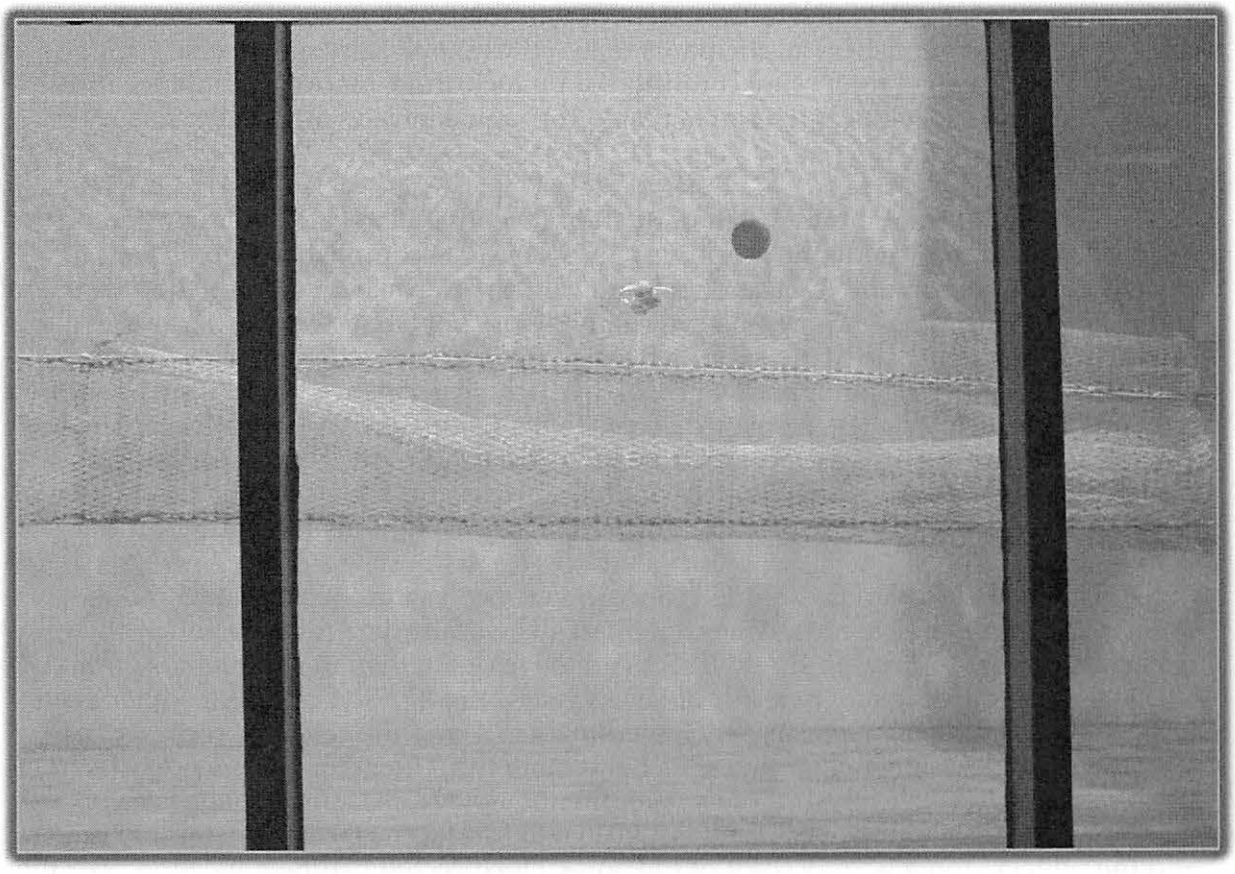
Annual Report 2012

NMFS IPA No. __CP IPA__

Chinook Salmon Bycatch Reduction Incentive Plan



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Introduction

Amendment 91 to the Bering Sea and Aleutian Islands Groundfish Fishery Management Plan (BSAI FMP) limits Chinook salmon bycatch in the eastern Bering Sea (EBS) pollock fishery. The rules and regulations implementing Amendment 91 came into force at the start of the 2011 fishery. Amendment 91 is an innovative approach to managing Chinook salmon bycatch in that it combines a prohibited species catch (PSC) limit on the amount of Chinook salmon that may be caught incidentally by the fishery with an incentive plan agreement (IPA) and performance-standard requirement designed to minimize bycatch to the extent practicable in all years. The approach is designed to motivate fishery participants to avoid Chinook salmon bycatch at the individual vessel level under any condition of pollock and Chinook abundance in all years. The vessel-level incentives are created through contracts among the fishery participants.

The Chinook Salmon Bycatch Reduction Incentive Plan (CP IPA) reported on here is designed to provide the incentives necessary to accomplish the goals and objectives of Amendment 91. The plan builds on experience gained in the development and refinement of time-and-area-based, rolling "hot-spot" avoidance programs. The plan creates incentives to avoid salmon bycatch by restricting the pollock fishing opportunities of vessels with poor Chinook bycatch performance while allowing vessels with good performance less restricted access to the fishing grounds. Losing access to good pollock fishing increases vessel operating costs and reduces product values. Avoiding grounds restrictions reduces operating costs and allows for the production of more high-value products (especially during the A-season), thus increasing profits.

The incentive plan is designed to work in concert with the annual Chinook salmon PSC limits specified in Amendment 91. The limits depend on whether the fishery participants develop IPAs. If IPAs are developed, then the annual PSC limit is 60,000 Chinook during any two-out-of-seven years, and 47,591 Chinook in other years. During 2011 all pollock vessels participated in an IPA and the catcher-processor (CP) sector IPA participants included vessels harvesting the American Fisheries Act (AFA) CP Sector and Alaska Community Development Quota (CDQ) pollock allocations. For the CP sector, the Chinook PSC limit is 17,040 fish (under the 60,000 fish annual limit) and the pollock quota is 36 percent of the non-CDQ directed fishing allocation. For the CDQ sector, the Chinook PSC limit is 4,896 fish (under the 60,000 fish annual limit) and the pollock quota is 10 percent of the annual directed fishing allocation.

Each year the IPA participants begin to manage Chinook bycatch using the lower 47,591 annual limit. For this limit, the CP sector Chinook quota is 13,516 fish and the CDQ sector Chinook quota is 3,883 fish. These pollock and Chinook quotas are further allocated among the seasons and the participating vessels. Table 1 shows the CP IPA 2012 "day-one" allocations of pollock and Chinook salmon PSC quota.

Primary IPA components include: (1) data gathering, monitoring, reporting, and information sharing; (2) identification of bycatch avoidance areas (BAA); and (3) fishing-area prohibitions for vessels with poor bycatch performance. Additional components include: (4) an A-season closed area of approximately 755 square nautical miles on the northern flank of the Bering Canyon; and (5) a set of conditional, B-season closed areas of approximately 1,295 square miles along the outermost EBS shelf.

Vessels are prohibited from fishing in the B-season areas beginning on October 15th and continuing through to the end of the season during those years when the aggregate bycatch of all plan vessels during the month of September exceeds a preset threshold.

Table 1. CP IPA Day-One Allocations of Pollock and Chinook Salmon, 2012.

Vessel	A-Season Pollock (tons)	A-Season Chinook (n)	B-Season Pollock (tons)	B-Season Chinook (n)
American Dynasty	17,346	1,076	26,018	269
American Triumph	17,346	1,076	26,018	269
Northern Eagle	17,346	1,076	26,018	269
Northern Jaeger	17,345	1,077	26,018	269
Ocean Rover	17,345	1,077	26,018	269
Arctic Fjord	15,506	990	23,260	248
Arctic Storm	16,368	990	24,551	248
Northern Hawk	15,921	992	23,881	248
Alaska Ocean	18,488	1,148	27,731	287
Pacific Glacier	18,488	1,148	27,731	287
Starbound	15,899	1,006	23,848	252
Island Enterprise	10,051	618	15,076	154
Kodiak Enterprise	10,051	618	15,076	154
Seattle Enterprise	10,051	618	15,076	154
Ocean Peace	0	0	1,270	66
Northern Glacier	0	0	0	0
Katie Ann	0	0	0	0
	Allocation Buffer		0	446
	Total Allocation		545,140 *	17,399

* includes 6,100 tons AI pollock roll-over on 1/17/12.

Incentive Measures

One of the most practical and direct methods to create incentives to avoid Chinook salmon bycatch is to limit the pollock fishing opportunities of a vessel when bycatch performance is poor. This simple approach works especially well for catcher-processors because efficient processing requires an uninterrupted flow of fish, and this can be achieved most reliably with unrestricted access to the grounds. Because experience has shown that high, local concentrations of pollock may often be found where concentrations of Chinook are also high (the vessels can "see" the pollock but not the Chinook), limiting access to local areas of relatively high Chinook bycatch is an efficient way to create a financial incentive to avoid Chinook salmon bycatch. The reason for this is that losing access to good pollock fishing grounds increases vessel operating costs and reduces the amount of products that can be produced during a day

of fishing. A vessel that retains nearly unrestricted access to good pollock fishing opportunities avoids costs associated with moving and finding pollock in other areas, and so the vessel can produce more products each day.

About a decade of industry experience has shown that the most efficient way to reduce salmon bycatch to the maximum extent practicable is to focus incentive programs on those areas where Chinook salmon bycatch is highest when compared to the amount of pollock harvested. To accomplish this, vessel performance benchmarks are calculated in a way that reflects the amount of pollock harvested. The first step in creating a program to avoid Chinook bycatch is to employ data gathering, reporting, and information sharing to identify local areas of relatively high Chinook abundance on the pollock grounds. Pollock catch and Chinook bycatch records from all fishery participants are gathered, compiled, and evaluated each week during which an IPA vessel catches pollock. In this analysis, areas of relatively high Chinook bycatch are identified (bycatch avoidance areas; BAA). Should vessels continue to fish in these areas, high Chinook bycatch is likely to occur because local concentrations of Chinook routinely persist in time and space for several weeks.

An important component the evaluation of potential BAA is the generation of a useful grounds-wide index of salmon abundance. This "baseline" index of relative salmon abundance on the grounds over time is called the base rate. More information about the methods used to identify the base rate is in the IPA agreement (available at: www.fakr.noaa.gov/sustainablefisheries/bycatch/salmon/chinook/ipa/chinook_salmon_ipa_2010.pdf).

To establish and maintain incentives to avoid Chinook bycatch under any condition of pollock and Chinook salmon abundance, the bycatch performance of the IPA vessels is measured both currently (most recent two weeks) and cumulatively (over the entire fishing season). To evaluate current performance, vessel performance is measured during the prior two weeks and compared to a standard that represents better-than-average performance. The measure of current vessel bycatch performance is called the vessel bycatch ratio. The bycatch ratio is calculated by dividing the number of Chinook caught incidentally by the vessel during the prior two weeks by the metric tons of pollock caught by the vessel during the prior two weeks. A two week period is used because experience has shown that day-to-day vessel bycatch performance is influenced by random factors associated with changes in weather, winds, water temperatures, and currents, and measuring performance over a two-week period "dampens" the effects of these random influences. This increases the usefulness of the measure in the creation of an incentive for the individual vessel to avoid bycatch.

If the current bycatch performance of an IPA vessel is not better than average, then the vessel is prohibited from fishing in the BAA for a week. Because the base rate is calculated by aggregating pollock catch and bycatch data from all vessels fishing for pollock, the base rate provides a measure of the average bycatch performance of the vessels fishing for pollock. The plan establishes the better-than-average-performance standard at 75 percent of the base rate. So every plan vessel with current bycatch performance higher than 75 percent of the base rate is prohibited from fishing within the BAA for seven days (i.e., the following week). If during the following week the current bycatch performance of a vessel operating under a fishing prohibition remains higher than 75 percent of the base rate, then the vessel is prohibited again from fishing

in the bycatch avoidance areas for an additional seven days. A seven-day fishing prohibition is called a weekly fishing prohibition.

The cumulative bycatch performance of a vessel is measured as the total amount (number) of Chinook salmon bycatch by the vessel during the fishing year relative to the pollock allocation assigned to that vessel (Table 1 shows the day-one" assignments for 2012). So the measure of cumulative vessel performance accumulates from the first day of fishing through to the last. Vessel cumulative bycatch performance is evaluated against a standard designed to magnify the incentive to avoid salmon bycatch during years when the baseline abundance of Chinook is medium and high. Based on analysis of more than a decade of CP catch records, an annual bycatch of 8,500 Chinook indicates a year when Chinook abundance on the grounds traditionally fished by CP vessels is at a medium level.

Cumulative bycatch performance is evaluated only for those vessels that receive a weekly fishing prohibition. For these vessels, if the cumulative Chinook bycatch rate is higher than the medium-abundance standard, then the vessel is prohibited from fishing in the BAA for two weeks. This standard is called the vessel cumulative amount, and a fourteen-day fishing prohibition is called an extended fishing prohibition. If vessel Chinook bycatch is greater than its cumulative amount, then it is subject to the extended fishing prohibition. Additional information about how the vessel cumulative amount is determined is in the IPA agreement.

Chinook Salmon Conservation Areas

Chinook salmon feeding migrations produce concentrations of Chinook in discrete, local areas along the EBS outer continental shelf, and many of these areas are well known to pollock fishermen. The areas are known to pollock fishermen because more often than not high concentrations of pollock are found in the areas. However, the precise times during which pollock and Chinook may be concentrated in any local area depends on a host of environmental and physical-oceanographic conditions that change with the seasons and the weather, such that it is not generally possible to know precisely where and when pollock and Chinook are concentrated together before going fishing for pollock.

Analysis of catch records over a decade or more has revealed the existence of one area along the outer continental shelf within which it seems that high concentrations of Chinook salmon exist almost every year during the winter fishery. Based on this analysis, an A-season fishing prohibition within an approximately 735 square mile area is included in the plan as a means to reduce bycatch. The area is called the A-season Chinook Salmon Conservation Area (CSCA; maps and the latitude and longitude coordinates of all CSCA boundaries are provided in the IPA agreement).

Analysis of B season catch records over two decades shows that when migrating Chinook arrive on the outer continental shelf in sufficient numbers during September, the odds that high concentrations of Chinook will be encountered by the fishery in October appear to increase. To create an incentive to reduce bycatch during the latter portion of the B-season, the CP IPA includes "triggered" fishing prohibition for three areas of approximately 1,295 square miles along the outermost shelf. These areas are

called the B-season Chinook Salmon Conservation Area. To implement the incentive, all vessels are prohibited from fishing in the areas beginning on October 15th and continuing through to the end of the season during those years when the aggregate bycatch rate for all vessels during the month of September exceeds 0.015 Chinook per metric ton of pollock harvest (n/t; hereafter metric tons are referred to simply as tons). The CP IPA also specifies the penalties levied on a vessel for violating a BAA prohibition or fishing in a CSCA when fishing there is prohibited. These penalties are $10,000 for the first annual violation, $15,000 for a second annual violation, and $20,000 for a third and each subsequent violation during a year, with every trawl inside a prohibited area considered a separate violation.

Effects of Incentive Measures on Individual Vessels

This annual report provides a qualitative evaluation and some quantitative information on the effectiveness of the plan. The CP IPA incentive program is largely an area-based program, and this evaluation relies heavily on spatial analysis of pollock trawl locations as well as the bycatch performance of the individual vessels. To begin an assessment of the IPA incentives on the individual vessels, the aggregate performance of the vessels in the 2011 and 2012 fisheries is tabulated and compared to performance during prior years. Table 2 shows the aggregate bycatch performance of CP IPA vessels during 2012.

Comparing years since just before the implementation of the AFA, Chinook salmon bycatch during 2011 and 2012 was low, especially when adjusted for the size of the pollock catch. Since 1998, the number of bycatch Chinook is the fourth lowest, and only 25 percent higher than the lowest annual bycatch since then. After adjustment for the size of the pollock catch, the 2011 bycatch ratio is the second lowest over the time period, and just 15 percent above the lowest value (a difference of one salmon for every 1,000 tons of pollock catch).

Figure 1 shows how aggregate CP IPA Chinook bycatch performance during 2011 and 2012 compares with that of prior years. Since 1998 climate conditions over the EBS shelf and coastal Alaska are believed to have mainly determined the abundance of Chinook salmon on the pollock grounds, with the warm period during 2001 through 2005 believed to have increased both freshwater and marine survival. In 2012 the bycatch ratio remained at a very low level, continuing a slow downward trend that began in 2008.

Figure 2 shows how aggregate 2011 and 2012 CP IPA chum bycatch performance compares with that of prior years. The coincidence of the warm-weather years and the high chum bycatch ratios of the vessels is consistent with high chum salmon abundance on the pollock grounds during the warm years. The bycatch ratios also indicate that the abundance of chum salmon was likely higher in 2011 than during recent years. This is consistent with the summer of 2011 likely providing relatively favorable conditions for salmon on the EBS shelf, at least compared to recent years, and these conditions probably persisted into the fall when concentrations of Chinook first moved onto the EBS shelf to feed.

Table 2. CP IPA Chinook Salmon Bycatch Performance, 2012.

Season	Pollock (t)	Chinook Salmon (n)	Average Ratio (n/t)
A	218,011	2,836	0.013
B	327,004	97	0.000
A + B	545,015	2,933	0.005

Figure 1. Chinook Bycatch Ratios by Sector, Bering Sea Pollock Fishery, 1998-2012.

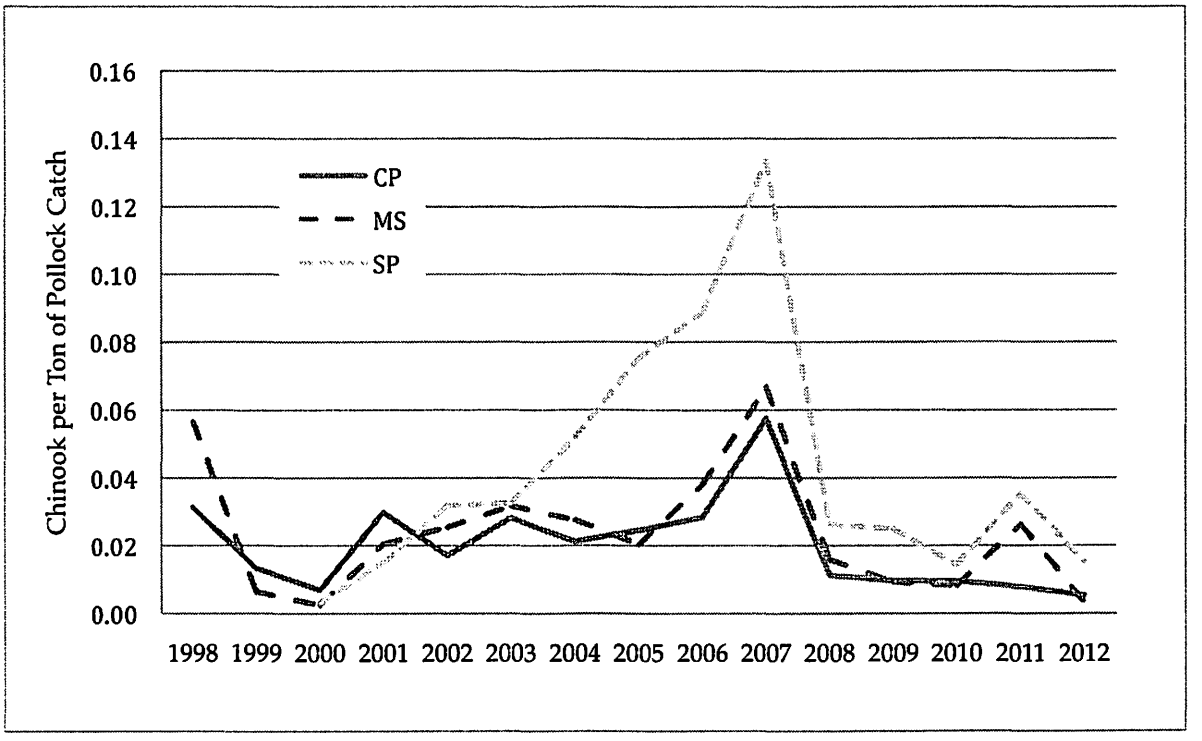


Figure 2. Chum Bycatch Ratios by Sector, Bering Sea Pollock B-Season, 1998-2012.

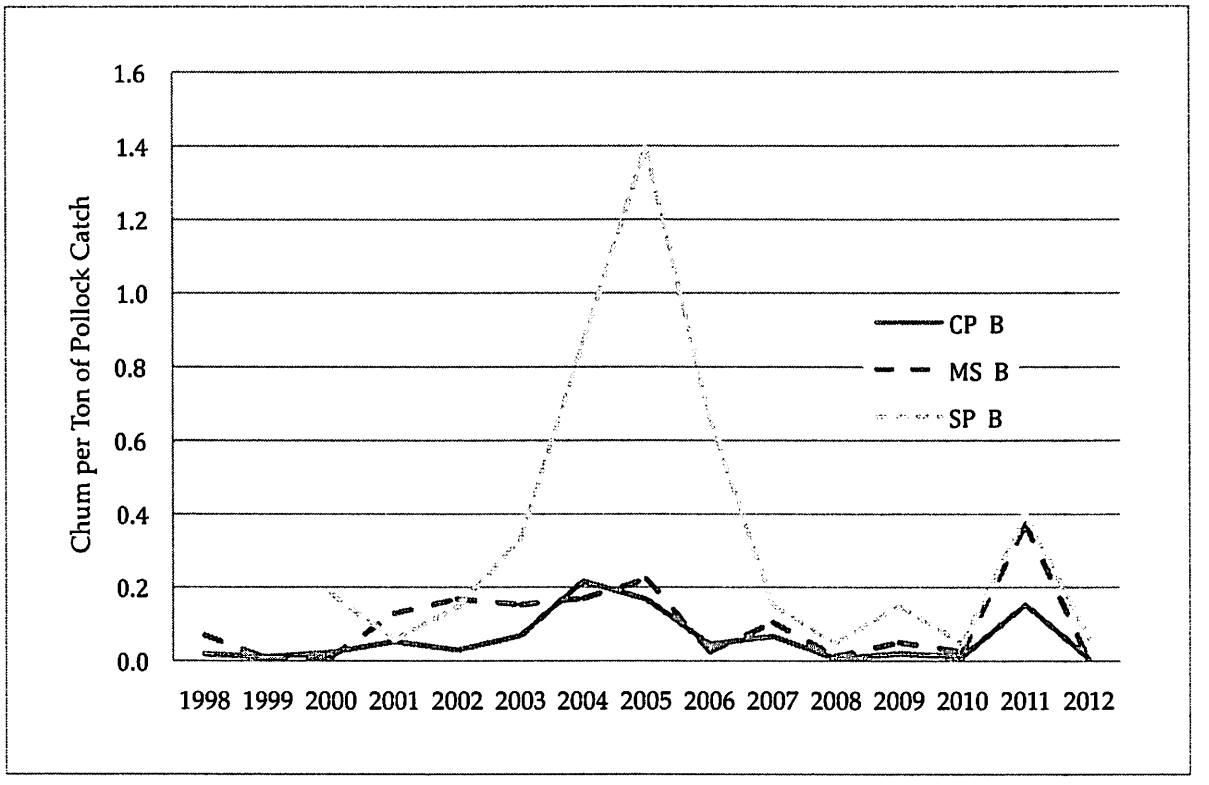


Table 3 shows the Chinook salmon bycatch performance of the IPA vessels. Performance is shown by season because the Chinook bycatch environment is different during the A-and B-seasons. During the A-season, bycatch ratios are often double those of the B-season because when the season starts Chinook salmon are already feeding on the EBS shelf. As the season progresses, Chinook salmon migrate to basin waters, and abundance on the grounds generally reaches a low level by mid March.

During the B-season, and when fishing starts quickly, it is sometimes possible to almost complete fishing operations before Chinook salmon arrive on the shelf in the fall to feed. In other years they arrive earlier and great effort must be concentrated on limiting the bycatch. Table 3 shows the range of vessel bycatch performance during the 2012 B-season. The ratio of Chinook bycatch to pollock catch was the second lowest recorded since 1998 (average ratio of 0.0003 n/t), and perhaps the best bycatch performance since then when adjusted for the size of the pollock TAC (the 2010 B-season shows a slightly lower ratio of 0.00023 n/t but pollock catch during the 2012 B-season was greater by 107,000 tons).

The CP IPA agreement specifies that all fishing in the B-season CSCA is prohibited beginning on October 15th in those years when the bycatch performance for all plan vessels combined exceeds 0.015 n/t during the month of September. The

Table 3. CP IPA Pollock Catch and Chinook Bycatch Performance by Season and Vessel, 2012.

Vessel	A-Season Pollock (t)	Chinook Salmon A (n)	B-Season Pollock (t)	Chinook Salmon B (n)	A-Season Ratio (n/t)	B-Season Ratio (n/t)
American Dynasty	16,128	119	26,794	4	0.007	0.000
American Triumph	17,297	313	25,737	1	0.018	0.000
Northern Eagle	17,836	152	27,039	7	0.009	0.000
Northern Jaeger	17,877	139	24,758	2	0.008	0.000
Ocean Rover	17,882	299	27,001	9	0.017	0.000
Arctic Fjord	18,849	215	25,619	1	0.011	0.000
Arctic Storm	13,063	54	22,483	4	0.004	0.000
Northern Hawk	15,947	160	23,929	1	0.010	0.000
Alaska Ocean	20,399	162	29,622	3	0.008	0.000
Pacific Glacier	16,666	196	26,359	3	0.012	0.000
Starbound	13,819	258	23,754	3	0.019	0.000
Island Enterprise	10,876	210	13,736	30	0.019	0.002
Kodiak Enterprise	10,856	236	10,651	4	0.022	0.000
Seattle Enterprise	10,517	323	19,521	25	0.031	0.001
Northern Glacier	0	0	0	0		
Katie Ann	0	0	0	0		
Ocean Peace	0	0	0	0		
Ocean Peace	0	0	0	0		
Forum Star	0	0	0	0		
American Challenger	0	0	0	0		
Ocean Harvester	0	0	0	0		
Tracy Anne	0	0	0	0		
Neahkanie	0	0	0	0		
Sea Storm	0	0	0	0	Weighted Average	Weighted Average
Muir Milach	0	0	0	0		
Total	218,011	2,836	327,004	97	0.013	0.000

IPA vessels caught 20 Chinook salmon and 35,056 tons of pollock during September, resulting in a bycatch ratio of 0.0006 n/t. As such, no IPA vessels were prohibited from fishing in the CSCA during the last two weeks of October.

Another way to look at the effect of the IPA program on vessel bycatch performance is to make an evaluation using statistics. In this case, the statistics describe the distribution of the vessel bycatch ratios (relative performance). The hypothesis is that the Amendment 91 IPA program creates a more uniform incentive to avoid Chinook salmon bycatch among the individual vessels. In the prior program, the bycatch performance of a cooperative vessel group was evaluated against a performance benchmark, and under some circumstances, incentives to avoid bycatch weakened for an individual vessel. With a more uniform incentive, the distribution of vessel bycatch performance is expected to narrow, reflecting more uniform vessel performance.

The standard deviation of a distribution provides information about data dispersion. A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data points are spread out over a large range of values. To interpret this statistic, it is believed that stronger, more uniform incentives for the individual vessel would reduce the "variability" of the observations. In this case, the standard deviation would be lower.

Skewness is another statistic that may provide some perspective on incentive changes. Skewness is a measure of the asymmetry of the distribution of a random variable, and can be positive or negative. Negative skew indicates that the tail on the left side of the distribution (lower bycatch ratio) is longer than the right side; a positive skew indicates that the right-side tail is longer than the left. A zero value indicates that the ratios are relatively evenly distributed on both sides of the mean, usually implying a symmetric distribution. To interpret this statistic, it is believed that stronger incentives for the individual vessel would reduce the likelihood of poor-performance outliers, thus increasing the symmetry of the distribution and resulting in a value for skewness close to zero.

Table 4 shows features of the IPA vessel Chinook bycatch performance distribution during the 2008-2012 A-seasons. Changes in the distribution features during 2011 coincide with the implementation of the Amendment 91 CP IPA. Analysis of the IPA vessel data 2008-2012 seems to indicate approximately similar Chinook abundance on the grounds. A similar comparison of B-season performance was not considered useful, as the bycatch environment was more difficult in 2011 than during the 2012 B-season (97 Chinook) or any of the previous three B-seasons (total IPA vessel bycatch for the 2008-2010 B-seasons combined was 797 Chinook). When a large change in bycatch conditions occurs during the same year that a change in bycatch incentives is implemented, it is difficult to measure the separate effect of the incentive change.

The IPA vessel A-season pollock catch also changed during 2008-2012, ranging from a low of 140,000 tons in 2009 to a high of 224,000 tons in 2011. However, the influence of a larger pollock quota on the strength of the individual vessel incentive to avoid Chinook bycatch is a matter of opinion. The "experimental" conditions that did occur provide data consistent with a more uniform distribution of IPA vessel bycatch

performance during the 2011 A-season. A skew of zero indicates that there were no poor-performance outliers in the distribution (no right-hand tail). The distribution coefficient of variation, which is a normalized measure of dispersion (standard deviation corrected for scale), was reduced by roughly half during 2011. For the 2012 A-season, the coefficient of variation is similar to the 2008-2010 seasons but the mean performance and standard deviation are lower by about 40 percent. Table 3 shows that half-a-dozen vessels had bycatch ratios somewhat higher than the average during the 2012 A-season, causing higher distribution skewness when compared to the 2011 A-season. At the vessel level, these higher ratios were the result of marginal increases in Chinook bycatch of about 100 fish.

Table 4. IPA Vessel A-season Bycatch Performance Distribution Features, 2008-2012.

Year	N (vessels)	Mean Ratio (n/t)	Standard Deviation (n/t)	Skewness	Coefficient of Variation
2008	16	0.026	0.013	0.2	0.49
2009	12	0.022	0.011	0.7	0.49
2010	13	0.025	0.011	0.8	0.43
2011	14	0.010	0.003	0.0	0.25
2012	14	0.014	0.007	0.9	0.50

A-Season Fishery Details

The A-season fishery began on January 20th with vessels fishing at the head of the Bering Canyon and along the 50 fathom curve to the west of the Alaska Peninsula. All vessels experienced good daily catch rates with little Chinook bycatch and few trawls with ratios higher than 0.075 n/t. [1] The incentive plan mandates that a short period at the beginning of each season be used to gather and evaluate catch and bycatch information and to assess the baseline abundance of Chinook on the grounds. The A-season period extends from January 20th to February 14th, and during this period the base rate is set at 0.040 n/t. The initial vessel performance evaluation was made on February 2nd (using the start-up base rate), and no BAA were identified. The average bycatch ratio (cumulative) through February 2nd was 0.015 n/t and the vessel performance benchmark was 0.030 n/t (75 percent of the base rate).

[1] A rule of thumb for quick appraisal of vessel annual bycatch performance is the 0.050 n/t benchmark (one salmon in every 20 tons of pollock). When Chinook salmon is relatively abundant on the pollock grounds, it is a significant challenge for vessels to remain under this standard given experience and existing technology. The figure legend breakpoints correspond to the 0.05 n/t benchmark as per the equation (0.40x0.075) + (0.60x0.035) = 0.05 (i.e., breakpoints in the A-season legends are twice those of the B-season).

The A-season fishery generated nine performance evaluations and these identified a persistent area of high Chinook abundance in deeper water around the east end of the CSCA beginning during the first week of February (roughly the same BAA was identified in six of the nine evaluations; the other three evaluations showed no fishing areas with bycatch higher than the base rate). Figure 3 shows vessel trawl locations during the two weeks prior to the BAA identified on February 16th (BAA shown in blue outline). At this time the base rate was set to its minimum value of 0.035 n/t because the three-week fishery-wide bycatch ratio was 0.025 n/t. Four vessels with two-week performance greater than 0.0263 n/t (75 percent of the base rate) were prohibited from fishing in the BAA. The prohibition notice indicated that trawls with more than 100 Chinook were made by vessels testing salmon excluders in the CSCA, but no trawls with such poor performance were observed outside of the CSCA.

Figure 3. IPA Vessel Trawl Locations and Bycatch Ratios, February 2-16, 2012.

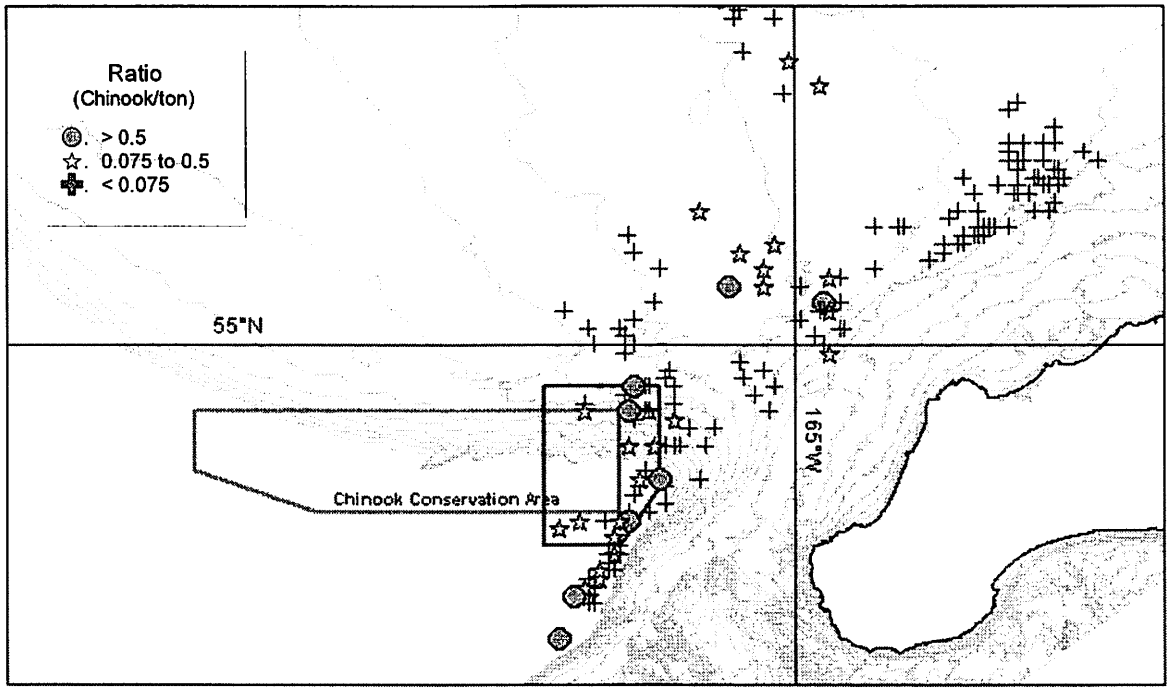


Figure 4 shows vessel trawl locations during the week after the BAA was identified. After the discovery of the concentration of Chinook in the BAA, virtually the entire fleet of IPA vessels moved fishing away from deep water in the Bering Canyon. As it turned out, most of the vessels relocated fishing to areas along the 50 fathom curve in the vicinity of the Pribilof Islands, well back from the shelf break (100 fathom curve). Figure 5 shows IPA vessel trawl locations in the vicinity of the BAA during the subsequent week. The concentration of Chinook appears to have moved offshore somewhat, with very low bycatch ratios for trawl locations shallower than 80 fathoms.

Figure 4. IPA Vessel Trawl Locations and Bycatch Ratios, February 16-23, 2012.

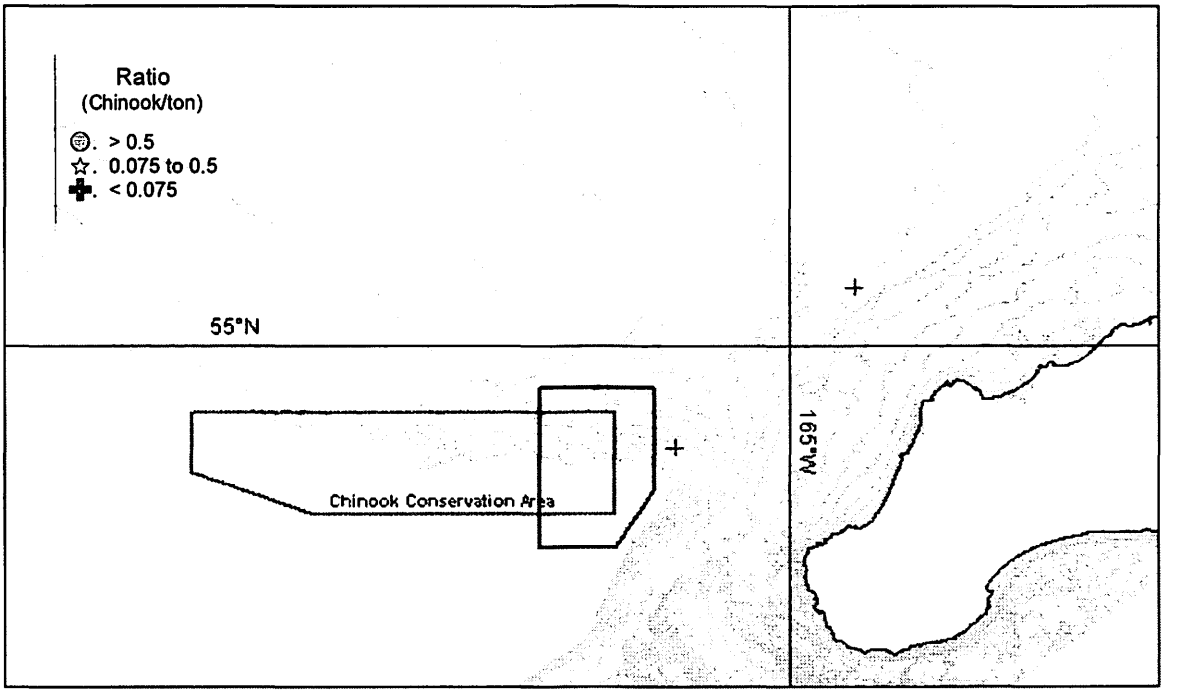
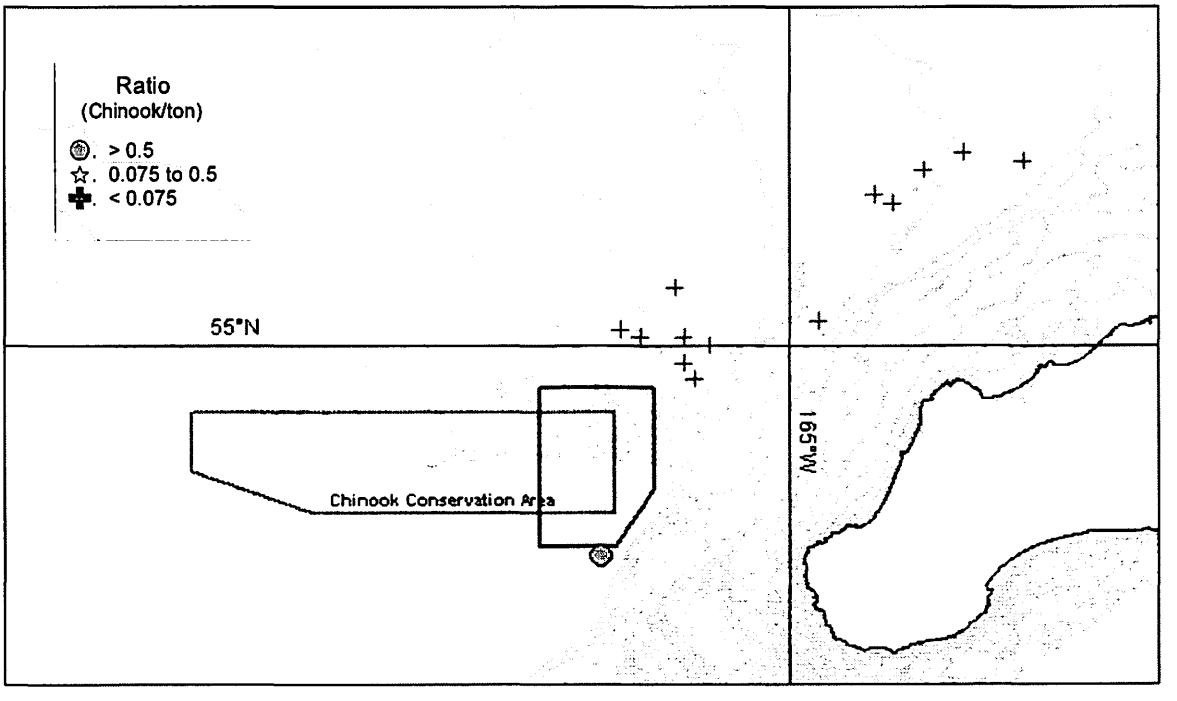


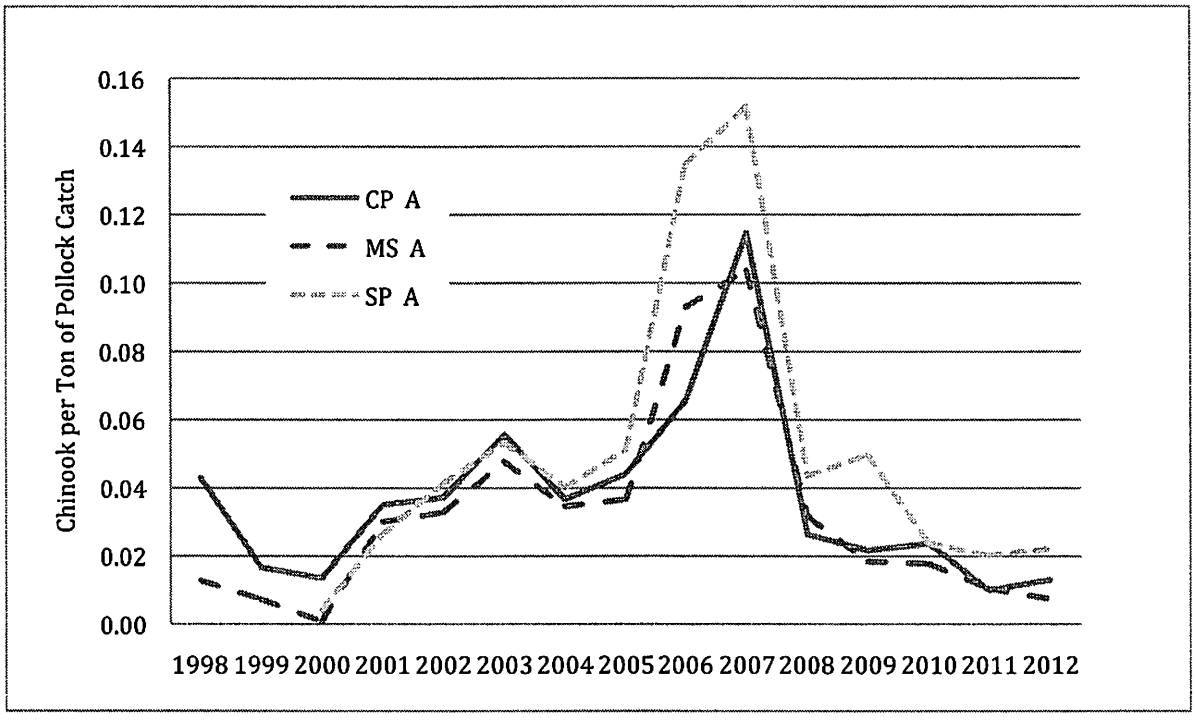
Figure 5. IPA Vessel Trawl Locations and Bycatch Performance, Feb. 16- Mar. 2, 2012.



The last A-season notice was provided on March 29th and showed the same persistent concentration of Chinook just outside of the eastern portion of the CSCA. Seven vessels were prohibited from fishing in a BAA that was slightly larger and covered deeper water than that shown in Figures 3-5. The final performance evaluation showed a cumulative vessel average bycatch ratio of 0.013 n/t.

Figure 6 shows A-season bycatch ratios from 1998 through 2012. Despite what is believed to have been a similar levels of Chinook abundance on the pollock grounds as during 2008-2010, the IPA vessels managed to achieve relatively low Chinook bycatch during 2011 and 2012 A-seasons, and so accelerated a trend toward improved bycatch performance that began in 2008 (average bycatch ratio during the 2011 and 2012 A-seasons was about half of the average ratio during the 2008-2010 A-seasons).

Figure 6. Chinook Bycatch Ratios, Bering Sea Pollock A-Season, 1998-2012.



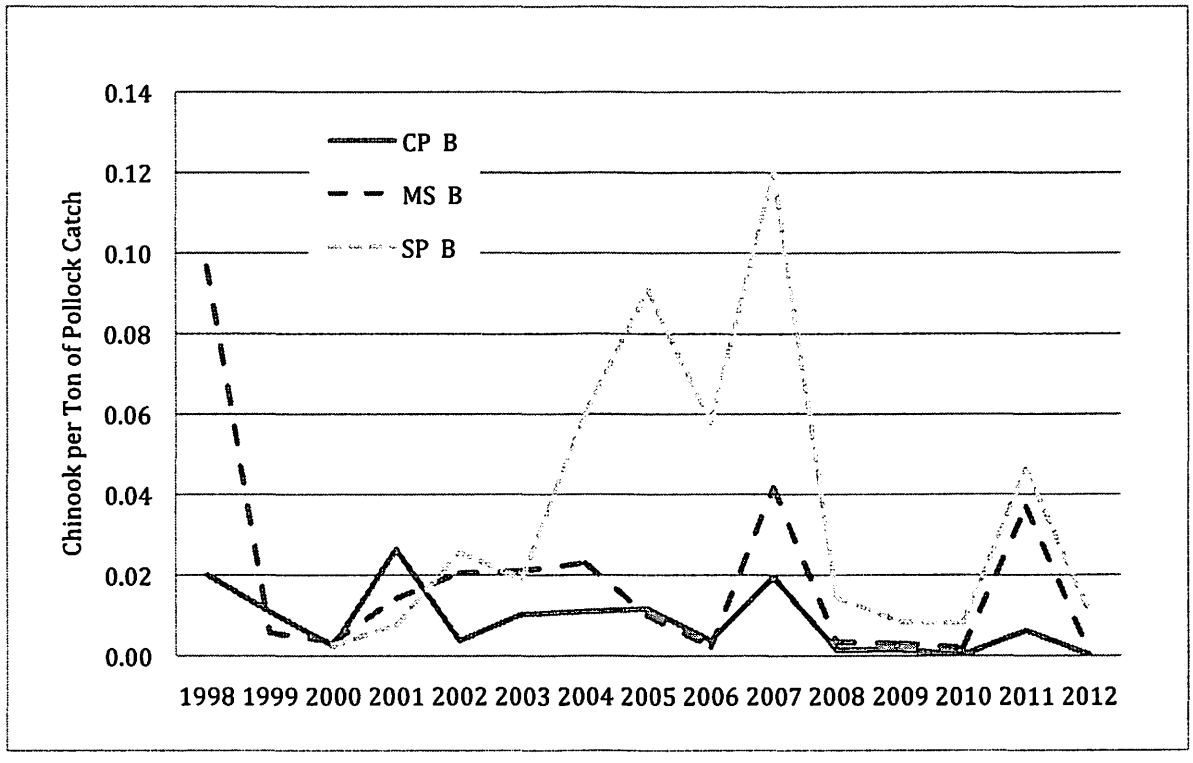
B-Season Fishery Details

Virtually all IPA vessels were on the grounds as the B-season opened. The B-season data-gathering period extends from June 10th to July 14th, and during this period the base rate is set at 0.035 n/t. The initial vessel performance evaluation was made on July 21st using the start-up base rate and no BAA were identified. Pollock daily catch rates were good from the season start through to the end of July with virtually all fishing west of 170° West longitude. Very few concentrations of Chinook were encountered and no BAA were identified; bycatch was 52 Chinook. During August and September the same bycatch environment persisted, no BAA were

identified, and bycatch by the end of September was 97 Chinook. Four vessels finished fishing before the end of August, and all but one vessel finished prior to October. The last of 17 B-season performance evaluations was provided on October 11 and showed no Chinook bycatch during October and a cumulative average bycatch ratio of 0.0003 n/t (three Chinook for every 10,000 tons of pollock catch).

Figure 7 shows Chinook bycatch ratios for the pollock fishery during the 1998-2012 B-seasons. The data shows that an unexpected, abrupt change in pollock abundance during the 2011 B-season resulted in a relatively adverse Chinook bycatch environment, at least when compared to recent years (during 2011 most IPA vessels were forced to fish until the end of the season, for two weeks after the second wave of Chinook arrived on the grounds, a circumstance where Chinook abundance in local areas can reach very high levels).

Figure 7. Chinook Bycatch Ratios by Sector, Bering Sea Pollock B-Season, 1998-2012.



Chinook Salmon Savings

The CP IPA is a time-and-area-based program that prohibits fishing in areas with high concentrations of Chinook salmon when compared to the abundance of pollock. Because performance benchmarks are calculated for each vessel individually, the program generates incentives to avoid Chinook bycatch for the individual vessel. This simple approach works especially well for CP vessels because efficient processing requires an uninterrupted flow of fish, and this can be achieved most reliably with unrestricted access to the grounds. Because CP vessels fully integrate catching and

processing activities, the benefit of unrestricted access to good pollock fishing grounds includes economic profits that reflect both catching value and processing value. This obvious difference in operational structure is believed to play an outsized role in motivating the IPA vessels to avoid potentially significant risks to both catching and processing value from unexpected, repeated episodes of high Chinook bycatch. This economic motivation remains even when bycatch is anticipated to remain below the annual limit. [1]

Figure 8 shows pollock A-season fishing locations before and after the Implementation of BSAI FMP Amendment 91. A close examination of the trawl locations in space and time, their bycatch ratios, and the bycatch performance of all of the IPA vessels shows clearly that the vessels changed their fishing strategy to avoid Chinook bycatch. The most salient feature of this changed approach was for vessels to locate initial fishing operations away from the outer margins of the shelf. Depending on the locations of pollock concentrations, any profitable movement of fishing to deeper water was accomplished via a deliberate, slow, and cautious progression while maintaining awareness of information about Chinook concentrations within the area. Evidence of local Chinook concentrations generally caused vessels fishing in deep water to move fishing to more shallow grounds. This behavior was most pronounced during the A-season and occurred in multiple areas when trawl bycatch ratios showed high concentrations of salmon, as e.g., when a wave of Chinook salmon moved into a local area to feed. During the B-season fishing was also moved ahead in time to avoid fishing during the latter portion of September and at any time during October.

The 2011 year was the first for the Chinook CP IPA program. The program identified relatively few BAA during both seasons, and most were selected based on the bycatch performance at shore-plant and mothership catcher-vessel fishing locations. During 2012 the average A-season bycatch ratio was slightly higher than for 2011, but nevertheless still very low. The 2012 B-season bycatch ratio was exceedingly low and no BAA were identified. In sum, the bycatch performance of the IPA vessels during 2011 and 2012 was just about the best recorded since 1998, and this period includes the salmon "crisis" years during which Chinook abundance on the grounds was also low. The analyses carried out to assess the effectiveness of the CP IPA leaves an impression that the vessels relied on spatial, temporal, and bycatch performance data from a large number of individual pollock trawls to guide a cautious adaptation to the new program. The changed fishing strategy that resulted is thought to have limited the number of BAA identified during 2011 and 2012.

IPA Amendments

There were no amendments to the CP IPA during 2012.

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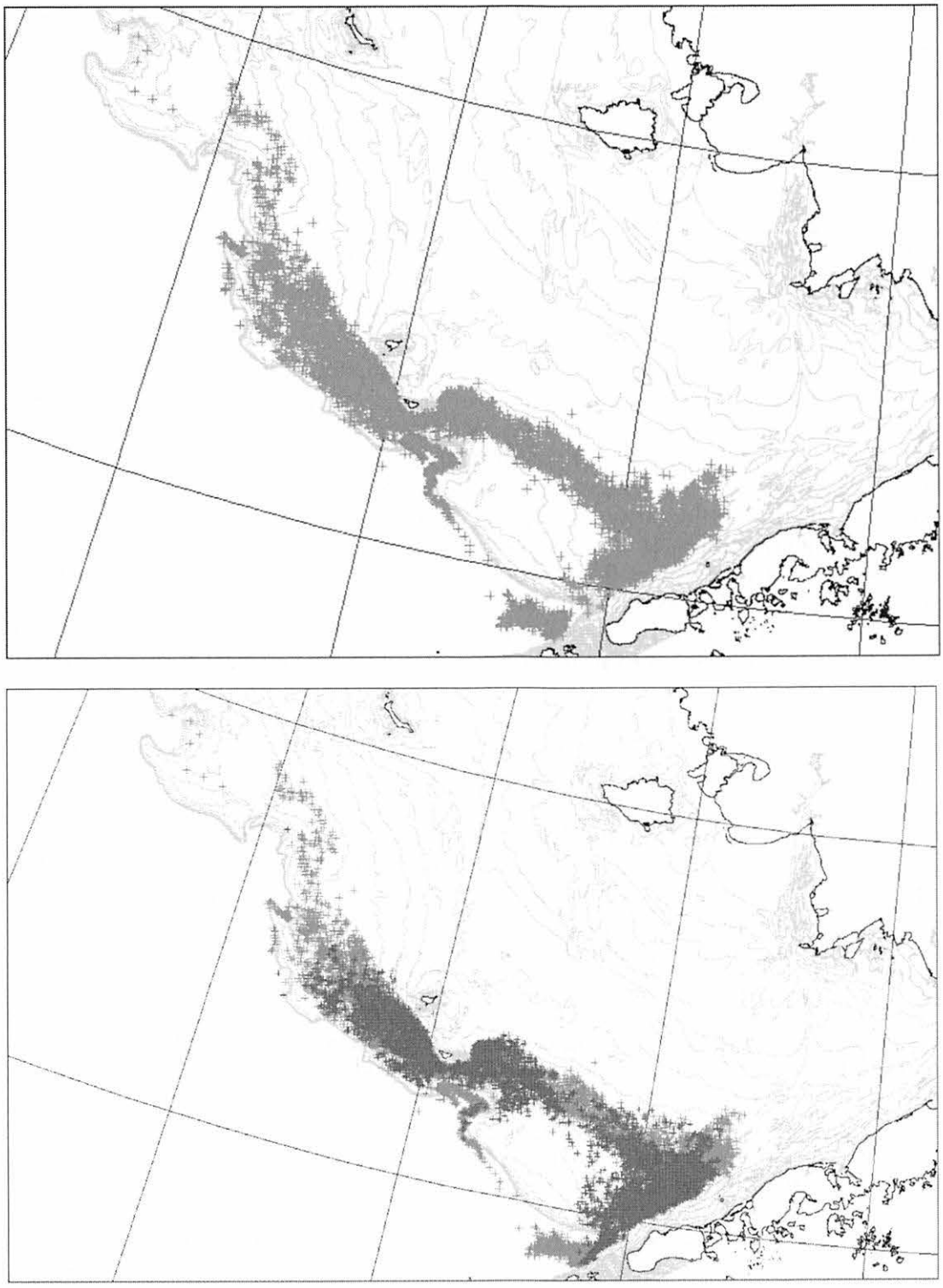
[1] A mothership and its catcher-vessels also integrate catching and processing activities, but the incentives in the mothership catcher-vessel IPA do not extend all the way down to the individual vessel.

Figure 8. Catcher-Processor A-Season Fishing Locations Before (Green 2007-10) and After (Blue 2011-12) Implementation of BSAI FMP Amendment 91.



Salmon Bycatch Research

The EBS pollock industry has supported research to reduce salmon bycatch for about ten years. During 2011 support was provided for research to improve the genetic baseline used to identify the stock of origin of chum salmon, and for efforts to develop a trawl-net section designed to reduce salmon bycatch. The design of the trawl-net section allows salmon caught by the trawl to swim free before the net is hauled back. A pelagic pollock trawl with the section installed is a salmon-excluder trawl.

Most but not all excluder-trawl development has been supported by the North Pacific Fishery Research Foundation via the development and execution of exempted fishing permits (EFP). The current EFP allowed research to proceed during the 2011 and 2012 pollock seasons. A final report on these activities is expected to be available during May, 2013.

Excluder-trawl trials during 2011 focused on measuring chum-salmon escapement using the excluder-trawl design developed during 2010. Trials were made using a catcher vessel and a high-horsepower, catcher-processor vessel. The most recent design places the excluder section just in front of the cod end where water flow (inside the net) is slowest. Prior designs placed the section more forward, where water flow is faster, in part due to the tapered shape of the net. Because chum salmon are not thought to be strong swimmers, it was believed that chum escapement rates from earlier designs (generally poor, less than three percent) could be improved upon with a revised design that would be easier for salmon to escape from. However, the trials did not reveal any improvement in chum escapement, with an average for all trials less than ten percent (but pollock escapement remained very low, about one-half of one percent).

The initial A-season trials occurred in an area with some intermittent Chinook salmon bycatch as well as reliable chum bycatch of between 30 and 100 fish. When Chinook were encountered, escapement averaged close to 40 percent, but chum escapement remained less than ten percent. The results reinforced conclusions drawn from video observations that chum and Chinook salmon behave differently inside the trawl and-or have different swimming abilities, or may react differently to escape path location. However, the EFP allowed for a total bycatch of just 125 Chinook for the A-season trials, and so research operations had to leave the area after making only eight trials. This limited the amount of data obtained about simultaneous Chinook and chum escapement.

Experimental fishing trials during the 2011 B-season were designed to investigate a modification of the excluder design that reduced somewhat the escape path. The hypothesis was that the change might allow slowly-swimming salmon to escape more frequently. The trials showed no change for both chum and pollock escapement. As no Chinook salmon were present where the trials were made, no information was obtained on whether the modification might affect Chinook escapement.

During 2011 the pollock industry also supported a research project to conduct a comprehensive gap analysis of deficiencies in genetic sample locations, sample sizes, and sample quality for Bering Sea and North Pacific Rim chum salmon populations. The project is headed by Dr. Tony Gharrett at the University of Alaska and the objective

is to add genetic information for approximately 50 populations to the coast-wide genetic baseline for chum salmon. A second part of the project will develop new, single nucleotide polymorphism (SNP) markers to improve discrimination of coastal western Alaskan chum salmon, including lower Yukon River, Kuskokwim River, and Norton Sound populations.

If successful, the project will provide some new methods that may be used by NOAA Fisheries and Alaska Department of Fish and Game geneticists to detect and estimate the proportions of western Alaska chum salmon stocks taken in both directed and incidental fisheries. In particular, improved stock-of-origin estimates can be used to inform estimates of impacts of groundfish fisheries on chum stocks as well as provide temporal and spatial information that may be useful for forecasts of salmon abundance. This work is relevant to management of western Alaska chum salmon populations that support subsistence and commercial fisheries, and also should provide useful information about other North Pacific Ocean stocks of conservation and treaty interest.

Use of New Gear Technologies

Figure 9 shows the frequency with which the IPA vessels used Chinook salmon-excluder trawls during the 2012 fishery. While experimental trials have resulted in repeated escapements of 20-40 percent of Chinook bycatch with very low pollock escapement, it is nevertheless possible for pollock to escape the trawl, especially during periods when the trawl is short-wired. As such, some vessel captains remain somewhat reluctant to deploy salmon-excluder trawls exclusively, especially at times and places (e.g., early in the B-season) when there is evidence that Chinook abundance on the grounds is very low. During 2013 the CP IPA vessels will begin a program to confirm low pollock escapement during trawl haul-backs using video observations. This program may promote increased use of excluder-trawls.

Figure 9. Frequency of IPA Vessel Chinook Salmon-Excluder Trawl Use, 2012.