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March 13, 2009

Mr. Eric Olson
Chairman
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501

Dear Chairman Olson:

The enclosed document is being submitted in response to the North Pacific Fishery Management Council's ("Council") request that industry representatives provide final documentation to the Council office by March 13, 2009, in order to afford the Scientific and Statistical Committee two weeks to review the industry incentive proposals and draft inter-coop agreement ("ICA") prior to the start of the March/April Council meeting. The Council requested that final documentation include the following:

- A description of the structure of the ICA, including information on the rules governing the inter-relationship of the different incentive programs and operations under those programs.

- A clear description of each incentive program proposed under the ICA, including a detailed explanation of how each incentive program will work and the mechanics of the specific programs by sector.

- Analysis to demonstrate how well each incentive program will achieve the Council's goals of bycatch reduction.

The At-Sea Processors Association and United Catcher Boats, representing a majority of the vessels eligible to fish pollock in the Bering Sea and Aleutian Islands under the AFA, are pleased to provide this response to the PPA's option for and the Council's subsequent direction regarding an ICA to reduce Chinook bycatch. In the event that the Council adopts the PPA or a similar alternative designed to implement a hard cap for Chinook salmon in the Bering Sea AFA pollock trawl fishery of not less than 68,392 Chinook, our members have developed elements of an ICA that provide explicit incentives for each participant to avoid salmon bycatch in all years. A description of the structure of the ICA and two draft incentive plans are described in the enclosed document.

Respectfully submitted,

At-Sea Processors Association

By: _Stephanie Madsen_

Stephanie Madsen,
Executive Director

United Catcher Boats

By: _____

Brent Paine,
Executive Director

<h1 style="text-align:center">Description of Structure of Bering Sea Salmon Bycatch
Inter-Cooperative Agreement</h1>

I. Purpose

The Bering Sea Salmon Bycatch Inter-Cooperative Agreement ("ICA") will describe the method of allocating a Chinook hard cap and will describe the incentive plans developed by the parties for the purpose of achieving Chinook salmon savings below the hard cap. The ICA will further describe how the different incentive plans will work in conjunction with one another.

II. Identification of Parties

The parties to the ICA may include participating inshore cooperatives, entities for participants in the offshore, catcher processor, and mothership sectors, and participating CDQ groups.

III. Allocation of Chinook Hard Cap

NMFS will allocate a portion of the Chinook hard cap in accordance with the sector allocations adopted at final action. Allocation by the parties, which may differ between sectors and incentive plans, is described in the enclosed draft incentive plans.

IV. Description of Incentive Plans

There are two draft incentive plans included with this submittal. One is referred to as the Financial Incentive Plan ("FIP"). The other is referred to as the Salmon Savings Incentive Plan ("SSIP").

A. **Financial Incentive Plan** The FIP is a program based on the concept presented in the paper, "*Analysis of an Incentive-Based Chinook Salmon Bycatch Avoidance Proposal for the Bering Sea Pollock Fishery*" (Kochin et al. 2008). The FIP creates an annual bycatch competition. It is an individual vessel incentive-based bycatch avoidance program that "provides explicit incentives for each participant to avoid salmon bycatch in all years" by creating a high marginal value for each Chinook salmon avoided by the vessel. To create the incentive, the program establishes a pool of money by assessing a fee of one penny a pound for every pound of pollock that is harvested ($22.05 per ton of pollock catch). As such, each vessel contributes to the fund in proportion to its pollock catch. The program returns payments from this incentive fund to each vessel according to relative salmon bycatch performance. The more a vessel can avoid Chinook salmon bycatch, the larger the incentive payment it will receive, and each Chinook taken as bycatch reduces the amount that a vessel receives from the incentive fund.

The intent of this program is to create strong economic incentives at the vessel level to avoid Chinook salmon bycatch at all levels of pollock and salmon abundance. It does so by providing financial rewards for salmon bycatch avoidance and financial penalties for failure to

avoid salmon bycatch at the individual level. The incentives provided by this plan are designed to augment the incentives to avoid salmon bycatch that will otherwise be created by the PPA bycatch cap; and a rolling hot-spot closure program that will operate in both the A and B seasons.

Details and analysis of the FIP are contained in the enclosed Exhibit 1.

B. **Salmon Savings Incentive Plan**   The SSIP requires that each participating vessel fish below its pro-rata share of a performance standard of 47,591 Chinook in order to earn savings credits for potential use in high encounter years. A substantial discount rate is applied to the number of Chinook saved by a vessel that fishes below the 47,591 performance standard, resulting in a higher level of salmon savings than credits earned. A vessel may be allowed to take an amount of Chinook that exceeds its proportionate share of the 47,591 performance standard in some years if it has accumulated additional credits through savings or transfers, but under no circumstances will a vessel be able to harvest an amount of Chinook that exceeds its proportionate share of the 68,392 hard cap.

Over time, the SSIP does not allow the average annual Chinook bycatch of participating vessels to exceed, in the aggregate, their pro-rata share of the 47,591performance standard. Because vessels will be sufficiently motivated to accumulate savings credits as "insurance" for years of elevated Chinook encounters, the average annual bycatch will be lower than the 47,591 performance standard, resulting in an improvement over PPA annual scenario 2. The SSIP will also include mandatory rolling hot spot closures to promote additional savings, especially in low encounter years.

Details, analysis, and a retrospective study of the SSIP are contained in the enclosed Exhibit 2.

V.   Operation of Incentive Plans in Relation to One Another

Although the individual incentive plans will largely function independently, there are some areas in which the plans will operate in conjunction with one another, i.e. certain rules of operation may apply to both plans or may constrain movement between plans. Those areas have been identified as:

- Eligibility criteria
- Movement between incentive plans
- Mechanisms for inter-plan transfers
- Initial allocation for late entrants to the SSIP
- Rolling hot spot programs

Eligibility Criteria
Participation in the FIP is sector specific and has been analyzed for the Catcher-Processor sector. Similar financial incentives have not yet been fully analyzed for the catcher vessel fleet. Participation in the SSIP is available to vessels in all sectors.

Movement Between Incentive Plans

Eligible participants may participate in one plan per year. Participants will commit to enrollment in a plan by a date certain. Participants in the FIP plan may not terminate their participation in the FIP at any time that their three-year rolling average of Chinook salmon bycatch exceeds their allocation of the 47,591 salmon limit. As more fully described in the plan, participants in the SSIP are allowed to leave that plan so long as their available cap is greater than or equal to their share of the 47, 591 performance standard, or they must limit their catch to less than their share of 47,591 in the following year.

Mechanisms for Inter-Plan Transfers

Transfers of Chinook salmon are contemplated within the ICA. The rules governing transfers are unique to each plan but fully compatible with the rules and objectives of each other.

Initial Allocation for Late Entrants to the SSIP

Because the SSIP provides for a participating vessel to earn salmon savings credits for future use by saving in prior years some amount of Chinook below the 47,591 performance standard, late entrants to the SSIP will be subject to special initial allocation rules.

Rolling Hot Spot Programs

Each of the incentive plans relies on use of a rolling hot spot program as described in each incentive plan in order to further reduce salmon bycatch.

VI.   Data Reporting, Monitoring, Audit

The parties will contract with one or more independent monitoring agent(s) who will collect, compile, review, and disseminate the data necessary to facilitate proper operation of and reporting for their respective incentive plans. The parties will pre-register their vessels as necessary and cooperate with one another in the implementation of the ICA. The parties will also contract with one or more independent third party(ies) for the purpose of auditing compliance and reviewing performance of their respective incentive plans.

VII.   Annual Report

The ICA will make available for Council and public review on an annual basis an annual report to the Council. The report will include:
A.   A comprehensive explanation of incentive measures in effect in the previous year;
B.   How incentive measures affected individual vessels;
C.   Evaluation of whether incentive measures were effective in achieving salmon savings beyond levels that would have been achieved in the absence of the measures; and
D.   A summary of data reporting, monitoring and auditing results of each incentive program.

At-sea Processors Association

Financial Incentive Plan

EXHIBIT I

APA
3/13/2009

Financial Incentive Plan:
A Chinook Salmon Bycatch Avoidance Program for the Catcher /Processor Sector

Executive Summary

I. <u>Introduction</u>

The Financial Incentive Plan (FIP) is a program that is responsive to the North Pacific Fishery Management Council (Council) request for a powerful incentive-based Chinook salmon avoidance program as expressed in the Preliminary Preferred Alternative (PPA) developed in June 2008. The plan described here is based on the concept presented in the paper, "*Analysis of an Incentive-Based Chinook Salmon Bycatch Avoidance Proposal for the Bering Sea Pollock Fishery*" (Kochin et al. 2008). The intent of this program is to create strong economic incentives at the vessel level to avoid Chinook salmon bycatch at all levels of pollock and salmon abundance. It does so by providing financial rewards for salmon bycatch avoidance and financial penalties for failure to avoid salmon bycatch at the individual level.

The incentives provided by this plan are designed to augment the incentives to avoid salmon bycatch that will otherwise be created by the PPA bycatch cap; and a rolling hot-spot closure program that will operate in both the A and B seasons. During periods of chronically low Chinook abundance, when avoidance becomes even more important, the plan actually increases the per-salmon incentive to avoid bycatch.

II. <u>Allocation of a Salmon Bycatch Cap</u>

As noted above, the economic incentives created by the FIP are <u>in addition,</u> and intended to compliment, those provided by establishing a salmon bycatch limit allocated to the vessel level. In the case of the catcher-processor sector, the cap limit will be allocated to each company in proportion to its pollock allocation, and then assigned as appropriate to each vessel. The cap limit itself provides strong economic incentives to avoid bycatch when salmon encounters are high and there is a significant chance the cap limit will be reached. When salmon bycatch encounters are moderate or low, however, the economic incentive to avoid bycatch resulting

from the cap limit is small. The magnitude of the incentives provided by the FIP is therefore greatest when bycatch encounters are low. The FIP thereby compliments the incentives generated by the cap limit itself by providing strong economic incentives to avoid bycatch when the Chinook encounters are low or moderate and the economic incentive of the cap limit itself is small.

III.   Bycatch Avoidance Competition

The FIP creates an annual bycatch competition. It is an individual vessel incentive-based bycatch avoidance program that "provides explicit incentives for each participant to avoid salmon bycatch in all years" by creating a high marginal value for each Chinook salmon avoided by the vessel. To create the incentive, the program establishes a pool of money by assessing a fee of one penny per pound for every pound of pollock (see Addendum III) that is harvested ($22.05 per ton of pollock catch). As such, each vessel contributes to the fund in proportion to its pollock catch. The program returns payments from this incentive fund to each vessel according to relative salmon bycatch performance. The more a vessel can avoid Chinook salmon bycatch, the larger the incentive payment it will receive, and each Chinook taken as bycatch reduces the amount that a vessel receives from the incentive fund.

In the FIP, vessel relative bycatch performance is measured as the number of Chinook salmon caught per metric ton of pollock catch. This performance measure, called the bycatch ratio, is evaluated against a reference point set at 2.5 times the median bycatch performance of all of the vessels. This benchmark is called the performance reference (Figure 1). Vessels with a bycatch ratio lower than the performance reference receive money back from the fund based on their estimated "undercatch" of salmon (undercatch is a proxy for avoided salmon). For vessels with performance better than the reference, the difference between the reference and the vessel bycatch ratio is called the undercatch ratio (distance). Estimated undercatch is determined according to the following formula:

$$U_j = C_j (R - BR_j)$$

where C_j is the pollock catch of vessel j, R is the performance reference, BR_j is the bycatch ratio of vessel j, and U_j is the undercatch of vessel j.

After the vessel undercatches are determined (Table 1), the incentive fund is allocated to the vessels according to each vessel's proportion of the total undercatch, viz.,

$$IP_j = (U_j / \Sigma (U_j)) BIF$$

where IP_j is the incentive payment to vessel j, U_j is the estimated undercatch of vessel j, $\Sigma (Uj)$ is the total undercatch of all of the vessels, and BIF is the bycatch incentive fund. Vessels with a bycatch ratio greater than or equal to the performance reference receive no incentive payment from the fund (i.e., they forfeit their entire fund contribution; Table 2), and then also pay an additional per-salmon fee (see Penalty for Poor Bycatch Performance below). As a result, at the vessel level, incentives to avoid salmon bycatch are not limited by the initial contribution to the incentive fund. Additional information about the incentive fund levy and the behavioral changes expected to result from the FIP is presented in the program addendum III(b).

Table 1. Bycatch Performance, Undercatch, and Bycatch Incentive Payments for a Vessel with Good Bycatch Performance. [a]

Vessel	Pollock Catch (t)	Incentive Fund Contribution ($)	Chinook Bycatch (n)	Bycatch Ratio (n/100 t)	Undercatch (n)	Bycatch Incentive Payment ($)	Net Incentive Payment ($)
Bering Sea	42,597	939,099	644	1.51	1,510	1,585,446	646,347

[a] Median bycatch performance is 2.02 and the performance reference is 5.06 salmon per 100 tons of pollock catch for this example.

IV. **Penalty for Poor Bycatch Performance**

In the original FIP concept (Kochin et al. 2008), the bycatch ratio of the worst performing vessel was adopted as the performance standard, and the single worst performing vessel lost its entire contribution but no more. It was subsequently determined that this limit on the incentive

structure could leave a poorly performing vessel or vessels with little incentive to improve performance. To address this weakness in the incentive structure, the location of the performance reference was changed to 2.5 times the median of the distribution of the vessel bycatch ratios, and an additional penalty is placed on any vessel with a bycatch ratio that exceeds the performance reference (Figure 1). The purpose of the additional per-salmon penalty is to maintain a strong incentive to avoid salmon bycatch on all vessels. The amount of the per-salmon penalty is calculated by dividing the incentive fund by the estimate of total undercatch.

Figure 1. Distribution of PCC Vessel Bycatch Performance, 2001.
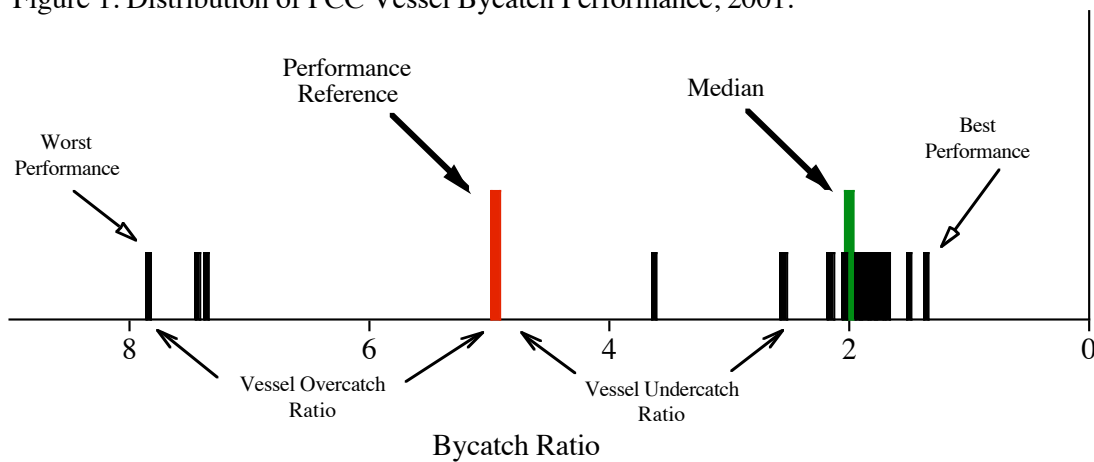
The size of the overcatch penalty is determined by first estimating the overcatch of a poorly performing vessel, and then multiplying the overcatch by the per-salmon penalty. Overcatch is estimated just like undercatch, but for vessels with bycatch performance worse than the reference, viz.,

$$O_j = C_j (BR_j - R)$$

where C_j is the pollock catch of vessel j, R is the performance reference, BR_j is the bycatch ratio of vessel j, and O_j is the overcatch of vessel j. In this way, a cost is realized on every salmon caught in excess of the performance reference. The overcatch penalties are distributed to vessels with bycatch performance better than the reference in the same way as for the incentive fund (i.e., in proportion to the vessel share of the total undercatch). This encourages a vessel to

improve performance because the costs associated with increasing salmon bycatch are not limited by the incentive fund contribution.

For the poorly performing vessel described in Table 2, undercatch is zero, the incentive payment is zero, and the estimated overcatch is 955 salmon. In this example from 2001, the total size of the bycatch incentive fund is $10,653,125 and the total estimated undercatch is 10,147 salmon. As such, the per-salmon overcatch penalty is $1,050 and so the size of the overcatch penalty for the vessel in Table 2 is $1,002,209, leaving this vessel with a total loss of $1,887,009 due to a Chinook salmon bycatch of 2,984 fish.

Table 2. Bycatch Performance, Undercatch, and Bycatch Incentive Payments for a Vessel with Poor Bycatch Performance. [a]

Vessel	Pollock Catch (t)	Incentive Fund Contribution ($)	Chinook Bycatch (n)	Bycatch Ratio (n/100 t)	Undercatch (n)	Bycatch Incentive Payment ($)	Net Incentive Payment ($)
Aleutian	40,134	884,800	2,984	7.44	0	0	0

[a] Median bycatch performance is 2.02 and the performance reference is 5.06 salmon per 100 tons of pollock catch for this example.

V. Undercatch Adjustment

The analysis of Kochin et al. (2008) shows that the structure of the FIP provides unequal rewards for avoiding salmon at the margin, and that the magnitude of the difference in these marginal values is related to the share of undercatch contributed by each vessel and each company. To approximately equalize the rewards for salmon avoidance at the margin, the undercatch of each company is adjusted according to the formula:

$$AdjU_i = ((R - BR_m) C_i) + (1/(1-(U_i/ \Sigma U_i))) * (U_i - (R - BR_m) C_i)$$

where $AdjU_i$ is the adjusted undercatch of company i, U_i is the undercatch (unadjusted) of company i, R is the performance reference, BR_m is the median of the distribution of vessel bycatch ratios, C_i is the pollock catch of company i, and ΣU_i is the total undercatch of all of the vessels. Additional information about the effects of the undercatch adjustment is provided in the program addendum V.

VI.   Sector Performance Standard

To insure that the pollock industry meets the Council objective that annual pollock-fishery Chinook bycatch is consistently below 47,591 salmon, the FIP includes a provision that increases the incentive fund contribution by one half-cent per pound ($11.03 per ton) of pollock catch should company bycatch exceed it's allocation of a 47,591 salmon limit, where such company bycatch is measured as a three-year rolling average of its annual salmon bycatch. Such increase will occur for every company and for every year following a year where a company three-year rolling average of annual salmon bycatch exceeds its share of the 47,591 limit. To illustrate this performance standard, Figure 2 shows a series of company Chinook bycatches 1999-2010, and Figure 3 shows the three-year rolling average of these amounts as well as the concomitant incentive fund levy amounts. As Figure 3 shows, the levy increase occurs in the year following a year when the rolling average of bycatch exceeds the company salmon allocation.

If the rolling-average bycatch were to exceed the allocation for two consecutive years, then in the following year the levy would increase by one full cent to two cents per pound ($44.10 per ton) of pollock catch. If bycatches were sufficiently high such that the rolling-average bycatch were to exceed the allocation for three consecutive years, then in the following year the levy would increase by one and one-half cent to two and one-half cents per pound ($55.12 per ton) of pollock catch, and so on. As Figures 2 and 3 illustrate, a single year of high Chinook bycatch could result in significant levy increases for a period of several years even though subsequent bycatches are reduced to low levels. Additional information about expected levels of salmon bycatch under the FIP is provided in the program addendum VI.

Figure 2. Example PCC-Company Chinook Salmon Bycatch, 1999-2010.

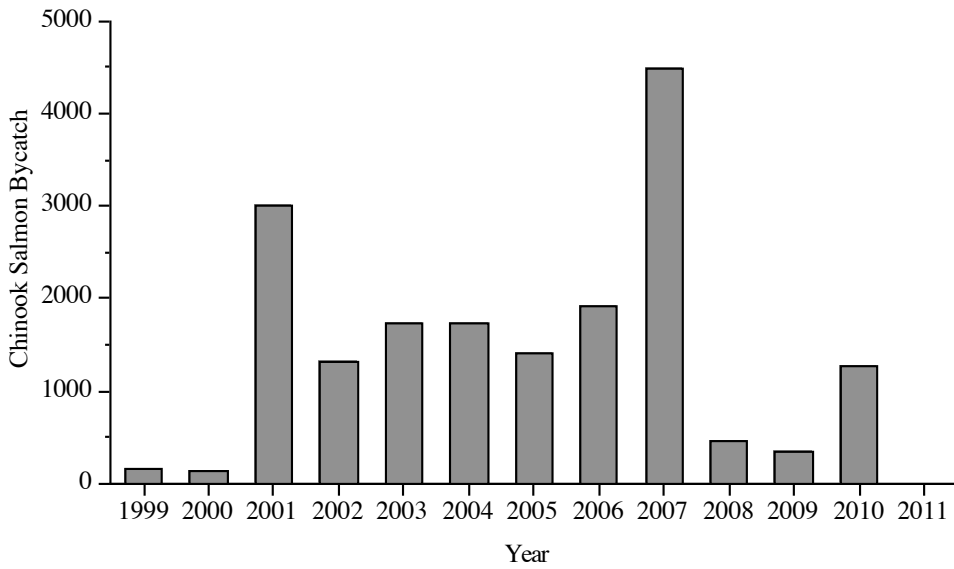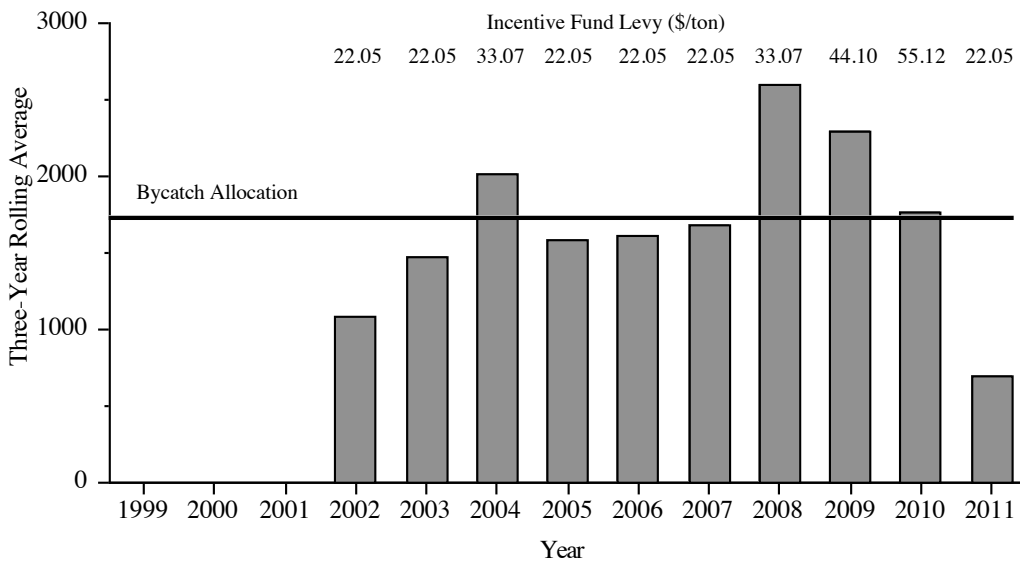Figure 3. Example PCC-Company Prior Three-Year Rolling Average Chinook Salmon
Bycatch Amounts and Incentive-Fund Levies per Ton of Pollock Catch, 2002-2011.

VII. Transfers

There are no transfer restrictions necessary to maintain the incentives in the FIP plan and none are proposed in this plan other than what may be mandated by Council or required when transferring between incentive plans

VIII. <u>Rolling Hot Spot Closure Program</u>

The structure of the Rolling Hot-Spot Closure Program (RHS) that will augment the incentives in the FIP is the same as the RHS that will accompany the Salmon Savings Incentive Plan except for the criterion that will determine which vessels are prohibited from fishing in the areas identified for closure. In the FIP plan, vessels with bycatch performance worse than the median of all vessels participating in the Rolling Hot-Spot Closure Program will be prohibited from fishing inside the identified closure areas.

IX. <u>Community Development Quota Harvest</u>

All pollock and Chinook salmon harvested by vessels in the FIP is subject to FIP rules.

X. <u>Prohibitions and Stipulations</u>

No company shall enter into any agreements to share or insure against the financial penalties for Chinook salmon bycatch created by the FIP, or otherwise agree with other members to operate in a way that purposefully diminishes the effectiveness of the FIP. In addition, no company may terminate its participation in the FIP at any time that its three-year rolling average of Chinook salmon bycatch exceeds its allocation of the 47,591 salmon limit. No less than two companies can participate in a FIP. Payments will be required each year within thirty days of receipt of the audited results of the prior year's performance.

XI. <u>Monitoring and Enforcement</u>

The legal entity formed for the offshore sector will be responsible for monitoring salmon allocations to vessels as well as managing, monitoring and reporting transfers to NOAA Fisheries. Penalties for Chinook salmon bycatch that exceeds vessel and company allocations will be contained in a binding contract between company vessels and the legal entity. Monitoring of the FIP will be done by a third party (e.g., SeaState, Inc.) with a mandatory compliance audit by a financial firm to verify all calculations and estimates as well as ensure an appropriate accounting of payments to and from the bycatch incentive fund.

Financial Incentive Plan:
A Chinook Salmon Bycatch Avoidance Program for the Catcher /Processor Sector

Addendum

III. Bycatch Avoidance Competition

Bycatch Incentive Fund Levy Choice of One Cent per Pound of Pollock Catch

The catcher-processor sector of the pollock industry has proposed a suite of complementary vessel-level programs that create incentives to avoid salmon at all levels of salmon and pollock abundance. These include a rolling hot-spot closure program (RHS), a tradable bycatch allocation (TBA) that depends on a sector-wide bycatch limit (hard cap), and a financial incentive program (FIP) designed to reduce bycatch even when salmon abundance is low and the pollock TAC is reduced. Taken together, these programs will create strong incentives at the vessel level to change fishing behaviors in ways that can be expected to reduce salmon bycatch.

The purpose of the FIP is to provide vessel-level incentives to avoid Chinook salmon bycatch that complement the incentives created by the sector-wide bycatch limit and bycatch trading and the rolling hot-spot closure program. The goal is to reduce the bycatch of Chinook salmon while at the same time allow the sector to harvest its entire share of the pollock fishery. In particular, the incentives created by the bycatch limit and the rolling hot-spot program are anticipated to dominate the incentives created by the FIP when salmon abundance on the pollock grounds is high. That is to say, when salmon abundance is high, changes in vessel fishing behavior are expected to be motivated mainly by the incentives created by the TBA and RHS programs. However, positive FIP incentives to avoid salmon bycatch will nevertheless exist, and are anticipated to have some effect in addition to (on top of) those of the other programs, even under circumstances where salmon abundance on the grounds is high.

The FIP creates a bycatch incentive fund via a levy on pollock catch. A levy amount of one cent per pound of catch ($22.05 per ton) was chosen, and depending on the size of the

eastern Bering Sea pollock total allowable catch, the incentive fund will range from about $10 million to $15 million for the catcher-processor sector. The analysis of Kochin et al. (2008) assesses the expected magnitude of the incentives created by TBA and the FIP program separately and together. They show that the two programs together will provide incentives to avoid salmon at the margin of about $1,000 per salmon. When salmon abundance on the grounds is low, and so Chinook bycatch is low, the primary incentive to avoid bycatch is provided by the FIP, and under these conditions, a per-salmon incentive to avoid of over $1,000 was desired. This consideration motivated the choice of the one-cent per pound levy.

As salmon abundance on the grounds increases, expectations that bycatch transfers may be required also increase, and because these transfers come at a price based on the benefits obtained from catching pollock, an incentive to avoid additional bycatch is created. In addition, the FIP-created incentive remains in effect, although at a slightly reduced level, and so augments the incentives created by the sector bycatch limit. Expectations are that the incentives created by the TBA program and the FIP program combined will yield rewards for avoiding salmon bycatch that are above $1,000 per Chinook under all conditions of pollock and salmon abundance. The changes adopted for the proposed version of the FIP program, including the revised performance reference and the undercatch adjustment, are not expected to result in significant changes in the marginal value estimates contained in the analysis of Kochin et al. (2008) for vessels with bycatch performance better than the performance reference. However, the addition of the overcatch penalty on vessels with performance worse than the reference will increase the cost of salmon bycatch for these vessels. As such, for vessels with poor bycatch performance the FIP as now proposed creates an incentive to avoid salmon at the margin that is higher than described in the analysis.

The analysis of Kochin et al. provided some examples of conditions and circumstances under which the incentives created by the TBA and FIP programs may be expected to result in vessel-level changes in fishing behavior. These examples are repeated below as they were developed using the $22.05 per-ton-of-pollock-catch levy amount and represent perhaps the best accounting (although admittedly simplified for the purpose of exposition) of how the incentives

may be expected to work in practice. They illustrate in a simple way how changes in the magnitudes of the incentives to avoid salmon bycatch are expected to interact with vessel operating costs such that purely financial considerations may be expected to motivate changes in the location and timing of pollock fishing operations, causing pollock fishermen to seek out times and areas where salmon bycatch is lower. The main result is that the incentives to avoid bycatch created by the FIP and a TBA program are additive, and that under conditions of low salmon abundance on the pollock grounds, a combination of FIP and TBA incentives is preferable to the incentives created by a TBA program alone.

<u>Example 1. (Table A1, Row 1). The beginning of the A season, catcher-processor with TBA and a 47,591 hard cap with fishery bycatch at its historically average rate</u>.

Assume a catcher-processor is fishing in an area of moderately high bycatch rate (Area A) and there is an area of moderately low bycatch (Area B) a distance away. The vessel expects pollock to be available in Area A for an additional twenty-four hours. The vessel also expects pollock to be available in Area B for twenty-four hours after arrival, and the vessel expects to catch twenty metric tons of pollock per hour at either location. The cruising speed of a catcher-processor is ten nautical miles per hour, the total daily cost of traveling is about $54,000 or $2,250 per hour, so the cost of traveling one mile is therefore $225.

Further, assume that the seasonal bycatch rate for the catcher-processor sector is 0.02 Chinook per metric ton of pollock (which is the historical annual bycatch rate observed for the sector over the last ten years). For this example, it is also assumed the processing rate is in excess of twenty metric tons of pollock per hour so that the catcher-processor is unable to gain any advantage by processing during transit. If the bycatch rate in Area A is 150 percent of the 0.02 average, or 0.03 Chinook per metric ton of pollock, and the bycatch rate in Area B is 50 percent of the 0.02 average, or 0.01 Chinook per metric ton of pollock, then how far would the vessel move to reduce its bycatch?

The catcher/processor catches 14.4 Chinook per day while in Area A.
(20 MT per hour x 0.03 x 24 hours = 14.4 Chinook per day.)

The catcher/processor catches 4.8 Chinook per day while in Area B.

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(20 MT per hour x 0.01 x 24 hours = 4.8 Chinook per day.)

The marginal value induced by TBA in a year of historically average bycatch rates would be $2,076 per Chinook salmon, with a 47,591 Chinook hard cap for all sectors combined, and it is assumed that the sectors can freely trade their bycatch allowances. A rational harvester would move if the marginal value of avoiding Chinook were greater than the marginal cost. By moving from Area A to Area B, the catcher-processor would save 9.6 Chinook per day (14.4 – 4.8 = 9.6), which would be worth $19,930 (9.6 x $2,076 = $19,930). The catcher-processor in this example would move as far as 88.6 nautical miles to Area B (19,930 ÷ 225 = 88.6) to avoid 9.6 Chinook salmon.

Example 2. (Table A1, Row 2). A catcher-processor with TBA from a 47,591 hard cap and fishery bycatch *below* its historically average at the beginning of the A season.

Now assume average bycatch is reduced by 30 percent from the historical average of 0.02 Chinook per metric ton of pollock due to industry efforts to avoid Chinook, or 0.014 Chinook per metric ton of pollock (0.7 x 0.02 = 0.014). If the bycatch rate in Area A is 150 percent of the 0.014 average, or 0.021 Chinook per metric ton of pollock, and the rate in Area B is 50 percent of the 0.014 average, or 0.007 Chinook per metric ton of pollock, then how far would the vessel move to reduce its bycatch of Chinook?

The catcher/processor catches 10.08 Chinook per day while in Area A.
(20 MT per hour x 0.021 x 24 hours = 10.08 Chinook per day.)

The catcher/processor catches 3.36 Chinook per day while in Area B.
(20 MT per hour x 0.007 x 24 hours = 3.36 Chinook per day.)

The marginal value of TBA in a year of bycatch rates that are 30 percent of the historical average would be only $1,060 per salmon with a 47,591 Chinook hard cap for all sectors combined. By moving from Area A to Area B, the catcher-processor would save 6.72 Chinook per day (10.08 – 3.36 = 6.72), which is worth $7,123 (6.72 x $1,060 = $7,123). The catcher-processor in this example would move as far as 31.7 nautical miles to Area B (7,123 ÷ 225 = 31.7) to avoid 6.72 Chinook salmon.

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Example 3. (Table A1, Row 3). A catcher-processor with the FIP and TBA from a 68,392 hard cap with the fishery bycatch *below* its historically average rate.

Assume that the average bycatch rate is reduced by 30 percent of its historical average, but the catcher-processor is operating under TBA from a hard cap of 68,392 and the FIP. By moving from Area A to Area B, the catcher-processor would still save 6.72 Chinook per day as in the previous example. The marginal value to avoid a salmon created by TBA, however, is only $337, but the marginal value created by the FIP is $867. The combined marginal value from the TBA and FIP is $1,204. The 6.72 Chinook salmon saved by moving to Area B would be worth $8,091 (6.72 x $1,204 = $8,091), and the catcher processor in this example would move as far as 36 nautical miles ($8,091 ÷ 225 = 36) to avoid 6.72 Chinook salmon.

Example 4. (Table A1, Row 4). A catcher-processor with TBA from a 47,591 hard cap and fishery bycatch *below* its historically average rate.

Now assume the average bycatch rate is reduced to 60 percent below the projected average bycatch rate, perhaps caused by natural conditions, after industry efforts to reduce salmon bycatch have already taken place (as in example 3). The catcher-processor is operating with TBA from a hard cap of 47,591 and the FIP. If the bycatch rate in Area A is 150 percent of 0.0056 (0.0056 = 0.014 x 0.4), or 0.0084 Chinook per metric ton of pollock, and the bycatch rate in Area B is 50 percent of 0.0056, or 0.0028 Chinook per metric ton of pollock, then how far would the vessel move to reduce its bycatch?

The catcher/processor catches 4.03 Chinook per day while in Area A.
(20 MT per hour x 0.0084 x 24 hours = 4.03 Chinook per day.)

The catcher/processor catches 1.34 Chinook per day while in Area B.
(20 MT per hour x 0.0028 x 24 hours = 1.34 Chinook per day.)

By moving from Area A to Area B, the catcher-processor would save 2.69 Chinook per

day (4.03 – 1.34 = 2.69). The marginal value created by TBA is only $89, and so the 2.69 Chinook salmon saved by moving to Area B would be worth just $239 (2.69 x $89 = $239). As such, the catcher-processor in this example would move only 1.1 nautical miles ($239 ÷ 225 = 1.1) to avoid 2.69 Chinook salmon.

Example 5. (Table A1, Row 5). A catcher/processor under the FIP and with TBA from a 68,392 hard cap with the fishery having bycatch *below* its historically average rate.

Now assume again that the average bycatch rate is 60 percent below the projected average bycatch rate, caused by natural conditions, after industry efforts to reduce bycatch have taken place. The catcher-processor is operating under TBA from a hard cap of 68,392 and the FIP. If the bycatch rate in Area A is 150 percent of 0.0056 (0.0056 = 0.014 x 0.4), or 0.0084 Chinook per metric ton of pollock, and the bycatch rate in Area B is 50 percent of 0.0056, or 0.0028 Chinook per metric ton of pollock, then how far will the vessel move to reduce its bycatch of Chinook?

The catcher/processor catches 4.03 Chinook per day while in Area A.
(20 MT per hour x 0.0084 x 24 hours = 4.03 Chinook per day.)

The catcher/processor catches 1.34 Chinook per day while in Area B.
(20 MT per hour x 0.0028 x 24 hours = 1.34 Chinook per day.)

By moving from Area A to Area B, the catcher-processor would save 2.69 Chinook per day (4.03 – 1.34 = 2.69). But the marginal value created by the TBA is only $14 while the marginal value created by the FIP is $2,168. So the combined marginal value of TBA and the FIP is $2,182. The 2.69 Chinook salmon saved by moving to Area B would be worth $5,870 (2.69 x $2,182 = $5,870), and the catcher processor in this example would move as far as 26.1 nautical miles ($5,870 ÷ 225 = 26.1) to avoid 2.69 Chinook salmon.

Table A1 summarizes the results on the distances that a vessel would move to avoid Chinook under the 47,591 salmon bycatch limit with a TBA program and a 68,392 salmon limit with a TBA program and a FIP. The key result is that when salmon abundance on the grounds is

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reduced, or if future industry efforts to reduce bycatch are successful (e.g., an effective salmon-excluder trawl is developed), it is likely that the incentives created by the FIP program and a TBA at a 68,392 fish limit would motivate changes in vessel behavior to reduce salmon bycatch more effectively than would incentives created solely by a TBA program based on the 47,591 fish limit (i.e., compare the results from examples 4 and 5).

Table A1. Distance a catcher-processor would move to avoid Chinook salmon bycatch (summary of results from examples one through five above).

Example	Bycatch Ratio (n/t)	Bycatch Limit (n)	TBA Marginal Value ($/n)	FIP Marginal Value ($/n)	TBA+FIP Marginal Value ($/n)	Chinook Relative Abundance (%)	Maximum Distance Moved (nm)	Salmon Bycatch Avoided (n)
1	0.02	47,591	2,076	—	2,076	0	89	9.6
2	0.014	47,591	1,060	—	1,060	-30	32	6.7
3	0.014	68,392	337	867	1,204	-30	36	6.7
4	0.0056	47,591	89	—	89	-30	1	2.7
5	0.0056	68,392	$14	2,168	2,182	-30	26	2.7

V. Undercatch Adjustment

Rationale for the Undercatch Adjustment

Anything that causes the marginal value of avoiding Chinook bycatch to be higher for one vessel than another increases bycatch at any given level of avoidance. The financial incentive plan (FIP) as originally conceived did not equalize the incentive to avoid bycatch for all companies. Instead, it gave a smaller incentive at the margin to larger companies than to smaller companies, and it gave a marginal incentive to all companies smaller than the average values used to estimate the incentive to avoid Chinook created by the FIP.

In the FIP, the bycatch incentive fund is distributed on the basis of the proportion of "adjusted" undercatch (AUC). The need for this adjustment is clear but is not intuitively

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obvious. The problem the adjustment is intended to address is that when the incentive fund is distributed on the basis of unadjusted undercatch (UC), the larger the proportion of undercatch held by a firm, the smaller is the marginal value of avoiding a Chinook. The hypothetical example in Table 1 illustrates the issue. An incentive fund of $1,000,000 is to be distributed to a fishing fleet on the basis of undercatch. This fleet consists of one firm that has UC equal to 500 and five firms with UC equal to 100. The total UC is 1,000. As shown in Table 1, the firm with UC equal to 500 receives $500,000 and each of the other five firms receives $100,000. The average value of UC is therefore $1,000,000 /$1,000 = $1,000. This average value of avoiding a Chinook is the same for all of the competing firms.

The problem addressed by the adjustment is that while the average value of an avoided fish is independent of the proportion of UC held by a particular firm, the same cannot be said for the marginal value of an avoided fish, and it is marginal value that motivates behavior. For example, imagine that a pollock fishing company with a 10,000-ton pollock quota faced a fee of $1 million for the first Chinook caught and no additional fee for each additional Chinook caught by that company. If the company catches 500 Chinook it would incur an average cost of $2,000 per Chinook. But the company would not be motivated by the fee schedule to avoid Chinook bycatch because catching at least one Chinook in the course of harvesting 10,000 tons of pollock is inevitable, and additional bycatch, which is avoidable, gathers no additional penalty.

In Table A2, while the average value of UC is $1,000, the marginal value of avoiding an additional fish is nearly twice as high for companies two through six, each owning one vessel with 100 UC, as it would be for the company that owns vessels with UC equal to 500. This is shown in Table A2 by separately calculating the impact of an additional unit of UC on the incentive payment to the company with UC equal 500. Company one would receive an additional $499 from avoiding an additional Chinook. On the other hand, the remaining companies with UC equal 100 would receive an additional $899.10 for reducing their bycatch by one Chinook. These unequal marginal values result in inefficiency (avoidance costs are not spent in the most efficient way) and fewer Chinook avoided (the incentives to avoid Chinook are

lower because the marginal value for avoiding a salmon is lower than the average value of avoiding a Chinook).

Table A2. Marginal value of undercatch to companies with large and small shares of undercatch.

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Company	UC (n)	Incentive Payment ($)	Added UC (n)	Incentive Payment ($)	Marginal Value ($)	Added UC (n)	Incentive Payment ($)	Marginal Value [a] ($)
1	500	500,000	501	500,499.5	499.5	500	499,500.5	
2	100	100,000	100	99,900.1		101	100,899.1	899.1
3	100	100,000	100	99,900.1		100	99,900.1	
4	100	100,000	100	99,900.1		100	99,900.1	
5	100	100,000	100	99,900.1		100	99,900.1	
6	100	100,000	100	99,900.1		100	99,900.1	
Total	1,000	1,000,000	1,001	1,000,000		1,001	1,000,000	
Per UC		1,000		999			999	

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[a] Marginal value of UC to companies three-six would also be $899.10.

Table A3 shows results from a simulated FIP competition among the catcher-processor companies using catch and bycatch data from 2001. Before the adjustment, incentive payments are based on the company share of UC, and the marginal value of undercatch for companies with a large share of undercatch is significantly lower than it is for those companies with a smaller share of undercatch. After the adjustment, the incentive payments are calculated using AUC, and the marginal values of undercatch are approximately equal for all of the companies.

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Table A3. Undercatch and marginal value of undercatch to catcher-processor companies before and after adjustment, 2001.

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| | Before Adjustment | | After Adjustment | |
| | Undercatch | Marginal Value | Undercatch | Marginal Value |
Company	(n)	($/n)	(n)	($/n)
ASC	7,443	280.32	7,763	1,028.65
AST	226	1,025.26	187	1,009.29
GFC	2,381	802.84	2,415	1,218.03
SLP	106	1,037.32	99	1,130.95
TRI	0	1,048.48	0	1,048.48

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VI. Sector Performance Standard

Supply of "Avoidable" Chinook Salmon and Expected Future Bycatch Reductions Under the Incentive Programs Proposed by the Catcher-Processor Sector

Chinook salmon bycatch in the BSAI groundfish fisheries varies from year to year, depending primarily on the abundance of Chinook salmon on the eastern Bering Sea outer continental shelf. During the late 1970s Chinook bycatch increased sharply, moving up from about 40,000 annually to about 100,000 in 1979 and exceeding 120,000 in 1980. Subsequently bycatch dropped to levels between 20,000 and 50,000 during most of the 1980s and early 1990s. Bycatch then increased slightly to between 50,000-60,000 during 1996-1998 before dropping to very low levels during 1999 and 2000. Bycatch returned to moderate levels during the early 2000s and then increased sharply again, exceeding 80,000 in 2006 and 120,000 in 2007. In

2008, bycatch returned to a level of about 20,000.

In the absence of incentive programs to avoid salmon bycatch, changes in abundance of Chinook salmon on the eastern Bering Sea outer continental shelf are the primary determinant of Chinook bycatch in the pollock fishery. However, it is not possible to predict Chinook bycatch for any particular future year in the absence of efforts to reduce bycatch given the current state of knowledge. But given any particular level of salmon abundance on the pollock grounds, changes in the size of the EBS pollock total allowable catch (TAC) can also be assumed to affect the amount of bycatch. While it is not possible to predict the level of salmon bycatch that may be expected in any future year, it is possible to tabulate its level under different conditions of salmon and pollock abundance.

Because Chinook salmon are not targeted by the pollock fishery, the ratio of salmon bycatch to pollock catch can be used as a rough relative index of salmon abundance on the pollock grounds. For the catcher-processor sector, Table A4 shows expected salmon bycatch for different levels of salmon abundance and several pollock TAC amounts in the absence of any efforts to reduce salmon bycatch. These example alternative Chinook bycatches form the basis for an assessment of expected future salmon bycatch for the catcher-processor sector under a combination of incentive programs to avoid Chinook salmon bycatch.

A suite of complementary vessel-level programs that create incentives to avoid salmon bycatch is proposed by the catcher-processor sector of the pollock industry. These include a rolling hot-spot closure program, a tradable bycatch allocation that depends on a sector-wide bycatch limit (hard cap), and a financial incentive program designed to reduce bycatch even when salmon abundance is low and the pollock TAC is reduced. Taken together, these programs will create strong incentives at the vessel level to change fishing behaviors in ways that can be expected to reduce salmon bycatch.

Table A4. Chinook salmon bycatch for alternative levels of salmon abundance, pollock total allowable catch (TAC), and expected catcher-processor sector catches.

	EBS Pollock TAC (tons)		
	1,400,000	1,100,000	800,00
	Expected Catcher-Processor Pollock Catch (tons) [a]		
	609,280	476,740	346,720
Salmon [b] Abundance Index (n/ 100 tons)	Salmon Bycatch (n)	Salmon Bycatch (n)	Salmon Bycatch (n)
10.0	60,928	47,674	34,672
5.0	30,464	23,837	17,336
3.3	20,309	15,891	11,557
2.5	15,232	11,919	8,668
2.0	12,186	9,535	6,934
1.7	10,155	7,946	5,779
1.4	8,704	6,811	4,953
1.3	7,616	5,959	4,334
1.1	6,770	5,297	3,852
1.0	6,093	4,767	3,467
0.9	5,539	4,334	3,152
0.8	5,077	3,973	2,889

[a] Includes Community Development Quota catches.

[b] Index of salmon abundance on the pollock grounds in the absence of any efforts to reduce salmon bycatch.

However, it is well known among the industry that a portion of salmon bycatch is also influenced by random events, and this is especially true when bycatch is measured at the individual vessel level during a single fishing year. For example, when salmon abundance on the pollock grounds is low, it becomes harder for the industry to consistently identify areas where relative salmon abundance is significantly higher than for other areas where large concentrations of pollock may be located. In such cases, the effects of incentive programs that depend on changes in fishing practices at the vessel level are reduced. In the extreme, when salmon abundance on the grounds is at very low levels, incentive based programs to avoid salmon bycatch can become little more than programs which assess a per-salmon fee for random salmon bycatch. That is to say, when salmon abundance is very low, changes in salmon bycatch no longer remain primarily under the control of the vessel.

Based on experience in the catcher-processor sector, when salmon abundance is less than two salmon per 100 tons of pollock catch, it becomes doubtful that current technologies and methods available to discover and avoid salmon concentrations continue to work as well. This places a practical limit on the ability of the pollock industry to avoid salmon when their abundance on the pollock grounds is very low. Adopting the 1.7 salmon per 100 tons of pollock catch abundance level as a practical limit to effective bycatch avoidance via vessel behavior changes, and then applying it to the salmon bycatch numbers in Table A4, yields estimates of "avoidable" salmon bycatch. These are shown in Table A5. In practice, if the incentives created by the suite of programs that is proposed function as expected, some fraction of these "avoidable" salmon will form the salmon bycatch reductions that result from the incentive programs.

Table A5. Estimates of avoidable Chinook salmon bycatch for alternative levels of salmon abundance, pollock total allowable catch (TAC), and expected catcher-processor catches.

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	EBS Pollock TAC (tons)		
	1,400,000	1,100,000	800,00
	Expected Catcher-Processor Pollock Catch (tons) [a]		
	609,280	476,740	346,720
Salmon [b] Abundance Index (tons/n)	Avoidable Salmon Bycatch (n)	Avoidable Salmon Bycatch (n)	Avoidable Salmon Bycatch (n)
10.0	52,224	40,863	29,719
5.0	21,760	17,026	12,383
3.3	11,605	9,081	6,604
2.5	6,528	5,108	3,715
2.0	3,482	2,724	1,981
1.7	1,451	1,135	826
1.4	0	0	0
1.3	0	0	0
1.1	0	0	0

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[a] Includes Community Development Quota catches.

[b] Index of salmon abundance on the pollock grounds in the absence of any efforts to reduce salmon bycatch.

The estimates of "avoidable" salmon bycatch in Table A5 are presented to illustrate in an approximate way the potential salmon bycatch reductions that may be anticipated for alternative levels of salmon and pollock abundance. With a bycatch limit of, say 20,000 to 22,000 salmon for the catcher-processor fleet, the calculations show that the allocated bycatch cap and rolling hot-spot closure program together will reduce bycatch by 10,000-30,000 salmon in years of very high salmon abundance on the grounds. With lower abundance, the incentives created by the FIP will become more important, and it may be possible to reduce salmon bycatch by 4,000-15,000 fish in years of moderate abundance (i.e., in years where abundance would have been to 2.5-5.0 salmon per 100 tons of pollock in the absence of any efforts to reduce salmon bycatch). In years of low abundance on the grounds bycatch reductions in the range of 1,000-2,000 Chinook salmon may be anticipated should the incentive programs function as expected. It should be remembered that the relative levels of salmon abundance indicated in the tables apply to circumstances where no efforts are made to avoid salmon bycatch. After the implementation of effective incentive programs to reduce salmon bycatch, bycatch will be reduced, and this particular relative index of salmon abundance will be lower than it would have been in the absence of the programs.

EXHIBIT 2

SALMON SAVINGS INCENTIVE PLAN DESCRIPTION

REVIEW DOCUMENT

Presented by:

United Catcher Boats Association

March 13, 2009

I.   INTRODUCTION

Annual Scenario 1 of the Council's June 2008 C-2 motion provides participants in an inter-cooperative agreement (ICA) access to a 68,392 Chinook salmon hard cap if that ICA includes at least one incentive program that meets the following criteria:

- Provides incentive(s) for each vessel to avoid salmon bycatch under any condition of pollock and salmon abundance in all years.

- Includes rewards for salmon bycatch avoidance and/or penalties for failure to avoid salmon bycatch at the vessel level.

- Specifies how those incentives are expected to promote reduction of actual individual vessel bycatch rates relative to what would have occurred in the absence of an incentive program. Incentive measures must promote salmon savings in any condition of pollock and salmon abundance, such that they are expected to influence operational decisions at bycatch levels below the hard cap.

Council discussion during its February 2009 meeting clarified that the incentive plan(s) should, in most years, reduce Chinook bycatch performance to a level below the 47,591 cap in Annual Scenario 2. Further discussion by the Council suggested that the 47,591 cap will serve as a Performance Standard against which the efficacy of an incentive plan should be measured.

The Salmon Savings Incentive Plan (SSIP) is an incentive plan designed to keep the average annual Chinook bycatch below the Council's 47,591 Performance Standard. Under the SSIP each participating vessel will be assigned its own transferable individual base cap (Base Cap) which will be calculated as its share of the 47,591 Performance Standard.   A participant's Base Cap will remain the same for the duration of the SSIP.   A participant that catches less than its Base Cap in a given year will earn salmon savings credits that are discounted from the salmon saved ("insurance"). Salmon Savings Credits have a limited life and may never be transferred for the use of harvesting another participants' pollock. A participant that uses more than its Base Cap in a given year (e.g., through transfers) must pay credits back in subsequent years by catching fewer salmon than allowed under its Base Cap.

SSIP participants will always have a significant incentive to keep their bycatch well below their individual Base Caps in order to earn salmon savings credits because, in a year of high salmon encounters, a participant may need these credits to harvest its pollock quota. A participant with accrued credits may utilize them to catch up to, but never to exceed, its calculated share of the regulatory hard cap of 68,392 (the "Hard Cap"). It is important to note that for it to be possible for SSIP participants to reach their pro-rata share of the Hard Cap of 68,392 in one year, the participating vessels' average annual bycatch rates will have to be zero in the previous year, or below their pro-rata share of approximately 32,000 fish for the previous three consecutive years.

A participant who has not earned any salmon savings credits can only exceed its share of the 47,591 Performance Standard through transfer, an action that carries heavy costs.

The SSIP is an incentive plan that meets the standards of Annual Scenario 1 of the North Pacific Fishery Council's June 2008 salmon bycatch motion and is justification for the Council to establish a regulatory Hard Cap of 68,392. The SSIP will achieve average annual Chinook bycatch rates significantly below the 47,591 Performance Standard. Under the SSIP, salmon bycatch caught in excess of the Performance Standard at one point in the program must be paid back at another point. The incentive for participants to build salmon savings credits for potential future use motivates participants to avoid salmon bycatch under any condition of pollock and salmon abundance in all years. The SSIP will operate in conjunction with a Rolling Hot Spot Program to further insure salmon bycatch avoidance in years of low encounters.

The SSIP retains the desirable characteristics of a multi-year legacy structure and the "insurance incentive" introduced in the Legacy Plan, but the SSIP has several important fundamental differences. These differences include the following:

- Individual performance is measured against an absolute Performance Standard of 47,591 rather than by a competitive ranking among participants. This shift away from relative ranking eliminates the risk that participants would avoid sharing of information that would help other participants avoid salmon bycatch in order to boost their own relative positions;
- Salmon Savings Credits are earned when a vessel outperforms its Base Cap rather than through a "zero sum" assignment of the entire 68,392 Hard Cap;
- Ability to show quantitatively that, over time, the vessels participating in this incentive

program will achieve an average annual Chinook bycatch mortality that is less than their pro-rata share of a the 47,591Performance Standard.

- The SSIP is based on simple math that is easily understood and is transparent. Understanding the program requires no assumptions.

The SSIP fully meets each of the criteria in Scenario 1 of the Council motion through simple, direct, and transparent methods that ensure that the average annual bycatch of Chinook salmon by SSIP participants will not exceed their proportional share of the 47,591 Performance Standard.

II. SSIP DESCRIPTION

II – A. Individual Vessels are Assigned Individual Base Caps.

Each vessel participating in the SSIP is assigned an individual transferable limit of salmon. This individual limit is called an "Individual Base Cap" (Base Cap). A participant's Base Cap remains the same throughout the program.

A vessel's Base Cap is its proportional share (see Table 1) of the 47,591 Performance Standard (see Table 1). Once sector allocations are determined the Base Cap is established as a pro-rata share of the Performance Standard based on pollock allocations within each sector. The SSIP's effectiveness in reducing bycatch will be measured against the 47,591 Performance Standard, but will also be subject to a Hard Cap of 68,392.

CDQ Groups that choose to participate in the SSIP are treated as individual vessels and are assigned Base Caps proportionate to their share of pollock. Owners of multiple vessels do not receive aggregated Base Caps. They receive Base Caps by individual vessel.

Table 1. Example sector and vessel Base Caps.

Sector	*Sector Cap of 47,591	Example Vessel Avg. % of Sector	Individual vessel - average Base Cap
SS (98 CV's)	26,485	1%	270.25
MS (19 CV's)	3,707	5%	195.10
CP (27 CP's)**	13,516	4%	500.60
CDQ	3,883		***

*Sector allocations per NPFMC June 2008 PPA motion. Once sector allocations are determined, a vessel's Base Cap is made pro-rata to pollock within each sector.

**Includes 19 AFA CPs , 1 non-AFA CP, and 7 CVs.

***CDQ Base Caps are dependent upon the Group's pollock allocation.

II - B.   A Vessel May Earn Salmon Savings Credits by Catching Less than its Base Cap.

If a vessel catches less than its Base Cap in any given year, it earns Salmon Savings Credits. Salmon Savings Credits are earned at the ratio of one Salmon Savings Credit for every 2.29 salmon saved below a vessel's Base Cap (see Table 2). Every uncaught salmon contributes toward a Salmon Savings Credit. Significantly, the 2.29:1[1] discount between uncaught Base Cap and Salmon Savings Credits means that SSIP participants must experience zero bycatch (see Table 3) in one year or maintain a 3-year bycatch average at or below their proportional share of approximately 32,000 per year in order to acquire enough Salmon Savings Credits to access their proportional share of a 68,392 Hard Cap in the subsequent year (see Table 4).

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[1]The 2.29:1 rate is the result of dividing the difference between 68,392 and 47,591 (20,801) by 47,591, which equals 0.4371. Therefore, in a year in which a vessel catches zero salmon, the vessel establishes Salmon Savings Credits equal to the difference between the vessel's Base Cap and its share of the Hard Cap.

Table 2. Discount rate - 2.29 salmon saved result in one Salmon Savings Credit.

Year	Base Cap*	Available Cap	Bycatch	Salmon Savings	Discount Rate Applied	Salmon Savings Credit	Salmon Saved Below 47,592
1	476	476	376	100	2.29:1	44	56

*Some tables use 476 as a Base Cap, which approximates 1% of the 47,591 Performance Standard. Other tables use 265 as a Base Cap, which approximates 1% of the inshore allocation of 47,591 under the PPA.

Table 3. One year of zero bycatch results in maximum insurance availability.

Year	Base Cap	Hard Cap	Available Cap	Bycatch	Annual Salmon Savings	Discount Rate Applied	Salmon Savings Credit	Salmon Saved Below 47,592
1	476	684	476	0	476	2.29:1	208	268
2	476	684	684	476				

Table 4. A vessel must maintain average bycatch ≤ its pro-rata share of 32,000 for three years in order to accumulate insurance equal to its pro-rata share of the 68,392 Hard Cap.

Year	Base Cap	Hard Cap	Salmon Savings Credits Available	Available Cap	Bycatch	Annual Salmon Savings	Cumulative TTL Saved below 47,592	Salmon Savings Credits In	Salmon Savings Credits Used
1	476	684	0	476	318	158	89	69	0
2	476	684	69	545	318	158	178	69	0
3	476	684	138	614	318	158	267	69	0
4	476	684	207	683	683	0	267	0	207
5	476	684	0	477			267		
AVG					**357.5**				

II - C. Salmon Savings Credits Account.

Each vessel has a Salmon Savings Credit account, the balance of which is comprised of the preceding three years' Salmon Savings Credits. Unused Salmon Savings Credits expire and are dropped from the account three years from the time they are earned. In Table 5 below, 100 salmon are saved in the first year that earns the vessel 44 credits. The credits are available in years two through four, and are not available in year five. Unless a vessel catches less than its Base Cap, its annual contribution to its Salmon Savings Credit account will be zero.

Table 5. Salmon Savings Credits expire after three years.

YR	Base Cap	Available Cap	Bycatch	Annual Salmon Savings	Salmon Savings Credits Earned	Salmon Savings Credits Available	Salmon Savings Credits Expired	Cumulative Salmon Saved Below 47,591
1	265	265	165	100	Y1 - 44	0	0	56
2	265	309	165	100	Y2 - 44	Y1 44	0	112
3	265	353	265	0	0	Y2 44 | Y1 44 — TTL 88	0	112
4	265	353	265	0	0	Y3 0 | Y2 44 | Y1 44 — TTL 88	0	112
5	265	309	265	0	0	Y4 0 | Y3 0 | Y2 44 — TTL 44	Y1 - 44	112

II - D.   A Vessel May Have Less than its Base Cap Available for Use in a Given Year.

While a vessel's Base Cap does not change year to year, it is possible for a vessel to have access to less than its entire Base Cap in any given year. The amount of a vessel's Base Cap that is actually available to it at a given point in time to utilize in harvesting pollock is called its "Available Cap."

One way that Available Cap can fall below the Base Cap is if decisions were made by an individual vessel to acquire, through transfer, a portion of another's Base Cap in the prior year. As shown in Table 6 below, a vessel will have an Available Cap which is equal to its Base Cap less any amount transferred in from another vessel(s)' Base Cap in the prior year.

Table 6. Available Cap equals Base Cap less transfers in.

Year	Base Cap	Available Cap	Bycatch	Transfers In
1	265	265	300	35
2	265	230	300	70
3	265	195	265	70
4	265	195	195	0
5	265	265	265	0

II - E . A Vessel May Have or Use More than its Base Cap In a Given Year.

In any given year, a vessel may have or use more than its Base Cap by either a) transferring a portion of another participant's Base Cap; or b) using Salmon Savings Credits from its own Salmon Savings Credits account (see Table 7).   Under no circumstance, however, can a vessel use more than its proportional share of the Hard Cap of 68,392. In other words, neither Salmon Savings Credits nor transfers in may be used to exceed the Hard Cap.

Table 7. Although Base Cap remains constant, Available Cap varies as a result of Salmon Savings Credits and/or transfers in.

Year	Base Cap	Hard Cap	Available Cap	Bycatch	Salmon Savings	Salmon Savings Credits In	Salmon Savings Credits Available	Salmon Savings Credits Used	Transfers In
1	265	381	265	165	100	44	0		0
2	265	381	309	305	0	0	44	40	0
3	265	381	269	400	0	0	4	4	131
4	265	381	134	305	0	0	0	0	171
5	265	381	94	94	0	0	0	0	0
AVG			214.4	253.8					

III. TRANSFERS

Transfers may include Base Cap Transfers (salmon only), Pollock Only Transfers, and Paired Transfers (pollock and salmon together). Transfers of salmon cannot be made to a vessel that is not a participant in an incentive program.

III - A. Transfer Definitions.

Base Cap Transfer - A Base Cap transfer occurs when a portion of one vessel's Base Cap is transferred to another vessel and is available to be taken as bycatch. Base Cap transfers may be made between vessels in the same cooperative or different cooperatives, same sector or different sectors, and may occur between vessels participating in different incentive plans (in the event of an umbrella ICA that includes more than one incentive plan). Only transferred Base Cap that is actually utilized will be debited against the transferee's Base Cap the following season. A vessel may not acquire salmon through transfer until it has used at least 50% of its available Base Cap and available Salmon Savings Credits.

Table 8. Eligibility to transfer.

	Base Cap	Available Cap	Bycatch	Transfer-In	Transfer-Out Eligibility
Vessel 1	265	285	300	Must transfer in 15	No Chinook Available
Vessel 2	300	325	275	Not eligible to transfer in	May Transfer out 25

Pollock Only Transfer - When a vessel harvests pollock acquired from another vessel without acquiring the associated Base Cap, it is considered a Pollock Only Transfer. The Available Cap of the harvesting vessel is adjusted the following year just as if it was harvesting its own pollock. In other words, the salmon bycatch used in the harvest of the acquired pollock is added to the harvester's annual bycatch total.

Pollock cannot be transferred between sectors due to restrictions contained in the American Fisheries Act.

Paired Transfer – Paired Transfers are intra-sector transfers of pollock made together with salmon. In order to qualify as a Paired Transfer, the proportion of salmon transferred with the pollock must be proportional to or less than proportional to the amount of salmon available to the transferring vessel from their Available Cap at the beginning of the year. In a qualified Paired Transfer, the transferring vessel may transfer some or all of its Salmon Savings Credits to the harvesting vessel. Transfer of Salmon Savings Credits is only allowed in the case of a qualified Paired Transfer (see table 9).

The purpose of a Paired Transfer is to allow one vessel to stack some or all of its pollock and associated Available Cap on another participating vessel. The Paired Transfer rules are written to prevent gaming the SSIP Salmon Savings Incentives. Paired transfers will not effect the fleet's achievement of the Performance Standard.

The bycatch rate of the harvesting vessel will be used to calculate the harvesting and transferring vessels' Available Caps in the following year. The harvesting vessel's Available Cap will be calculated in the following year based upon its average bycatch performance for the entire season(s). In the event the Paired Transfer includes any of the transferring vessel's Salmon Savings Credits, then the transferring vessel's Available Cap will be calculated based upon the average bycatch performance of the harvester achieved while harvesting the transferred pollock. Any transferred Available Cap, including Salmon Savings Credits, not used in the harvest of the transferred pollock will remain in the account of the transferring vessel. A Paired Transfer including Salmon Savings Credits does not allow the harvesting vessel to harvest any of its own pollock with the transferred salmon.

In the event that the Paired Transfer does not include Salmon Savings Credits, then the harvesting and transferring vessel may agree that the calculation of the transferring vessel's Available Cap in the following year is made as above or they may agree that the calculation will be made using the harvesting vessel's average bycatch rate for the season(s), pro-rata to the pollock harvested pursuant to the transfer.

The terms of the transfer and the bycatch accounting must be documented in a Transfer Agreement and approved by the SSIP Manager (see VIII – A. SSIP Management).

Table 9. Descriptions of qualified Paired Transfers.

	% Pollock	MT Pollock	Base Cap	Total Available	Pollock transfer	Chinook Transfer
Qualified Paired- Transfer	1%	1,000	265	300	1,000	300
Qualified Paired-Transfer	1%	1,000	265	300	500	100
Non-Qualified Paired-Transfer	1%	1,000	265	300	20	300

III - B. A Vessel May Transfer Some or All of Its Individual Base Cap to Another SSIP Vessel.

Any portion of the vessel's Base Cap that is not caught by the vessel may be transferred to another vessel participating in an incentive program. In the event any portion of a Base Cap is transferred to another vessel participating in the SSIP, transferred Base Cap will be debited against the transferee's Base Cap for purposes of calculating its Available Cap the following year, but only if it is actually caught.   SSIP Vessels that transfer Base Cap prior to completing their harvest of pollock harvest are limited to their Base Cap for the remainder of the fishing year, unless they acquire another's Base Cap through transfer. A vessel cannot use Salmon Savings Credits in the same year that it transfers any portion of its Base Cap.

III - C.   Transfers of Base Cap May be Made To and From Incentive Programs Other Than the SSIP.

In contrast to transfers made within the SSIP, participants who transfer Base Cap to a vessel or vessels participating in an incentive program other than the SSIP will have the transferred Base Cap count as if it were caught (whether or not it was actually caught) for purposes of calculating their Available Caps in the following year. This is necessary to ensure bycatch remains below the SSIP Performance Standard because there is no way to guarantee that a participant in another program will save the salmon.

For example, if a vessel with an available cap of 476 salmon has a bycatch of 300 salmon for the year it will have 176 salmon available for transfer and/or savings. If the vessel chooses to transfer 176 salmon to a vessel participating in a different incentive plan the transferor's bycatch will be 476 for the purpose of calculating its following year's Available Cap (see Table 10-1). In contrast, if the transfer was to another vessel participating in the SSIP, the transferor's bycatch would have remained at 300 and the transferor would earn 77 Salmon Savings Credits (see Table 10-2).

Table 10-1. Transfers to another incentive plan.

Year	Base Cap	Available Cap	Bycatch	Annual Salmon Savings	Transfers Out to Another Plan	Salmon Savings Credits Available	Salmon Savings Credits Used
1	476	476	300	176	176	0	0
2	476	476				0	0

Table 10-2. Transfers within the SSIP.

Year	Base Cap	Available Cap	Bycatch	Annual Salmon Savings	Transfer to a SSIP Participant	Salmon Savings Credits Available	Salmon Savings Credits Used
1	476	476	300	176	176	77	0
2	476	553					

Participants in the SSIP may also transfer salmon into the SSIP from another incentive program. If they do, any salmon transferred in will be deducted from that participant's Available Cap in the following year, insuring an equal salmon savings in the following year (see Table 11). Like intra-SSIP transfers, transfers from another incentive plan may not be used to allow a vessel to exceed its proportional share of the 68,392 Hard Cap.

Table 11. Transfer from a non-SSIP participant.

Year	Base Cap	Hard Cap	Available Cap	Bycatch	Annual Salmon Savings	Transfer from a non-SSIP Participant	Salmon Savings Credits Available	Salmon Savings Credits Used
1	476	684	476	576	0	100	0	0
2	476	684	376					

IV.   SALMON SAVINGS CREDITS

Instead of transferring Base Cap from another vessel, a vessel that has Salmon Savings Credits in its own Salmon Savings account may access those credits to catch more than its Base Cap in any given year.   When used, Salmon Savings Credits are removed from the Salmon Savings Credits account on a first-in, first-out basis.

IV - A.   Salmon Savings Credits are May Not be Transferred to Another Vessel That Vessel's Pollock Allocation.

Salmon Savings Credits are a reward created when an individual vessel outperforms its Base Cap and saves salmon. Salmon Savings Credits operate as insurance against future years of high salmon encounters. The only beneficiary of this insurance is the one who holds the pollock allocation that earned the credits; they can never be transferred to another vessel in the SSIP to harvest that vessels pollock allocation or to a vessel in another incentive plan.

IV - B.   A Vessel May Not Use Salmon Savings Credits in the Same Year it Makes a Base Cap Transfer to Another Vessel.

In order to maintain annual average bycatch levels at or below the Performance Standard of 47,591 and in order to prevent gaming of the Salmon Savings Credits account, a vessel that transfers Base Cap through a Base Cap Transfer can not also use Salmon Savings Credits in the same year.

V.   START-UP PROVISION

In the first year of the program, participating vessels will be allowed to access their proportional share of the Hard Cap (68,392). The difference between their Base Cap and their proportional share of the 68,392 Hard Cap is known as the "Start-up Loan." The Start-up Loan provides insurance against the possibility of starting the SSIP in a high encounter year. The Start-up Loan is a desirable feature because participants who join the first year haven't had an opportunity to accrue Salmon Savings Credits, which otherwise serve as insurance in the plan. If a vessel uses any portion of its Start-up Loan in the first year of the program, it must pay it all back by saving an equal number of salmon over the next three years. A vessel may choose to pay it all back in one or two years, but may not pay back less than one third of the debt each year. A vessel with an unpaid Start-up Loan debt cannot gain any Salmon Savings Credits until the debt is paid in full. The Start-up Loan is available to participants in the first year of the program only and is not transferable. Any unused portion of the Start-up Loan will not carry into a vessel's Salmon Savings Credits account.

VI. NEW ENTRANTS

New Entrants May Annually Choose Join the SSIP.

Vessels will declare annually whether they intend to participate in the SSIP. Vessels may elect to join the SSIP program prior to the beginning of a new fishing year. New entrants joining after the first year are allowed to start the program as if they had been participating since the beginning, except they will not be eligible for a Start-up Loan. If a new participant meets the criteria for earning Salmon Savings Credits based on its previous bycatch history it will start with an Available Cap that includes those Salmon Savings Credits.

VII.   DEPARTING THE PROGRAM

Vessels May Leave the SSIP Program but Must Pay Back Base Cap Overages.

Vessels may leave the SSIP at the end of a fishing year. If their Available Cap is, or would be, less than their Base Cap in the following year, they must deduct that number of salmon from their cap in another incentive program or continue to participate in the SSIP until their Available Cap meets or exceeds their Base Cap.

VIII.   SSIP MANAGEMENT

VIII – A.   Transfer Accounting Management.

Management of SSIP transfers (including those from another incentive plan) will require both the transferor and transferee to submit a signed Transfer Agreement to an SSIP Manager for approval. The Transfer Agreement will identify the parties and their incentive plans, and will specify the amount of Base Cap or salmon from another incentive plan being transferred. In the

case of a Paired Transfer that does not include Salmon Savings Credits, the Transfer Agreement will also specify whether the bycatch caught while harvesting the Paired Transfer will be attributed to the transferor based on the harvester's average bycatch rate or whether bycatch will be tracked directly to the pollock transferred.

VIII – B. A Coop Reserve Pool May Be Established.

Each participating cooperative may establish a Coop Reserve Pool containing up to three percent of the total aggregated Base Cap of the cooperative's SSIP members. Use of this Reserve Pool is not subject to Base Cap transfer rules. This pool may be used by the coop to facilitate end-of-season "clean-up" fishing where one participant catches a small quantity of another participant's pollock, or may be used to cover overages.

VIII – C. **Unintentional Overages and Penalties.**

Individual participants' Base Cap amounts may represent very limited numbers of salmon. It is possible that a vessel may unintentionally exceed its Base Cap as a result. In the event this occurs, the vessel must immediately quit fishing. The vessel may not resume fishing until this overage is covered by a Base Cap transfer or with Coop Reserve Pool fish. In the event the vessel cannot cover the overage in either manner, then the vessel's subsequent year's Available Cap will be reduced by 2.29 salmon for every salmon caught in excess of its Base Cap.

IX.   ROLLING HOTSPOT PROGRAM

A Rolling Hot Spot Program Will Be Used to Enhance the Effectiveness of the SSIP in Periods of Low Salmon Encounters.

The SSIP will incentivize vessels to avoid salmon at all levels of pollock and salmon encounters. However, to further enhance the effectiveness of the program and this incentive, particularly in

multiple years of low encounters, the SSIP will be supplemented by a mandatory Rolling Hot Spot (RHS) Program.

1. The RHS Program will be modeled after the 2008 program and will include a fixed closure area (currently referred to as the Chinook Conservation Area). RHS closures for all participants in the SSIP (including CDQ) will be applied at the individual vessel level for the catcher processor and inshore sectors and at the delivery platform level for the mothership sector (MS).

2. Weekly closure areas will be closed to vessels and MS platform fleets with bycatch rates equal to or greater than 75% of the Base Rate. The same Base Rate will be used in both the A and B seasons. In other words, the closure areas will be open only to those achieving a bycatch rate that is less than 75% of the Base Rate; as currently described for Tier One coops in the 2008 Salmon Bycatch Agreement. Tier 2, intermediate weekly open/close status level, will be eliminated. All updates will be made weekly.

3. The RHS program will be administered by an independent RHS monitor and will be subject to independent third party audit.

4. Closures will only be made in "core" areas (see chart below) defined by repeated placement of closures to control Chinook bycatch over the last two years. If overwhelming evidence indicates that Chinook abundance is higher outside the core areas, then closures may be placed outside core areas at the discretion of an RHS monitor, but as a rule closures outside of core areas will be avoided so as not to drive vessels into dirtier areas.

5. A base rate using the three-week rolling average will be used to define the Base Rate for closures in the core areas.

Core Closure Areas

Chinook closures from 2006 - 2008 (black) and suggested
core areas (blue) for rolling hot spot closures
as part of the research-incentive ICA
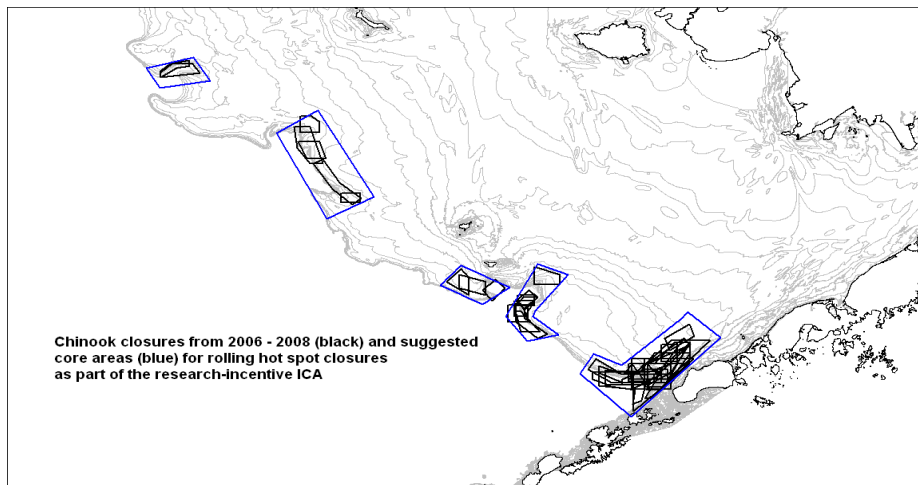
X. REPORTING AND MONITORING.

The participants in the SSIP will make all data available to third parties for the purpose of auditing compliance with, and reviewing the performance of the ICA.

XI.   CONCLUSION.

The SSIP is a simple, transparent incentive plan that is available to all participants in the pollock fishery on an individual vessel basis.

The SSIP uses a Performance Standard of 47,591 to generate incentives to reduce salmon bycatch. The opportunity for vessels to earn discounted credits for catching less than their individual Base Cap incentivizes salmon avoidance and also rewards participants with insurance

for future years of high encounters. The expiration of these credits after three years ensures that a vessel cannot become complacent during multiple consecutive years of low encounters or allow it to rely on its past performance.

The Salmon Savings Credits provided in the SSIP create incentives for each vessel to avoid salmon bycatch under any condition of pollock and salmon encounters in all years. This result is further enhanced through the use of a supplemental mandatory RHS Program. The SSIP provides individual vessel rewards (Salmon Savings Credits) for salmon bycatch avoidance and/or individual vessel penalties for failure to avoid salmon (reduction of Available Cap to any vessel receiving transfers).

The SSIP is an incentive plan that meets the criteria of Annual Scenario 1 of the North Pacific Fishery Council's June 2008 salmon bycatch motion. Further, the SSIP is an improvement over Annual Scenario 2 because participating vessels will, in the aggregate, be incentivized to harvest less than 47,591 Chinook annually on average. Therefore, in accordance with the PPA, the Council is justified in establishing a regulatory Hard Cap of 68,391 with a Performance Standard of 47,591.

APPENDIX I. SSIP SCENARIOS

Appendix I explores two scenarios; the first is a series of 4 hypothetical vessels fishing in the inshore sector and the second reviews the performance of 2 actual inshore vessels using their actual bycatch results from 2004 -2008 applied to the SSIP program.

Scenario 1.

The following Tables 1.a., 1.b., 1.c. and 1.d. cover four hypothetical inshore CVs with equal inshore pollock sector allocation of 1.2%. The 1.2% represents the average vessel pollock allocation for the inshore sector. In the following scenarios the various vessels experience a range of rates in each of the years with the exception of year 7 which is a high encounter year for the entire fleet.

TABLE 1.a. This first scenario covers an average inshore vessel that is trying to maintain a level of bycatch performance that provides a high level of insurance for future years with unavoidable high encounter rates. In other words, taking advantage of the incentives provided in the SSIP program. Vessel 1.a. has been very successful at reducing bycatch in years 1 through 6, but in year 7 experiences the same high salmon encounters as the rest of the fleet. By keeping bycatch low in previous years, Vessel 1.a. had accumulated a significant "insurance policy" against the unavoidable high salmon encounters in Year 7.

Vessel:	1.a.								
Coop:	Inshore			Vessel % of Inshore Pollock:		1.20%			
	1	2	3	4	5	6	7	9	8
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated
									Year	Savings Balance
1	318	457	457	**204**	n/a	253	114	114	50	50
2	318	457	368	**194**	0	174	124	238	54	104
3	318	457	422	**145**	0	277	173	410	76	179
4	318	457	457	**92**	0	365	226	636	99	228
5	318	457	457	**212**	0	245	106	742	46	220
6	318	457	457	**124**	0	333	194	936	85	230
7	318	457	457	**450**	0	7	-132	804	0	97
8	318	457	415	**214**	0	201	104	907	45	130
9	318	457	448	**187**	0	261	131	1,038	57	103
10	318	457	420	**78**	0	342	240	1,278	105	207

10 Year Average Bycatch:	**190**
Equivalent Fleet Bycatch Total:	**28,452**

Not only was Vessel 1.a. able to harvest his pollock in Year 7, it had accumulated enough Salmon Savings Credits to fish Year 8 with a fair amount of bycatch insurance available. Had all Bering Sea pollock been harvested at the same rate as Vessel 1.a., over the 10 year period, the fleet's average annual Chinook bycatch would have been 28,452.

TABLE 1.b. This vessel exceeded its Base Cap in the first year of the program, therefore using the bycatch provided under the Start-up loan provision. The SSIP rules require that the 130 salmon caught over the Base Cap must be paid back within the following 3 years. In this example vessel 1.b. was able to keep its bycatch low enough to pay off its start up debt in 2 years. However, in paying off the debt, those low bycatch years generated only 3 Salmon Savings Credits for its savings account.

Vessel 1.b. had to continue keeping bycatch low to build up insurance against the possibility of a high encounter year. When the high salmon encounters did occur in year 7 it had barely built up enough Salmon Savings Credits to harvest its pollock. The use of the "insurance" all but completely drained its savings account to do so.

Vessel:	1.b.								
Coop:	**Inshore**			Vessel % of Inshore Pollock:		1.20%			

	1	2	3	4	5	6	7	9	8	
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated	
									Year	Savings Balance
1	318	457	457	**448**	n/a	9	-130	-130	0	0
2	318	457	274	**273**	0	1	45	-85	0	0
3	318	457	275	**226**	0	49	92	6	**3**	3
4	318	457	321	**232**	0	89	86	92	38	40
5	318	457	358	**266**	0	92	52	144	23	63
6	318	457	381	**149**	0	232	169	313	74	134
7	318	457	452	**450**	0	2	-132	181	0	2
8	318	457	320	**231**	0	89	87	267	38	40
9	318	457	357	**187**	0	170	131	398	57	95
10	318	457	413	**153**	0	260	165	563	72	167

10 Year Average Bycatch: **262**
Equivalent Fleet Bycatch Total: **39,159**

Despite the rough start in the first year and the high encounters of Year 7, this vessel managed to recover and build up savings. Had all Bering Sea pollock been harvested at the same rate as Vessel 1.b. over the 10 year period, the fleet's average annual Chinook bycatch would have been 39,159.

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TABLE 1.c. This scenario covers bycatch under, but close to, the vessel's Available Cap in 7 out of 10 years. Vessel 1.c. exceeds its Available Cap in years 4 and 6, requiring it to find available credits from another vessel and transfer in enough credits to cover the overage. These transfers into Vessel 1.c.'s account are debited against its next year's Available Cap; resulting in an Available Cap below its Base Cap.

However, year 7 was a high encounter year for the fleet and no bycatch was available for transferring into its account. Therefore Vessel 1.c. had to stop fishing upon reaching its Available Cap, not harvesting all its pollock. This is a vessel that has not responded to incentives, in other words fishing as though it was operating under a hard cap of 47,591, and as a result had an Available Cap lower than its Base Cap for 2 of the 10 years and was unable to harvest all its pollock in year 7, the fleet wide high encounter year.

Vessel: 1.c.									
Coop: Inshore			Vessel % of Inshore Pollock:		1.20%				
	1	2	3	4	5	6	7	9	8
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated
									Year	Savings Balance
1	318	457	457	302	n/a	155	16	16	7	7
2	318	457	325	298	0	27	20	36	9	16
3	318	457	333	294	0	39	24	59	10	26
4	318	457	344	356	12	-12	-38	21	0	0
5	318	457	306	282	0	24	36	57	10	10
6	318	457	328	345	17	-17	-27	30	0	0
7	318	457	301	301	0	0	17	47	0	0
8	318	457	318	274	0	44	44	90	19	19
9	318	457	337	310	0	27	8	98	3	23
10	318	457	340	199	0	141	119	217	52	74

10 Year Average Bycatch:	**296**
Equivalent Fleet Bycatch Total:	**44,340**

Despite not taking advantage of the insurance created by responding to incentives, the SSIP program kept Vessel 1.c. under the 47,591 performance standard over the 10 year period. This boat did eventually pay the price for its indifference to the incentives by hitting its cap in Year 7 when, due to the high encounter year, it was unable to find salmon to transfer into its account.

TABLE 1.d. Vessel 1.d. has paid no attention to the incentives or consequences of the SSIP program during the first 7 years of the program. The captain only somewhat paid attention to his individual catch limit and, consequently, has received transfers whenever he could to cover bycatch above his Available Cap. When the fleet wide high encounter year came along in Year 7 Vessel 1.d. had to stop pollock fishing before exceeding its Available Cap. Unable to find additional bycatch to transfer in, it had to forego the majority of its pollock harvest.

It is safe to assume that the Year 7 experience would create bycatch behavior changes for subsequent years; for example: hire a different captain, new vessel ownership/management, or, at a minimum, a new harvest strategy.

Vessel:	1.d.									
Coop:	Inshore			Vessel % of Inshore Pollock:		1.20%				
	1	2	3	4	5	6	7	9	8	
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated	
									Year	Savings Balance
1	318	457	457	**438**	n/a	19	-120	-120	0	0
2	318	457	278	**299**	21	-21	19	-101	0	0
3	318	457	246	**266**	20	-20	52	-50	0	0
4	318	457	298	**344**	46	-46	-26	-76	0	0
5	318	457	271	**439**	168	-168	-121	-197	0	0
6	318	457	150	**322**	172	-172	-4	-201	0	0
7	318	457	146	**112**	0	34	206	5	15	15
8	318	457	333	**310**	0	23	8	12	3	18
9	318	457	336	**320**	0	16	-2	10	0	16
10	318	457	334	**300**	0	34	18	28	8	11

10 Year Average Bycatch: **315**
Equivalent Fleet Bycatch Total: **47,171**

Regardless of the poor bycatch practices by Vessel 1.d., the SSIP program still kept bycatch performance below the 47,591 performance standard over the 10 years. Not covered in this table is the good practices that had to take place by other SSIP vessels in order for the transfers in years 2, 3, 4, 5, &6. Those transfers represent 427 salmon saved below the Base Cap of the transfer source vessels.

Scenario 2.

Scenario 2 reviews the performance of 2 actual inshore vessels utilizing actual bycatch experienced between 2004 and 2008. They are modeled as if they had been participating in the SSIP program. Vessel 2.a. had generally low bycatch and Vessel 2.b. had high bycatch over the 5 years. Four out of the 5 years had a total bycatch, AFA and CDQ, over the 47,591 Performance Standard threshold.

TABLE 2.a. Chinook Bycatch 2004-2008

Year	2004	2005	2006	2007	2008
Chinook Bycatch	51,696	67,363	82,647	121,217	19,233

TABLE 2.b. The low bycatch vessel exceeded its Available Cap in 2007, but stayed under in each of the other 4 years as shown.

	Vessel:	Actual Low Bycatch Vessel							
	Coop:	Inshore		Vessel % of Inshore Pollock:	1.31%				
	1	2	3	4	5	6	7	9	8
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated
									Year	Savings Balance
2004	347	499	347	**147**	0	200	200	201	87	88
2005	347	499	435	**327**	0	108	20	221	9	96
2006	347	499	443	**280**	0	163	67	288	29	125
2007	347	499	472	**857**	385	-385	-510	-222	0	0
2008	347	499	-38	**146**	184	-184	201	-21	0	0

For the low bycatch vessel to have harvested all its pollock in 2007 a transfer of 385 salmon credits would have had to taken place. The likelihood of a vessel receiving any transferred in credits in 2007 is nil, therefore it is assumed that the boat would have had to stop fishing upon reaching its Available Cap. Table 2.c. is the more likely outcome.

TABLE 2.c.

Year	1	2	3	4	5	6	7	9	8	
Vessel: Low Bycatch Vessel **Coop:** Inshore				Vessel % of Inshore Pollock:	1.31%					
	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated	
									Year	Savings Balance
2004	347	499	347	**147**	0	200	200	201	87	88
2005	347	499	435	**327**	0	108	20	221	9	96
2006	347	499	443	**280**	0	163	67	288	29	125
2007	347	499	472	**472**	0	0	-125	163	0	0
2008	347	499	347	**146**	0	201	201	364	88	88

The low bycatch vessel, under this assumed outcome, would have successfully harvested its pollock in 4 out of 5 years. In the high encounter year, 2007, it would have left 875 metric tons of pollock uncaught.

TABLE 2.d.   The high bycatch vessel exceeded its Available Cap in all 5 years. This table demonstrates results not realistically possible under the SSIP program, but does demonstrate that this vessel will have to change its bycatch behavior.

Year	1	2	3	4	5	6	7	9	8	
Vessel: Actual High Bycatch Vessel **Coop:** Inshore				Vessel % of Inshore Pollock:	1.52%					
	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated	
									Year	Savings Balance
2004	403	579	403	**448**	45	-45	-45	-44	0	0
2005	403	579	358	**1,256**	898	-898	-853	-897	0	0
2006	403	579	-496	**1,869**	2,365	-2,365	-1,466	-2,364	0	0
2007	403	579	-1,962	**1,803**	3,765	-3,765	-1,400	-3,764	0	0
2008	403	579	-3,363	**536**	3,899	-3,899	-133	-3,898	0	0

Once again, the likelihood of this vessel ever being able to acquire the transfers required for continued fishing is very low. Therefore, it is assumed the high bycatch vessel must stop fishing upon reaching its Available Cap in each of the 4 of the 5 years. Table 2.e. covers this more likely outcome.

TABLE 2.e.

	Vessel:	Actual High Bycatch Vessel									
	Coop:	Inshore			Vessel % of Inshore Pollock:		1.52%				
	1	2	3	4	5	6	7	9	8		
Year	Base Cap	Vessel Hard Cap	Available Cap	Bycatch (including Transfers In)	Transfers In	Over / Under Available Cap	Salmon Saved Under Base Cap	Running Total Salmon Saved Under Base Cap	Credits Generated		
									Year	Savings Balance
2004	403	579	403	**403**	0	0	0	1	0	0
2005	403	579	403	**403**	0	0	0	1	0	0
2006	403	579	402	**402**	0	0	1	1	0	0
2007	403	579	403	**403**	0	0	0	1	0	0
2008	403	579	402	**536**	134	-134	-133	-133	0	0

Having had to stop fishing in 4 of the 5 years, assuming it would have been able to acquire a transfer in 2008 and keep fishing, the high bycatch vessel left 15,172 metric tons of pollock uncaught.

APPENDIX II.   Retrospective Study

A retrospective study of the fleet's performance under a SSIP-like plan was carried out using catch and bycatch numbers collected by Sea State, Inc from the 2000 – 2008 Bering Sea pollock fishery. Initial Base and hard Caps were assigned to vessels based on the percent-of-sector pollock allocation, multiplied by the sector allocations defined in the PPA. The retrospective analysis then tracked each vessel's catch through the years and calculated Salmon Savings Credits accumulated by vessels in those years in which a vessel's total Chinook bycatch remained under its Base Cap. A vessel Available Cap that was the sum of the Base Cap and 3-year savings accumulations was determined annually. The analysis then tracked usage of these Salmon Savings Credits in those years when a vessel's bycatch exceeded its Base Cap. Of course, during this time vessels were not bound by the Caps just described, and in many cases vessels actual salmon bycatch was in excess of these Caps. The retrospective analysis tracked Chinook bycatch throughout the year and determined the tonnage of pollock that vessels would not have been able to harvest had they been limited to it's share of the 47,591 Performance Cap plus any accumulated Salmon Savings Credits.

The following points add more detail to this description:

1. Retrospective vessel-level allocations were synthesized by equating each vessel's allocation percentage in each year to it's actual percentage-of-sector pollock catch that year. Thus if a vessel leased pollock in any given year, it's allocation of Chinook reflected this increase since it's share of the 47,591 hard cap was based on it's pollock harvest.
2. No Start-up rules were used; however, since Chinook catch in 2000 was so low, no vessels would have used the Start-up Loan.
3. A discount rate of 2.29:1 was applied to the difference between a vessel's Base Cap and it's actual bycatch if it's bycatch was lower than it's Base Cap to establish Salmon Savings Credits.
4. The sum of three previous years' Salmon Savings Credits was added to each vessel's Base Cap, unless the sum of the Base Cap and Salmon Savings Credits was greater than it's Hard Cap, in which case the Hard Cap became the current year's Available Cap.
5. Catches in excess of a vessel's Base Cap were subtracted from it's Salmon Savings Credit account in a first-in, first out manner; that is, savings from the earliest year in the three years preceding the year in question were depleted before savings from later years.
6. Each CDQ group was treated as a single entity despite the fact that several different vessels typically fish each group's pollock in any given year.
7. Vessels with very low pollock catches (typically making only one or two deliveries throughout the years involved) were removed from the analysis. This meant that not all salmon that would be allocated under the program were actually allocated in the analysis. For example, the first year of the program, which did not include the Start-up Loan, was characterized by Base

Cap allocations of 47,578 salmon rather than the full Performance Standard of 47,591 being allocated.

8. No A/B season Chinook split was simulated. This led to some boats exceeding their Available Cap in January during 2007 (i.e. after just three deliveries). If an A/B season split had been included in the analysis they would likely have caught much more pollock in 2007 since the loss of several trips in the A season would have been more than compensated for by fishing during the 2007 B season. Unfortunately, time did not permit an incorporation of this feature of the PPA into this analysis.

9. No attempt was made to approximate any salmon transfers. Transfers may have led to increased Chinook bycatch and increased pollock catch (hence, less foregone catch) in some years, with decreased Chinook bycatch, and possibly more foregone pollock catch in other years. However, many scenarios involving transfers can be envisioned; time constraints prevented the examination of any of these scenarios.

Results

The sum of all vessels' share of the 47,591 plus Salmon Savings Credits (i.e. the sum of vessel Available Caps) is shown in Table 1. In reality, the Start-up Loan provision of the SSIP provides a savings loan to each vessel that would have brought the total Available Cap up to approximately 68,392 if the program had been run in these years. A bycatch of zero salmon in 2000 would have been required in order for the sum of the 2001 allocations to reach the 68,392 level. Nonetheless, relatively low bycatch in 2001 and 2002 led to the maintenance of high Available Cap levels through 2003. The sum of allocations began to drop after 2003 when the very high salmon savings from 2000 (the first year with very low bycatch) were no longer included in vessels' three-year savings. After the very high bycatch year of 2007, the sum of Available Caps dropped to just under 50,000. Under the SSIP, it cannot drop under the 47,591 level unless vessels need to pay back transfers or the Start-up Loan, and neither of those possibilities was modeled in the program. Even with the high bycatch in 2007 some vessels still had Salmon Savings Credits left from the three previous years, which is why the sum of Available Caps was still in excess of 47,591 in 2008. The 2009 Available Caps were based, as usual, on savings from the three previous years, and since 2008 bycatch levels were very low, the projected Available Caps in 2009 reflect the salmon savings from 2008 and it's sum is again over 60,000.

Table 1. Sum of vessels Chinook allocations. 2009 allocations assume that each vessel's pollock percent-of-sector will be the same as in 2008.

Year	Sum of fleet-wide Available Caps
2000	47,578
2001	65,259
2002	65,538
2003	64,775
2004	62,925
2005	59,191
2006	54,802
2007	52,183
2008	49,901
2009	61,377

In an attempt to see how much bycatch might have accrued in the past had vessels been forced to stop fishing when they reached it's allocations, Table 2 was constructed by assuming vessels would have caught it's Available Cap, or it's actual historical catch, whichever was less. By this method, the "retrospective allowed catch" must be less than or equal to the actual bycatch. Percentage reductions in the retrospective allowed catch ("retrospective allowed" vs. actual) were naturally very high (42% and 60% respectively) in 2006 and 2007 when fleet bycatch levels greatly exceeded caps outlined in the PPA. However, the reductions ranging from 3% to 15% in lower bycatch years indicate the potential for the program to reduce bycatch in years when actual bycatch would be well below the cap.

Table 2.   Expected past bycatch under program had vessels been limited to it's SSIP cap (i.e. retrospective allowed equals sum of all vessel's actual bycatch or cap, whichever was lower) compared to actual bycatch.

Year	Retrospective allowed bycatch	Actual bycatch taken	Reduction from actual bycatch to retrospective allowed
2000	5,069	5,069	0%
2001	25,427	30,015	15%
2002	32,659	35,041	7%
2003	40,131	44,176	9%
2004	41,237	50,931	19%
2005	42,963	68,021	37%
2006	46,954	81,315	42%
2007	48,674	120,838	60%
2008	17,122	17,657	3%

The loss in pollock harvest presented in Table 3 is certainly an overestimate of foregone harvest since it does not include any division of Caps between A and B season, and any dilution of Caps due to the rollover tax of 20% envisioned in the PPA. The division of Caps into A and B season would likely have resulted in less foregone harvest in years

when vessels would have reached it's caps in the "A" season. However, this occurred rarely in years other than 2006 and 2007, so in those other years the estimates of foregone harvest are likely closer to what might actually have occurred. The rollover tax of the PPA would likely have increased the numbers of vessels that reached it's caps in the B season, so adding this feature into the retrospective analysis would be expected to increase the forgone harvest in all years. Only in 2000, when bycatch was down near 5,000 fish, was there no foregone pollock harvest due to vessels reaching it's Available Caps. While one would assume that with the SSIP program in place, vessels would fear this loss and change behavior to avoid hitting the caps, it is clear that the incentives to do so exist even in years of relatively low bycatch: 30,000 Chinook in 2001 and 17,657 in 2008.

Table 3. Projected loss in harvest due to vessels reaching individual Available Caps.

Year	Un-harvested pollock (mt)
2000	0
2001	11,280
2002	37,085
2003	88,602
2004	35,543
2005	123,570
2006	563,798
2007	805,110
2008	1,132

The retrospective analysis tracked the number of credits left in individual vessel Salmon Savings Credit accounts and the number of salmon each vessel caught *under* its Base Allocation to produce those savings. Table 4 presents the level of unused Salmon Savings Credits by year; these are savings not offset by catch in future years. While large catches under each vessel Base Cap and concomitant "savings" after the discount rate was applied, could only be produced in low-bycatch years, there were also salmon savings generated even in high bycatch years (see 2006 and 2007 below). This result indicates that at least several vessels were able to operate below it's share of the 47,591 Performance Cap in those years. It is much easier for vessels with small allocations to achieve this low bycatch in high-encounter years by arranging to fish at the times when few Chinook are historically present, but also indicates that there are strategies to be pursued that will result in much lower bycatch than the fleet has seen in the past, without loss of pollock harvest.

Table 4. Savings produced and equivalent numbers of salmon caught under individual vessel hard caps to produce those savings. Savings prior to 2006 are past the 3-year summation period and thus cannot be used in the future. Savings prior to 2006 could still be used in future years.

Year	Savings	Salmon remaining under individual vessel caps to produce savings in middle column
2000	12,673	28,993
2001	6,635	15,180
2002	4,319	9,881
2003	1,420	3,249
2004	882	2,018
2005	1,403	3,210
2006	1,197	2,739
2007	672	1,537
2008	13,333	30,503