA during the period August 15-October 14.

The Chinook Salmon Savings areas were established in 1996 (Figure 2). These areas close to pollock trawling if 29,000 Chinook salmon are taken. The timing of the closure depends upon when the limit is reached:

1. If the limit is triggered before April 15, the areas close immediately through April 15. After April 15, the areas re-open, but are again closed from September 1-December 31.
2. If the limit is reached after April 15, but before September 1, the areas would close on September 1 through the end of the year.
3. If the limit is reached after September 1, the areas close immediately through the end of the year.

Background

The regulations for chum and Chinook salmon established these closures in areas and at times when salmon bycatch had been highest based upon the best available historical observer data at

the time of the analysis. Unfortunately these closures did not appear to have been effective in 2003 and 2004 when high amounts of both chum and Chinook salmon were taken.

Representatives of the pollock trawl fleet testified to the Council in the fall of 2003 to indicate that the closure of the Chum Salmon Savings Area in August 2003 had forced the fleet into areas with higher chum salmon bycatch rates. Representatives again approached the Council in both October 2004 and December 2004 to testify that record high numbers of both Chinook and chum salmon were being caught (despite cooperatively managed ‘hot spot’ measures by the fleet). The pollock trawl representatives also indicated that CDQ boats operating within the closure zones were encountering lower bycatch rates than the rest of the trawl fleet operating outside of the closures (K. Haflinger, personal communication). It appeared as though the closures themselves were actually exacerbating the salmon bycatch problem.

Salmon bycatch in 2003-2004

Bycatch of salmon in 2003 and 2004 is much higher than the long-term average from 1990-2001. Relative to average (1990-2001) historical bycatch amounts, Chinook and chum salmon bycatch in BSAI groundfish fisheries during 2003 and 2004 were high (see table below; amounts include CDQ catch). Recent chum salmon bycatch amounts were the highest since the chum salmon bycatch controls were implemented in 1994. Chinook salmon bycatch in 2004 was much higher than the long-term average from 1990-2001.

BSAI Salmon Bycatch:

	Chinook	Chum
1990-2001 average	37,819	69,332
2002	36,385	81,470
2003	54,911	197,091
2004	62,493	465,650

Bycatch of Chinook salmon by week with groundfish catch (mt) for 2004 is shown in Figure 3. Bycatch is highest at predictable times from late January through March and again in September through October. Notably, however, bycatch is highest in mid October to early November for the lowest groundfish catch. The Chinook Salmon Savings Area closed to directed fishing for non-CDQ pollock with trawl gear on September 5, 2004 for the remainder of the year following the limit for Chinook salmon being exceeded. The highest bycatch numbers for Chinook in 2004 were outside of this area following the closure.

Bycatch of chum salmon by week and with groundfish catch (mt) is shown in Figure 4. Bycatch is highest in mid to late September. The Chum Salmon Savings Area closed to directed fishing for non-CDQ pollock with trawl gear from August 1-31 per annual regulations, and then again from September 14 through October 14th following the regulatory limit of 42,000 ‘other salmon’ being exceeded since August 15th. The highest chum salmon bycatch was outside of the Chum Salmon Savings Area and after its closure.

A brief analysis of NMFS bycatch data for 2003 and 2004 by area indicates that bycatch rates for chum salmon (in number of salmon per mt of groundfish) did increase dramatically with the implementation of the Chum Salmon Savings Area closure on August 1. Note that the Chum Salmon Savings Area (Figure 1) is predominantly (4 ‘blocks’) in Area 517, with one ‘block’ in 509.

Chum salmon bycatch rates:

Area:

2003:	509	517
July	0.30	0.08
August	0.19	0.28
September	0.27	0.56
2004		
July	0.12	0.16
August	0.81	1.72
September	0.20	2.80

In 2003, bycatch rates jumped from 0.08 in Area 517 in July to 0.29 in August and doubled again in September. In 2004, this was even more pronounced, with rates in 517 increasing from 0.16 in July to 1.72 in August and 2.80 in September.

Origin of salmon bycatch in the Bering Sea

A pertinent question for the Council in considering any modification to the existing regulation is: what is the origin of the salmon incidentally caught in the groundfish trawl fisheries? While the absolute stock origin of incidentally-caught salmon in the BSAI is not well-known, some previous studies on this as well as on-going research investigating salmon origin, give some background on this issue.

A historical overview of salmon bycatch in Alaska groundfish fisheries is provided by Witherell et al (2002). The origin of salmon taken as bycatch in the Bering Sea includes rivers in western Alaska, Southcentral and Southeast Alaska, Asia, British Columbia and Washington (Witherell et al. 2002). Recent studies in the Bering Sea have looked at the origin and distribution of chum salmon (Urawa et al. 2004; Moongeun et al. 2004). Genetic stock identification (GSI) with allozyme variation was used to determine the stock origin of chum salmon caught by a trawl research vessel operating in the central Bering Sea from late August to mid September 2002 (Urawa et al. 2004). Results indicated that the estimated stock composition for maturing chum salmon was 70% Japanese, 10% Russian and 20% North American stocks, while immature fish were estimated as 54% Japanese, 33% Russian, and 13% North American (Urawa et al. 2004). Stock composition of North American fish was identified for Northwest Alaska, Yukon, Alaskan Peninsula/Kodiak, Susitna River, Prince William Sound, Southeast Alaska/Northern British Columbia and Southern British Columbia/Washington State. Of these the majority of mature chum salmon for North America stocks came from Southern BC/Washington State and Alaska Peninsula/Kodiak (Urawa et al. 2004). For immature chum salmon, the largest contribution for North American stocks came from Southeast Alaska/Northern BC, followed by Alaska Peninsula/Kodiak and Southern BC/Washington State.

Additional information on the stock origin of salmon in the Bering Sea is available through the High Seas Salmon Research Program at the University of Washington. The High Seas Salmon Research Program of the University of Washington routinely tags and monitors Pacific salmon species. The Coded Wire Tag (CWT) information may not accurately represent the true distribution of hatchery caught salmon however as much of the CWT tagging occurs within the British Columbia hatcheries and thus most of the CWT recovered come from those same hatcheries. CWT tagging does occur in some Alaskan hatcheries, but is currently limited to Southcentral and Southeast Alaska, specifically in Cook Inlet, Prince William Sound, other Kenai

region hatcheries as well as in hatcheries in Southeast Alaska (Johnson, 2004). Tagging operations on hatcheries on the Yukon River were in operation in the past but ceased in the 1990's. No tagging occurs for chum salmon in Alaska. The 2003 program report for the High Seas Salmon Research Program details additional data on west coast salmon tag recoveries (Myers et al 2004). In 2003, 124 tags were recovered in the eastern Bering Sea and GOA. Of these tags, 103 were recovered in groundfish trawl fisheries while 21 were recovered by U.S. and Japanese research vessels. Tagging results in the Bering Sea showed the presence primarily of Yukon River Chinook salmon in the eastern Bering Sea though actual recovered tags were limited (and tagging in recent years from the Yukon River has ceased). Columbia River Basin and Oregon Chinook salmon were also recovered in the eastern Bering Sea though the majority of the tagged recoveries of these salmon occur in the GOA.

A study completed in 2003 estimated age and stock composition of Chinook salmon in the 1997-1999 BSAI groundfish fishery bycatch samples from the NMFS observer program database (Myers et al. 2004). Results indicated that bycatch samples were dominated by younger (age 1.2) fish in summer and older (age 1.3 and 1.4) fish in winter (Myers et al. 2004). The stock structure was dominated by western Alaskan stocks, with the estimated stock composition of 56% Western Alaska, 31% Central Alaska, 8% Southeast Alaska-British Columbia and 5% Russia. In the winter, age-1.4 western Alaskan Chinook were primarily from the subregions of the Yukon and Kuskokwim. In the fall, results indicated that age-1.2 western Alaskan Chinook were from subregions of the Kuskokwim and Bristol Bay with a large component of Cook Inlet Chinook salmon stocks as well (Myers et al. 2004).

The proportions of western Alaskan subregional stocks (Yukon, Kuskokwim and Bristol Bay) appear to vary considerably with factors such as brood year, time and area (Myers et al. 2004). Yukon River Chinook are often the dominant stock in winter while Bristol Bay, Cook Inlet and other Gulf of Alaska stocks are often the dominant stocks in the eastern BSAI in the fall (Myers et al. 2004). Additional studies from high seas tagging results as well as scale pattern analyses from Japanese driftnet fishery in the Bering Sea indicate that in the summer immature western Alaskan Chinook are distributed further west in the Bering Sea than other North American stocks.

Proposed problem statement and draft alternatives

The following problem statement and draft alternatives were adopted by the Council in December 2004:

Problem statement:

In the mid-1990's, the Council and NMFS implemented regulations to control the bycatch of chum salmon and Chinook salmon taken in BSAI trawl fisheries. These regulations established closure areas in areas and at times when salmon bycatch had been highest based on historical observer data. Unfortunately, these regulations did not appear to have been effective in 2003 and 2004, when record amounts of salmon bycatch were taken. Information from the fishing fleet indicates that bycatch was exacerbated by the regulations, as much higher salmon bycatch rates were encountered outside of the closure areas. Some of these bycaught salmon likely include Chinook and chum stocks of concern in western Alaska. Further, the closure areas impose increased costs on the pollock fleet. To address this problem, the Council will examine and consider other means to control salmon bycatch.

Draft alternatives:

Alternative 1 – Status Quo.

Alternative 2 – Eliminate the regulatory salmon savings area closures.

Alternative 3 – Suspend the regulatory salmon savings area closures on a year-by-year basis so long as the pollock cooperatives have in place a salmon bycatch “hot zone” closure system.

Suboption: Develop an individual vessel accountability program that may be implemented if, after 3 years, it is determined the pollock cooperatives’ “hot zone” closure system has not reduced salmon bycatch.

Alternative 4 – Establish new regulatory salmon savings area closures based on current salmon bycatch data.

Alternative 5 – Develop a regulatory individual vessel salmon bycatch accountability program.

Analytical needs and timeline for each of the alternatives

This analysis will be an EA/RIR/IRFA for the amendment to the BSAI FMP to modify the closures in regulation from amendments 21, 35 and 58. In order for rulemaking to be in place for the 2006 specifications process and before the trawl fishery opens on January 20th, 2006, final action by the Council would need to occur no later than June 2005. Initial review by the Council would occur in April 2005.

Alternatives 2 and 3 eliminate (alternative 2) or suspend (alternative 3) the regulatory salmon savings area closures. While alternative 2 eliminates them entirely, alternative 3 suspends them pending participation in a cooperative salmon bycatch ‘hot spot’ closure system as is currently utilized voluntarily by members of the fleet. A suboption under alternative 3 is to develop an individual vessel accountability program that may be implemented if after 3 years the pollock cooperatives’ ‘hot zone’ closure system has not reduced salmon bycatch.

Adoption of either alternative 2 to repeal the closures or alternative 3 to suspend the closures would indicate that the Council and the agency are relying upon the fleet to control their bycatch of salmon area-wide. With no triggered closures for either chum or Chinook salmon in the BSAI, the fleet would be self-regulated to control their bycatch. The pollock fleet has already been managing themselves under a voluntary bycatch cooperative structure. This Intercooperative Agreement is between the nine catcher vessel cooperative in the BSAI pollock fishery. Some aspects of this inter-cooperative agreement include provisions for: allocation, monitoring and compliance of the PSC caps amongst the catcher vessel fleet; establishment of penalties for cooperatives which exceed allocations; promoting compliance with PSC limits while allowing for maximum harvest of allocated groundfish; and the reduction of PSC bycatch in the groundfish fishery. Sea State is retained to provide data gathering, analysis and reporting services to implement the bycatch management agreement, and in doing so provides timely hot spot reports to the fleet as well as summaries of bycatch characteristics, trends and/or fishing behaviors which may be having an effect on bycatch rates (Gruver 2003). Fleets are notified of avoidance areas for Chinook salmon and have previously agreed within the cooperative to avoid these areas as notified. Cooperative agreements in the BSAI vary between salmon species, with bycatch rates

calculated for use in monitoring access to the Chum Salmon Savings Area while 'hot spot' avoidance areas are utilized for Chinook salmon bycatch reduction.

The Intercooperative agreement would likely need to be modified to accommodate the repealed or suspended closures in order to be adaptive to the most appropriate means to continue to reduce Chinook and chum bycatch across the fleet. The Council should consider mechanisms for determining how and if the fleet has been effective at controlling salmon bycatch in the absence of regulatory closure areas.

Analyzing the repeal of the closure areas and the suspension of the closure areas under alternatives 2 and 3 would be a relatively straightforward and simplified analysis. The analysis of these alternatives (together with alternative 1, Status Quo) would require an EA/RIR/IRFA, and data for location-specific salmon bycatch would be necessary for several years, from at least 2002 (prior to the observed bycatch increase) through 2004. These alternatives represent the most simplified alternatives put forward for analysis but still require substantial analytical work. Given the analytical burden, this analysis could likely be brought back to the Council for initial review in June 2005 with final action for the Council in October 2005. This schedule would not allow for the regulations implementing this action to be in place in time for the start of the 2006 fishery. However, the regulations implementing this action would likely be in place by the Spring or early Summer of 2005 and prior to Chum Salmon Savings Area annual closure on August 1st.

The suboption under alternative 3 involves development of an individual vessel accountability program that may be implemented if after 3 years the pollock cooperative's 'hot zone' closure system has not reduced salmon bycatch. This suboption (and the analytical requirements of it) will be discussed in the context of alternative 5, to develop a regulatory individual vessel salmon bycatch accountability program.

Alternative 4 would establish new regulatory salmon savings area closures based on current salmon bycatch data. Analysis of this alternative would require similar analyses to that which comprised the original amendments (21, 35 and 58) establishing the regulatory closure areas. The analytical burden here is much greater than for the previous two alternatives as new areas would need to be established with the Council reviewing the chosen areas to ascertain which would be the most appropriate for new closures. Analyzing this alternative (in conjunction with the others or analyzed separately) would require an EA/RIR/IRFA. The analysis involved in proposing specific closure areas as well as analyzing the environmental and economic effects of moving the fleet away from these specified closures is extensive. It would be difficult, if not impossible, for this alternative to be analyzed in time for the Council to take initial review of an amendment package in June 2005. Analysis of new proposed closure areas based upon current salmon bycatch would be a longer-range solution and could be pursued as a separate amendment package to the previous alternatives. The timeline for completing this analysis would be much longer, possibly initial review in late 2005 and final action in 2006.

Alternative 5 (and suboption for alternative 3) would develop a regulatory individual vessel salmon bycatch accountability program. Under this alternative, vessels would receive a specific allocation of salmon bycatch (possibly an Individual Bycatch Quota, IBQ) which their vessel cannot exceed. If vessels exceed their individual bycatch quota they must cease fishing. Under the cooperative structure, the cooperative can receive an allocation for the entire cooperative and subdivide this amongst their vessels in order to better monitor the fleet. This alternative (as well as the suboption to do this under alternative 3) is extremely problematic both from a monitoring standpoint as well as for potential economic losses to fishermen.

For monitoring and enforcement, generating bycatch numbers on an individual vessel basis would require whole-haul sampling. Basket sampling for salmon on an individual vessel basis would not generate meaningful numbers for managing bycatch by individual vessels. However, whole haul sampling the entire AFA pollock fleet is a massive undertaking. On catcher vessels alone this would likely require video monitoring to enforce a no-presorting requirement and additional observers at the plant to whole-haul sample 24 hours per day (K. Lind, NMFS, personal communication). For catcher processors, this would be also be very difficult. Currently these CPs carry 2 observers and are still not yet able to whole-haul sample on a boat operating 24 hours per day, so at the minimum an additional observer would be necessary on board CPs. Obviously the observer program would need to be involved in developing the protocol for how they would achieve sampling 100% of the pollock catch on 100% of the fleet. In order to be effective for management and enforcement, the observer estimates of salmon on each vessel would need to be extremely precise.

Another consideration is the potential for economic losses to fishermen. If a vessel has a tow with very high salmon bycatch early in the season, depending upon their IBQ amount, it is possible for that vessel to exceed its annual IBQ for salmon. That vessel would likely then have to cease fishing for the remainder of the year. While vessels can coordinate on known 'hot spot' areas, changing conditions and migrating salmon leave open the possibility for extreme economic hardship to vessels based on the possibility of even a single bad tow. This also presents problems for the responsibility placed upon individual observers doing this whole-haul sampling. Some form of appeals process would likely need to be incorporated into an individual vessel accountability program in order for vessels to be able to challenge the reliability of a single whole-haul estimate particularly in cases where this could preempt fishing for the remainder of the year.

These are just some of the issues which would need to be considered in developing an individual bycatch accountability program. While these problems may not be insurmountable, the development of any individual vessel accountability program would need to give careful consideration to these and likely many other additional issues. The Council would need to consider what type of individual vessel bycatch system would be developed (i.e. would it be vessel specific IBQs?) and how this would be monitored and enforced. Would IBQs be managed by the co-ops? How would the allocative process be decided upon? These and other questions would need to be addressed in conceptualizing and analyzing the development of a program. The development and analysis of this alternative would therefore be fairly lengthy and would require a substantial timeline for development. This analysis would not be possible in 2005 and if initiated would likely take considerable time into 2006 in order to develop this program appropriately.

Next steps in the Council process

The Council may consider splitting the analysis and evaluating some of the alternatives (i.e, alternatives 1-3) in an amendment package at this time while initiating another analysis for the remaining alternatives. Bifurcating the analysis in this manner will allow the Council to act quickly to mitigate the problem at this time without ignoring an analysis of those alternatives which may take considerable time to analyze.

If the Council chose to simplify the analysis at this time to address alternatives 1-3 only, the Council would need to similarly simplify their draft problem statement to ensure that is consistent with any revision to the suite of alternatives for analysis.

Additional considerations for the Council:

If the Council chooses to move forward with an analysis which repeals (or suspends) the salmon savings area closures for chum and Chinook, the Council would need to include the following considerations:

- How will the AFA cooperatives regulate themselves and what sort of oversight will the agency have on salmon bycatch by the cooperatives in the absence of PSC limits which trigger closure areas?
- Will there be any hard caps on either chum or Chinook salmon bycatch which close the fishery? If not what mechanisms will ensure compliance with the over-arching goal of reducing salmon bycatch?
- What regulations on salmon bycatch will pertain to CDQ groups? What oversight will there be on their relative bycatch of chum and Chinook salmon?

The CDQ Program is allocated 7.5% of the Chinook salmon PSC and the non-Chinook salmon PSC annually. Once the initial allocation is taken, each of these prohibited species quota (PSQ) "reserves" are further allocated among the six CDQ groups. Each group is required to comply with the same time/area closures that apply to the non-CDQ fisheries when the group reaches its PSQ. If the salmon savings area closures are repealed, it would be necessary to specify what the CDQ groups must do. If there remain hard caps on salmon bycatch, the CDQ groups would continue to receive their 7.5% (PSQ) allocation, and this would continue to be further allocated amongst the six CDQ groups. However, it would be necessary to specify if and what the penalty would be if or when a group reached its PSQ or how the groups would be instructed to control or manage their salmon bycatch. Any analysis of modifying the current salmon bycatch structure in the BSAI would need to consider the impact on CDQ groups in addition to the consideration of other potential impacts (environmental and economic).

References

- Johnson, J. K. 2004. Regional Overview of Coded Wire Tagging of Anadromous Salmon and Steelhead in North America. Regional Mark Processing Center, Pacific States Marine Fisheries Commission, 205 SE Spokane Street, Suite 100, Portland, OR 97202-6413.
- Moongeun, Y., V. Brykov, N. Varnavskaya, L.W. Seeb, S. Urawa, and S. Abe. 2004. Mitochondrial DNA analysis of genetic variation in the Pacific Rim populations of chum salmon. (NPAFC Doc. 792) 25 p. Graduate School of Fisheries Sciences, Hokkaido University, 3-1-1 Minato, Hakodate 041-8611, Japan.
- Myers, K., R.V. Walker, N.D. Davis and J.L. Armstrong. 2004. High Seas Salmon Research Program, 2003. SAFS-UW-0402, School of Aquatic and Fishery Sciences, University of Washington, Seattle. 93p.
- Urawa, S., M. Kawana, G. Anma, Y. Kamaei, T. Shoji, M. Fukuwaka, K. M. Munk, K. W. Meyers, and E. V. Farley, Jr. 2000. Geographic origin of high-seas chum salmon determined by genetic and thermal otolith markers. North Pacific Anadromous Fish Commission Bulletin 2:283-290.
- Urawa, S., T. Azumaya, P. Crane and L. Seeb. 2004. Origin and distribution of chum salmon in the Bering Sea during the early fall of 2002: estimates by allozyme analysis. (NPAFC Doc. 794) 11p. National Salmon Resources Center, Toyohira-ku, Sapporo 062-0922, Japan.
- Witherell, D, D. Ackley, and C. Coon. 2002. An overview of salmon bycatch in Alaska groundfish fisheries. Alaska Fishery Research Bulletin (9)1:53-64.

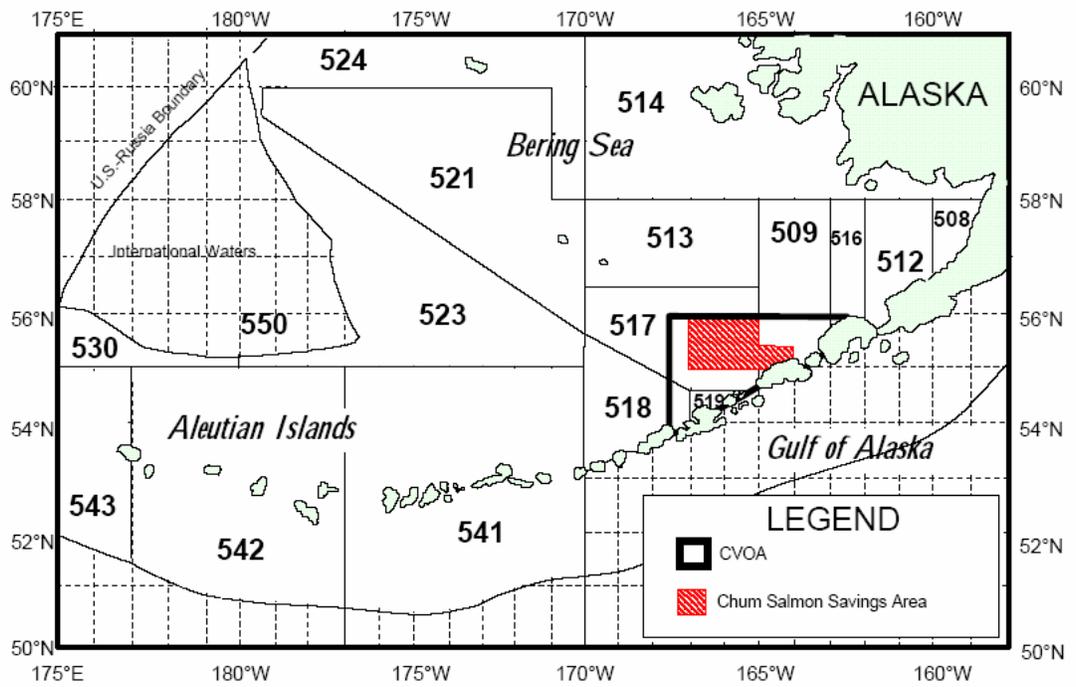


Figure 1: Chum Salmon Savings Area and Catcher Vessel Operational Area (CVOA)

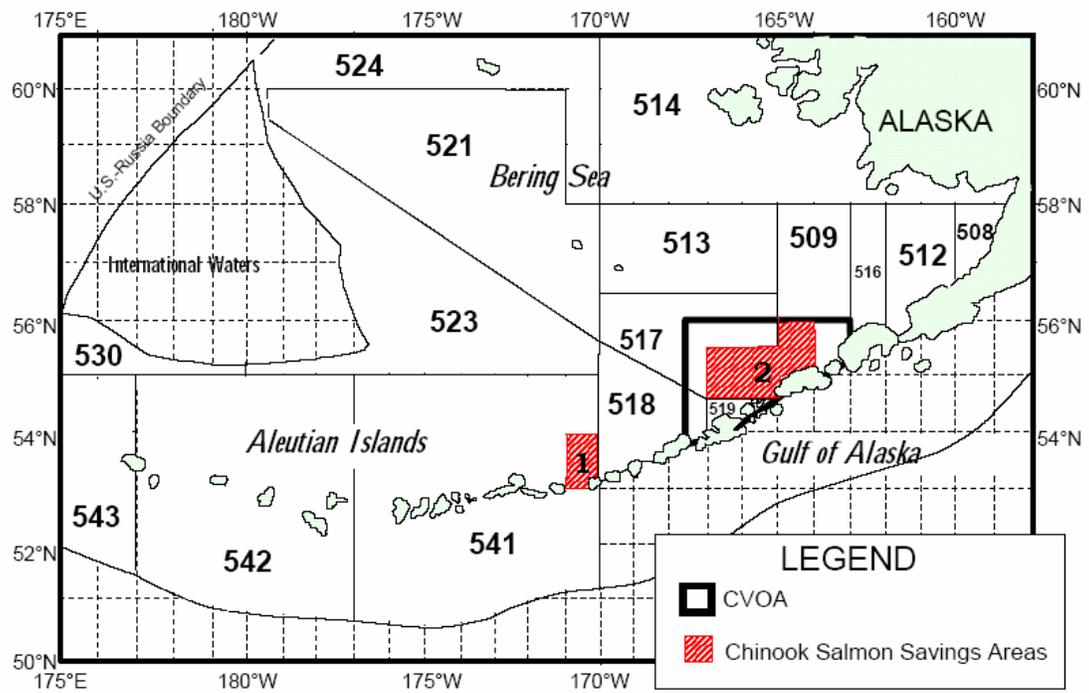


Figure 2: Chinook Salmon Savings Area and Catcher Vessel Operational Area (CVOA)

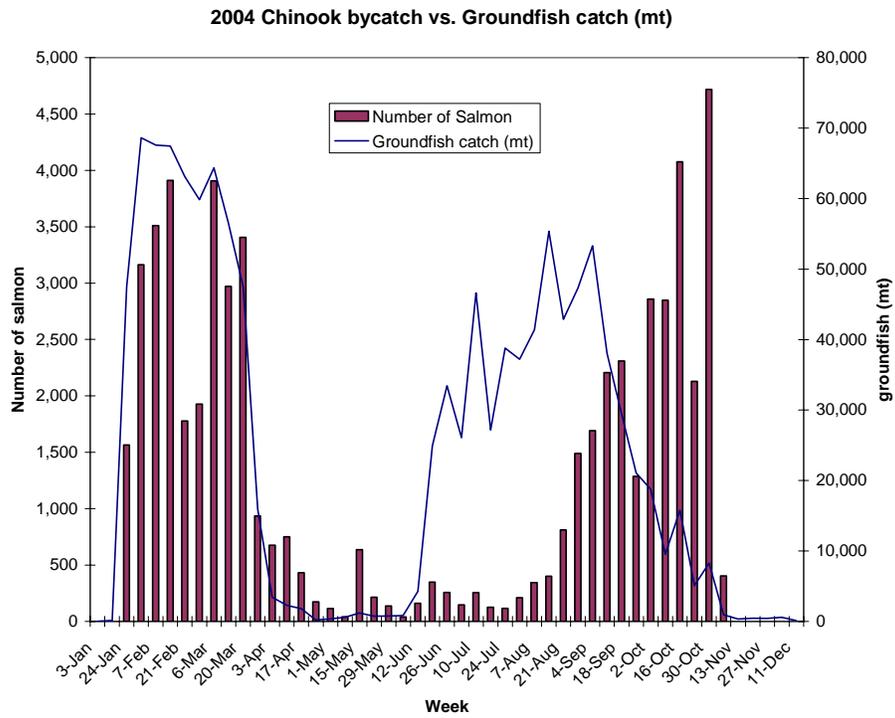


Figure 3: Bycatch of Chinook salmon by week in the BSAI (2004) with groundfish catch (mt)

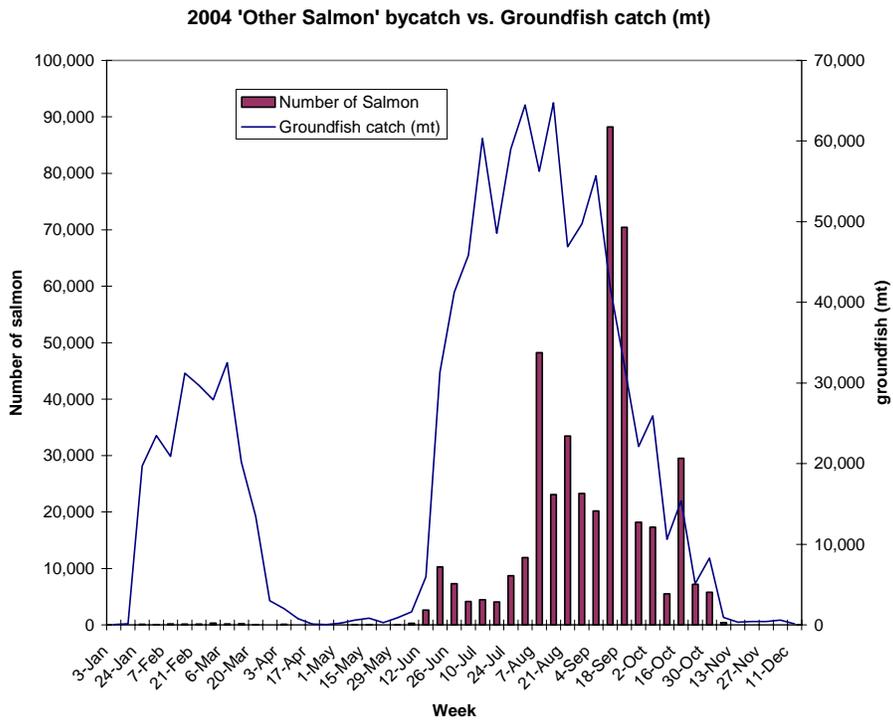


Figure 4: Bycatch of 'other salmon' by week in the BSAI (2004) with groundfish catch (mt)