# MEMORANDUM

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| TO: | Council, AP, and SSC Members | ESTIMATED TIME<br>5.0 HOURS |
| FROM: | Clarence G. Pautzke<br>Executive Director | |
| DATE: | June 16, 1993 | |
| SUBJECT: | Salmon Bycatch Management | |

## ACTION REQUIRED

(a) Consider final action on the BSAI Chinook salmon bycatch cap analysis (Amendment 21b).

(b) Consider final action on a proposed salmon bycatch Vessel Incentive Program.

(c) Consider endorsing a proposal to establish an industry sponsored "salmon foundation".

## BACKGROUND

Over the past two years, the Council has pursued the possibility of placing a limit on the incidental capture of chinook salmon in the BSAI trawl fisheries. At the April meeting, the Council was in position to recommend a chinook salmon PSC program utilizing a combination of time/area closures to trawl fisheries triggered by attainment of an established number of chinook salmon (Amendment 21b). However, after reviewing a draft analysis of a proposed Vessel Incentive Program (VIP) for salmon, and also receiving an industry-sponsored concept of establishing a voluntary "salmon foundation" program to reduce chinook salmon bycatch, the Council decided to wait until the June meeting to make a final recommendation on a possible salmon bycatch program. In so doing, the Council allowed for public review of the salmon VIP analysis and gave industry representatives an opportunity to more fully develop their "Salmon Foundation" concept, which could result in reduced bycatch of chinook salmon through a combination of incentives.

The revised Draft EA/RIR/IRFA for Amendment 21b to the BSAI FMP was sent to you on March 17, 1993. Due to the number of alternatives and sub-options, I have attached as Item D-2(b)(1) an Executive Summary of this analysis, which includes the alternatives considered, maps showing the areas proposed for closure, and a summary table of the potential impacts of the various alternatives.

The draft EA/RIR/IRFA for a possible salmon VIP was sent to you on May 14, 1993. The Executive summary of the salmon VIP analysis is attached as Item D-2(b)(2). In addition, NMFS staff will present additional information at the June meeting on which to base appropriate salmon performance standards should the Council recommend that a salmon VIP be implemented. This information is presented as an addendum to the VIP analysis dated May 14.

Regarding the industry "salmon foundation" proposal, this concept, as presented at the April meeting, would require:

1. mandatory retention of all salmon bycatch with a stiff penalty for discard;

2. retained bycatch would be analyzed by NMFS/ADF&G and later distributed to food banks;

3. publication of number of salmon bycatch by vessel name by week on NMFS' computer bulletin board; and

4. the creation of a "Salmon Foundation.

The foundation would require trawl operations to pay into the foundation a fee for each salmon caught as bycatch, with a base rate for unavoidable bycatch that would match the externality cost to the terminal fisheries of foregone harvest. The fee would be increased if an operation exceeded an unacceptable amount of salmon bycatch. This would be a punitive assessment for wilful failure to avoid salmon bycatch. Funds from this foundation would be used for salmon research, such as stream of origin analysis, stock strength analysis, and bycatch pattern analysis. Representatives from the trawl industry will present a more defined proposal to the Council at this meeting.

The Council can, after hearing public comment, make a final recommendation on a Chinook salmon bycatch program by deciding on a preferred alternative that is based on one of the three potential salmon bycatch regimes, or a combination thereof, incorporating a salmon VIP, time/area/cap program and/or a "Salmon Foundation" approach into one preferred recommendation. Either option would allow for adequate time for Secretarial review in order to have a salmon bycatch program implemented by early 1994.

AGENDA D-2(b)(1)
JUNE 1993

# EXECUTIVE SUMMARY
# SALMON BYCATCH - AMENDMENT 21b

## I. Background

An initial proposal was submitted to the North Pacific Fishery Management Council (Council) on August 8, 1991 by the Yukon-Kuskokwim Task Force. The brief statement of the proposal was as follows:

> To set an annual bycatch cap for the interception of chinook salmon in the Bering Sea at 0.004 salmon/mt, apportioned to different fisheries based on historic percent of bycatch, and enforced with mandatory time/area closures once that fishery in general, or that fishery in a certain area at a certain time reaches its apportioned cap.

The analysis of the proposal was conducted by the Alaska Department of Fish and Game, the Commercial Fisheries Entry Commission, and Council staff and presented to the Council at the April 1992 meeting. In order to provide the Council with a wide range of options to consider, the analysis was expanded to include the following:

1) four different assumptions about chinook salmon in a Vessel Incentive Program (VIP);
2) a range of four possible caps including the cap prescribed in the proposal (0.004, 0.008, 0.012 and 0.024 chinook/mt);
3) three different area closure options based on combinations of statistical areas; and
4) two different scenarios based on time or duration of closure.

The above analysis, which was based on the Bering Sea bycatch simulation model, showed that the more restrictive the cap, the greater the loss in benefits to the nation due to early closures of the groundfish fisheries. The analysis also showed that the more finely resolved the area and time definitions (e.g. more separate areas and time periods which took into account the high bycatch early in the year), the less negative were the impacts on the groundfish fisheries while still controlling chinook bycatch. The analysis also indicated that as the effectiveness of the VIP program increased, the costs to the groundfish fisheries were reduced (without consideration of management costs).

Following presentation of the analysis in April 1992, the Council followed AP recommendations that an alternative be included to examine the effects of time and area closures in the absence of a cap. The SSC had also recommended that the model be re-run using the data from 1990 and 1991 separately (rather than averaging the two) to allow maximum bycatch rates in the model.

The analysis presented in January 1993 included an examination of time and area patterns in chinook bycatch based on a Geographical Information System (GIS) which could precisely locate individual hauls from observer data. The analysis reiterated the findings of the National Marine Fisheries Service that chinook salmon bycatch is highest during the months of January - April and September - December. Bycatch also tended to be higher in the vicinity of Unimak Island and along the 200 m contour which extends to the north and west of Unimak Island. A series of buffer strips were constructed which extended for 5, 10 and 15 miles on either side of the 200 m contour line, and catch and bycatch were compared within and outside of the buffers. Data from the foreign, joint venture, and domestic fisheries indicated a much higher bycatch and rate of bycatch within the buffer strips and in the blocks near Unimak Island than outside of these strips and blocks. The data also indicated that groundfish catch per tow did not vary greatly inside or outside of the strips and blocks.

In order to determine the impacts of closures based on the findings of the GIS analysis, blocks which approximated the contour buffer strips were identified for closure in the Bering Sea bycatch simulation model. The results of the model runs indicated that most of the groundfish catch could be taken under buffer closures while maintaining savings in chinook bycatch. The reduction in net benefits to the nation were very small in comparison to the negative impacts seen in alternative scenarios from previous analyses. Of the runs made with buffer strip closures, the option with the least impact was closure of the buffer strip following attainment of a cap (e.g. 16,000 chinook in this case) during the months of January - April and September - December only.

Separation of the model runs into data from either 1990 or 1991 (rather than the average of the two years) did not allow bycatch rates in the model to increase to the extent that the higher caps (.012 or .024) could be fully evaluated. But the data from the higher bycatch levels in 1991 indicated that the bycatch cap of 24,000 chinook (based on the 0.012 chinook/mt annually) would still be constraining to the groundfish fisheries and lead to negative benefits in years with similar levels of bycatch.

Following the January 1993 presentation, the Council, based on SSC and AP recommendations, voted that the analysis should be released for public review following the addition of two sections to the EA/RIR. The first additional section was to estimate the impacts of trawl-caught chinook salmon on western Alaskan chinook salmon stocks. The second additional section addressed the value of bycaught chinook salmon to the recreational fisheries. The AP had also requested that a table be included which ranked statistical areas by bycatch level.

Fairly detailed information on returning chinook salmon was available for the Nushagak River, and some information was also available for the Yukon River chinook salmon returns. Combined with scale pattern analysis information from chinook salmon bycaught in Bering Sea trawl fisheries, this data was used to estimate the percent by which the returns to the Nushagak and the Yukon Rivers would have increased had bycatch not occurred. Percentage increases to the Nushagak River returns were estimated to have ranged between 2% and 7% and percentage increases to the Yukon River returns were estimated to have ranged between 1% and 4%.

Qualitative discussions of the value of chinook salmon to the commercial, recreational and subsistence fisheries were provided in the document which was submitted for public review as well.

## II. Alternatives Considered in the Analysis

The various alternatives considered in the present analysis are as follows with alternative reference numbers corresponding to the sections in the text:

3.1.1. Alternative 1. Status Quo. No chinook PSC caps or time/area closures. Each of the four VIP assumptions is presented under Status Quo.

3.1.2. Alternative 2. Chinook Prohibited Species Caps. Chinook PSC caps in place, both with and without time/area closures.

3.1.2.1. Option 1. Close the entire BS/AI to a specific fishery upon attainment of the chinook PSC cap by that fishery, or group of fisheries.

3.1.2.2. Option 2. Close specific federal statistical areas to a specific fishery upon attainment of the chinook PSC cap by that fishery, or group of fisheries.

Area sub-options:

1) Close areas 511, 517 and 519 as one zone; Close all other areas as a second zone. Caps are apportioned to zones by historic bycatch values.

2) Close 5 independent zones:
- a) area 511
- b) areas 517 and 519
- c) area 540
- d) area 518
- e) all other areas.

Caps are apportioned to zones based on historic bycatch values.

Time closure sub-option:

Divide all closures listed above into 2 time periods: January-April; and May-December. The cap is evenly divided between the two time periods. The closed areas are reopened on May 1 for the remainder of the cap.

3.1.2.3. Option 3. Close areas which do not conform to federal statistical areas but which have been shown historically to have high chinook bycatch. Closures of these areas would be triggered by attainment of a chinook PSC cap in specific fisheries. Closed areas are reopened during May, June, July and August. The closures would apply to a buffer strip on either side of the 200 m contour, and to a few blocks in the vicinity of Unimak Island.

3.1.3. Alternative 3. Time and Area Closures - No Chinook PSC.

Close areas which do not conform to federal statistical areas but which have been shown to have high chinook bycatch during certain periods of the year. These areas are in proximity to the "horseshoe", Unimak Island, and the 200 m contour. The closure would be in effect during periods of high chinook bycatch, January - April and September - December.

## III. Vessel Incentive Program

The Vessel Incentive Program (VIP) is currently in effect for halibut and red king crab. The Bering Sea bycatch simulation model mimics an effective VIP program by reducing high bycatch rates to acceptable program levels. In the April 1992 draft of Amendment 21, the status of the salmon VIP program was unknown, and various VIP assumptions were analyzed to cover the various outcomes of a salmon VIP decision. Salmon has since been dropped from the VIP program. The original VIP assumptions were retained in this analysis in order to conform with previous analyses, to allow for eventual inclusion of salmon into the VIP program, and in order to gauge the effects of an active avoidance of high bycatch rates by groundfish vessels.

Four VIP assumptions used throughout this analysis were as follows:

1. No VIP for any species. Within the model, all bycatch rates are included as observed in the 1990 and 1991 fisheries.

2. VIP in effect for halibut and red king crab. Within the model, the bycatch rates for these species which are greater than double the VIP approved rate are not included in calculations. Salmon is not included in the VIP program (all salmon bycatch rates included in the model).

3. VIP in effect for halibut and red king crab as above. Salmon bycatch rates which are greater than five times a previously accepted VIP rate are not included in the calculations (salmon bycatch rate standard is "relaxed").

4. VIP is in effect for halibut, red king crab and salmon. Within the model, the bycatch rates for these species which are greater than double the VIP approved rates are not included in calculations.

Assumption #2 most closely reflects current groundfish management.

## IV. Summary of Findings

The Bering Sea bycatch simulation model was used to estimate the net benefits to the nation under the various alternatives. The data was from the 1990 and 1991 domestic fisheries in the Bering Sea, and model runs were made using the average of the two years and each of the two years separately. See attached table for a summary of the following discussion.

3.1.1. Alternative 1. Status Quo. No chinook PSC caps or time/area closures.

Runs of the Bering Sea bycatch simulation model under this alternative served as the baseline by which to compare the various alternatives. In general, net benefits to the nation tended to increase as the bycatch rates came into the bounds expected under an effective VIP program.

3.1.2. Alternative 2. Chinook Prohibited Species Caps.

Based on bycatch simulation model runs, the implementation of PSC caps for chinook salmon reduced the bycatch of chinook salmon to within the range of the caps.

However, the loss of groundfish due to chinook PSC closures resulted in sometimes very significant costs to the groundfish fisheries. Based on the rates encountered in 1990 and 1991, the chinook PSC caps resulted in the early closure of most fisheries. If chinook salmon bycatch rates are maintained within the levels originally suggested in the VIP program, fewer chinook are encountered, and the higher caps are not reached, and therefore there are no decreases in benefits due to closures. The model was unable to fully evaluate the effect of the higher PSC caps (24,000 and 48,000 chinook) because the number of chinook bycaught in 1990 was approximately 19,500 chinook, and in 1991 was approximately 30,900 chinook. The effects of a higher cap on net benefits during a year of extremely high chinook bycatch are unknown.

3.1.2.1. Option 1. Close the entire BS/AI upon attainment of the chinook PSC cap.

Generally the net benefits were lower when the entire Bering Sea was closed than when more well defined areas were closed. High decrease in net benefits from baseline cases.

3.1.2.2. Option 2. Close specific statistical areas upon attainment of the PSC cap.

Area Suboptions: Close 2 zones; and close 5 different zones:

Generally, the net benefits increased as the number of separately managed zones increased. Overall substantial decrease in net benefits from baseline cases.

Time closure sub-option: Divide all closures listed above into 2 time periods:

The separation of the chinook PSC cap into 2 specific time periods dramatically decreased the loss in net benefits due to chinook PSC cap closures. Fisheries which were halted early in the year due to high chinook bycatch were able to fish during periods of lower bycatch, and increase total groundfish catch. Division of the cap in this manner, however, did reduce the amount of PSC cap available in the first third of the year, and fisheries not affected by the higher cap levels (e.g. 24,000) were halted by the PSC cap in the first third of the year because the overall cap available for January - April was cut in half.

3.1.2.3. Option 3. Close areas which do not conform to federal statistical areas but which have been shown historically to have high chinook bycatch:

Analysis of historical data showed that the majority of chinook salmon are bycaught during the months of January-April and September-December. Chinook salmon are primarily bycaught in the region of the "horseshoe", in the vicinity of Unimak Island, and along the 200 m contour, especially within 15 miles of the contour.

In order to use the bycatch simulation model which has blocks as the finest scale of resolution, blocks which roughly conform to the 200 m contour buffer strip and the two blocks above Unimak Island were closed upon chinook PSC cap attainment. Since fisheries were still prosecuted outside of this area, and within this area during the months of May - August, the closure of this area when a cap of 8,000 chinook was reached resulted an estimated chinook bycatch of approximately 14,000 chinook. The decrease in net benefits under an 8,000 chinook trigger was approximately $7.2 million dollars which was substantially less than the decreases from statistical area closures ($60 - $400 million). The 16,000 chinook cap resulted in an estimated chinook bycatch of approximately 17,000 chinook, and an estimated increase in benefits of $1.0 million dollars. It should be noted that because the total number of chinook salmon generated by the model under the baseline used for comparison was only 18,000, the effects of this cap and closure may not be fully accurate.

3.1.3. Alternative 3. Time and Area Closures - No Chinook PSC.

In order to use the bycatch simulation model which has blocks as the finest scale of resolution, two areas approximating the geographical areas described above were defined as follows:

1) The three blocks in the "horseshoe", and two blocks above Unimak Island were closed for the bycatch simulation during January-April and September-December. The simulation resulted in a reduction in chinook salmon bycatch of only 800 fish. This is because although the rates in these blocks were high, there were also high rates in other portions of, for instance, area 517 along the 200 m contour.

2) The blocks which roughly conform to the 200 m contour buffer strip and the two blocks above Unimak Island were closed for the bycatch simulation during January-April and September-December. Under this simulation, a total of 8,180 chinook were caught outside of this area, and during this area in the summer months. The estimated groundfish catch did not vary greatly from the baseline data, however, because of slightly higher halibut and crab bycatch, and because of the changes in value of the catch during the year, the closure resulted in a net decrement in benefits of approximately $20.6 million.

# EXECUTIVE SUMMARY
# SALMON VIP

## 0.1 Background

The incidental salmon fishing mortality experienced in the groundfish fisheries is one of several competing uses of the fully utilized salmon resource. Salmon also are used as catch and bycatch in directed commercial, subsistence, and sport salmon fisheries and as bycatch in other non-salmon and non-groundfish fisheries. The groundfish fisheries may result in reduced escapement or harvest in the salmon fisheries, thereby imposing a cost on other salmon users.

If sufficient incentive exists for a vessel operator to move to another area or take other action to reduce the possibility of continued high bycatch rates, then incidence of repeated high salmon bycatch rates on a haul by haul basis may be curtailed. Nonetheless, some salmon bycatch is unavoidable in the groundfish trawl fisheries, as a degree of unpredictability is associated with salmon bycatch. Difficulties may exist for individual vessel operators to take action that will predictably reduce salmon bycatch rates on a haul by haul basis.

## 0.2 Alternatives Under Consideration

Alternative 1: No action (status quo alternative). No vessel incentive program for salmon would be implemented.

Alternative 2: Implement a salmon VIP for the BSAI trawl fisheries.

**Option 1.** Implement a vessel incentive program similar to the halibut incentive program so that salmon bycatch rate standards and monitoring of vessel compliance would be based on observed bycatch rates in the sampled portion of observed hauls (number of salmon per metric ton of groundfish catch).

**Option 2.** Implement a salmon incentive program that is independent of observer sampling procedures. Three suboptions are considered:

**Option 2a.** Specify a standard (observed number of salmon, all species combined) that a vessel would be allowed on a weekly basis, independent of catch. Incidental takes of salmon that exceed the standard would constitute a violation. Fines could be assessed for just exceeding the standard or for each salmon that was counted that exceeded the standard. All salmon counted in sampled and unsampled hauls would be credited against the weekly standard. No extrapolation or estimation of salmon bycatch would be involved. The only data used would be the number of salmon observed during a week.

**Option 2b.** Specify a salmon bycatch rate standard for all trawl fisheries based on the observed number of salmon, all species combined, and the amount of groundfish retained during a weekly reporting period. Vessels that exceed the specified bycatch rate standard during a week would be subject to prosecution as violators of the incentive program. This program would require that round weight estimates of total retained catch be derived using product recovery rates (at-sea processing operations) or landed weights (shoreside processing operations). Weekly production reports submitted by at-sea processors and fish ticket information submitted for shoreside deliveries would be used to determine amounts of retained catch for each observed vessel.

**Option 2c.** All salmon incidentally taken in the BSAI trawl fisheries must be retained for observation by either an at-sea or shoreside observer. This option could be adopted separately from Options 2a and 2b or jointly. All salmon retained onboard vessels must be stored separately from other fish products to facilitate access by observers or enforcement agents and inventory of salmon product onboard. Retained salmon can be transferred to designated ports where NMFS agents could take possession of salmon and either make it available to nonprofit foodbank organizations, revert to sale of the fish, or dispose of the salmon in the most appropriate manner available.

## 0.3 Summary of Results

The analysis provides information on the difficulties of establishing a VIP for salmon. Namely, there is concern about: (1) obtaining statistically valid estimates for salmon bycatch, (2) the effect of annual fluctuations of ocean salmon abundance on salmon bycatch levels, (3) the true monitoring and enforcement costs, and (4) the proven effectiveness of an incentive program to reduce salmon bycatch rates.

Not withstanding these concerns, adoption of a vessel incentive program (VIP) based on a specified allowable number of salmon that could be taken during a specified time period (i.e., Option 2a under Alternative 2) would provide the simplest approach for an incentive program and involve the least cost to implement and enforce. An option that would prohibit the discard of salmon until counted and examined by an observer (Option 2c under Alternative 2) would facilitate the collection of biological information on salmon bycatch and possibly provide additional benefit by addressing the perception of waste in the groundfish trawl fisheries if salmon are retained and processed for human consumption or other purposes.

Initial consideration of Option 1 of Alternative 2 by NMFS statisticians indicate that observer sampling procedures would need to be changed substantially and a significant amount of staff time committed to develop appropriate statistical procedures to derive valid estimates of vessel bycatch rates. Whole haul sampling for salmon, or a minimum sample size of at least one or two metric tons may be required to support this approach for a salmon VIP. Concerns exist that required changes to observer sampling procedures would require a large amount of additional experimentation and assessment. Ultimately, revised procedures may not be possible to implement or may not be easily adaptable to all vessels and fisheries.

Although Option 2b of Alternative 2 would allow those vessels retaining more groundfish to take more salmon, use of round weight equivalents of reported catch would raise questions about appropriate product recovery rates and whether retained catch was correctly reported to NMFS. As a result, the monitoring and enforcement of this option would be more complicated and likely result in fewer violations being prosecuted relative to Option 2a of Alternative 2.

Fishing activities conducted under a salmon VIP would not affect any endangered or threatened species listed under the ESA in any manner not already considered in the recent formal and informal consultations conducted on the FMP and BSAI groundfish fishery.

The costs of implementing, monitoring and enforcing a salmon VIP would be high. The effectiveness of a VIP is severely undermined if adequate staff are not available to enforce the program and prosecute violations in a timely manner. Options 2b and 2c under Alternative 2 are designed to minimize the difficulties of "proving" a violation has taken place based on observer sampling data. However, additional staff would be required for any option under Alternative 2.

AGENDA D-2(b)
JUNE 1993
SUPPLEMENTAL



May 5, 1993

Dr. William Aron
NMFS/AFSC
7600 Sand Pt. Way NE
Bin C-157, Bldg. 4
Seattle, WA. 98115

Dear Bill,

The NPFMC is currently considering imposing a Vessel Incentive Program for salmon in the BSAI trawl fisheries. Dave Ackley has done a great deal of analysis of the haul by haul observer data, both in GIS format and statistical analysis. The statistical analysis employed a basic regression analysis of a variety of possible factors which might correlate with salmon bycatch. The results of that work did not yield any indication of significant correlations of the factors examined. In council discussion NOAA-GC, Lisa Lindeman, raised the question of the appropriateness of a VIP that requires fishers to change their behavior to reduce bycatch without any evidence that bycatch of salmon is correlated with identifiable behavior.

Given the statistical methodologies employed and the set of factors examined it is probably premature to conclude that such factors do not exist. However, before a VIP is implemented it is necessary to demonstrate not only do such factors exist but that they are behaviors over which fishers have a reasonable degree of control (i.e. Salmon bycatch is clearly correlated to the month being fished - January is bad, June is good - but pollock fishing is closed in June.).

In order to discover whether the basis for a VIP exists, a more intensive examination of the data set must be made. This can occur in one of two ways. We can continue on the current rather lengthy iterative process where staff examines certain factors and brings the results to the council, where the AP and SSC suggest further factors to be examined and methodologies to be employed. These suggestions may require new extractions of additional fields from the NORPAC data base; and the suggestions are of limited value, in that those making them are not able to view that data which is being analyzed. This is a bit like working inside a black box, and it leads to frustration on the part of those who want to see the council take action, as well as a perception that trawlers are attempting to stall the process by prolonging the analysis. Alternatively, the agency could make available to the public a 'sanitized' or anonymous version of the NORPAC data base so that independent analysts could work with the data.

The creation of a publicly accessible data base could be a one time operation that will provide a multi-purpose data source, if a broad enough range of data fields are included.

The following is a description of the fields which ought to be included in a public version of the NORPAC data base:
Record ID (haul/cruise #)
Gear code
Vessel category code
Date
Latitude
Longitude
Time of retrieval
Duration
Bottom Depth
Net Depth
Speed in Knots
Observer estimate of total catch
Sample size in Kg's
Groundfish species comp by #'s & Kg's (for each species for which there is a TAC)
PCs species comp by #'s and Kg's

To make the data set manageable for PC users it would be preferable to have it in subsets by year, management area (BSAI or GOA), mode (TALFF/JVP/DAP), and gear (trawl, hook, pot). Our immediate need for access to the data base relates to the salmon bycatch amendment before the council and as such priority should go to making available the Trawl BSAI data. It would also seem that any unresolved confidentiality questions would be more likely to pertain to domestic rather than foreign data, and perhaps work could begin on extracting and providing TALFF data (for which extensive precedent exists for releasing haul by haul data - see Sea Grant report 81-4). By setting up and debugging the programming to extract the TALFF data now, perhaps the remainder of the process will go more quickly when NOAA-GC provides the go-ahead on the JV & DAP data. The industry has made a commitment to make a good faith effort to respond to proposals for a salmon VIP at the June council meeting, but it is essential to have access to the haul by haul data in order to do so.

We would like to discuss with your staff in the Observer Program the details of the format of the data.

Thank you.

signed

AHSFA Kate Graham

AIF

AGDB Chris Blackburn (KG)

MTC Steve Hughes

AFTA

cc: Janet Wall / Jerry Berger
Lisa Lindeman / Susan Auer
Clarence Pautzke / Brent Payne
Steven Pennoyer / Sue Salveson

May 2,1993

To: Sue Salveson
From: dave fraser
Re: Salmon VIP

Lisa Lindeman raised an important question at the council meeting when she asked what fishers can do to reduce their bycatch of salmon. If it isn't something one has a reasonable level of control over, then it is hardly fair to impose punitive fines for having encountered a random event. There are several layers to examining this question.

The first step would be to re-examine the basic distribution of vessel/weeks by rate as per Norris's Nov. 29, 1991 paper submitted to the Dec. 1991 council meeting or the VIP discussion paper at the April 1993 meeting. A separate set of histograms should be done for those vessels which were whole-hauled vs. those which were basket sampled and vs. those which were partial whole-hauled. This would allow a comparison of the vessel/weeks distribution by rates between sampling modes to see if the "outliers" are an artifact of extrapolated data, or a reality.

If there are real "outliers" that sub-group should be examined to determine if the high bycatch rates are distributed randomly over the vessels within a fishery, or if there are consistent repeat offenders.

The next step would be a review of the "Fishermen's Guide" (Norris, et al Ap. 92) to look for avoidable patterns. My own appraisal isn't too promising. Time is the obvious factor which correlates to Chinook bycatch. July is the month with the lowest probability of Chinook bycatch; however under the Olympic system one does not have a choice of fishing in July. The "Guide" can also be used to look at area by month. Unfortunately, in a month like October the critical "horseshoe" block in the Mid-water Pollock fishery can have a 50/50 chance of being better or worse than the BSAI average (see Good/Bad Index). Other months such as March show a somewhat clearer pattern of good & bad areas, but when contrasted with CPUEs by block (Norris, et al Ap. 91) it is apparent that in the bad months there are few alternative areas to move to that have sustained any volume of catch at reasonable CPUE. If one is in the horseshoe area fishing bottom trawl pollock in September, moving away from the contour decrease the probability of Chinook encounters but raises the probability of halibut rates above the halibut VIP standard.

If there are time/area movements that fishers can reasonably be expected to make, the data must be reviewed on a finer resolution than the 1/2x1 degree block scale. This leads to the ~~third step which~~ is to expand on Dave Ackley's ~~work~~ in which he did basic regression analysis of several possible correlating factors over which fishers would have control. As the analysis for Amendment 21b indicates there are no apparent correlations of practical significance (pg. 2-49). However, i don't think this avenue has been exhausted. In talking with both Ackley and Norris it appears there are other regression techniques which may be better suited to the type of data with the characteristics of salmon bycatch rates. Also, there may be potential in looking at the synergistic effects of two factors. (i.e.: the rate may not significantly correlate with bottom depth though one would expect it to if contour is a surrogate for depth-but it may correlate with the interaction of the proximity of the net to bottom along a certain depth contour.)

This sort of analysis requires access to the haul by haul data, which is currently unavailable to the public for independent analysis. No individual fisher has compiled enough data through their own fishing activity to under-take a viable statistical analysis. However, the combination of the intuitive knowledge of fishers, with access to the full data set might lead to a more interactive ability to follow leads in the data than the tedious iterative process whereby the AP, SSC and others make suggestion to the council which then may or may not instruct the agency analysts to follow them up.

Even if the data were more intensively reviewed with more sophisticated statistical methodology, i have my doubts that strong correlations of factors contained within the fields of observer data will emerge. To carry this process through, additional "pallets" of information need to be examined in conjunction with the observer data in a combination statistical/GIS approach. This would allow extracting and exploring localized time/area subsets of the data to "scope" for factors that differ between a bad tow in an area and it's neighbors. Moving into a GIS approach would allow bringing in multiple pallets of other data such as sea surface temperature data, bottom contour data and tide/current data (these are the factors that lead to identifying upwellings, which salmon trollers who collect this sort of information intensively over the years will tell you is key to predicting where salmon may be).

Assuming this latter approach yielded positive results in showing salmon bycatch rates to have a predictable nature (aside from pollock and salmon being in the same general area during the A-season and separating during the closure between the A and B seasons) a question arises. Is the agency willing or able to collect and disseminate surface and bottom temperature data in a real time mode even if the industry willingly submitted it through the observer program?

Demonstrating the existence of predictable correlations over which fishers have control is likely to require an extensive and expensive analysis which is unlikely to yield useful results at its less complex levels. Imposing a penalty-based VIP, absent such positive results, is as Lisa Lindeman indicated difficult to justify. A research foundation funded as per the AP proposal may yield positive results over time if we don't get hung up on a demanding a quick fix.

ADDENDUM TO THE

PUBLIC REVIEW DRAFT

of the

# ENVIRONMENTAL ASSESSMENT
# and
# REGULATORY IMPACT REVIEW/
# INITIAL REGULATORY FLEXIBILITY ANALYSIS
# (EA/RIR/IRFA)

# OF A FISHERY MANAGEMENT PLAN AMENDMENT TO IMPLEMENT A VESSEL INCENTIVE PROGRAM TO REDUCE SALMON BYCATCH RATES IN THE BERING SEA AND ALEUTIAN ISLANDS AREA TRAWL FISHERIES

prepared by
National Marine Fisheries Service
Juneau, Alaska
June 15, 1993

## INTRODUCTION

A public review draft of the EA/RIR/IRFA prepared on alternatives for a salmon vessel incentive program (VIP) was distributed by the North Pacific Fishery Management Council (Council) on May 14, 1993. Since that time, additional analyses have been completed to explore the effect of observer sampling procedures (whole haul versus partial haul or basket sampling) on weekly counts of salmon and salmon bycatch rates. Additional analyses also were completed that explore the seasonal differences in salmon bycatch rates with respect to the derivation of appropriate salmon bycatch standards under a VIP. The purpose of this addendum is to present these analyses as they relate to Options 2a and 2b under Alternative 2 for a salmon VIP as presented in the EA/RIR/IRFA.

Questions exist on how various environmental, spatial, temporal, and operational factors affect salmon bycatch rates in the groundfish trawl fisheries. Analyses presented in the EA/RIR/IRFA prepared for Amendment 21b[1] (public review draft dated March 18, 1993) identify time/area closures that would reduce chinook salmon bycatch rates in the Bering Sea. Although other factors likely exist that exhibit a predictable correlation with salmon bycatch, additional analysis would be needed to identify these factors, especially those over which vessel operators have control. NMFS is preparing for public release a comprehensive database that includes haul by haul data that may be used by interested industry persons to further explore the existence of predictable correlations affecting salmon bycatch rates.

### Seasonality of salmon bycatch

The alternatives for a salmon VIP program would apply to all salmon species, although salmon bycatch in the groundfish trawl fisheries is composed predominately of chinook and chum salmon. The EA/RIR/IRFA prepared for Amendment 21b presents analyses of historical chinook salmon bycatch rate patterns that indicate bycatch rates of chinook salmon are lowest during May through September, and typically higher during fall and winter months. Conversely, bycatch rates of chum salmon tend to be higher during mid to late summer months.

In general, salmon bycatch rates (all species combined) tend to be lower during winter months relative to summer months (Figures 1 and 2). A relatively small number of vessel weeks during late summer months experienced very high bycatch amounts of chum salmon (300 or more salmon per week) that resulted in an overall

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[1] Amendment 21b to the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area.

summer bycatch rate (.0648 salmon per metric ton groundfish) that was about double that observed during winter months (.0343 salmon per metric ton groundfish). These data suggest that separate bycatch rate standards could be considered for winter/fall and summer months to better address the seasonality of salmon bycatch. These data also suggest that a salmon VIP to address the chinook salmon bycatch problem could be implemented during the fall and winter months of each year and that no salmon VIP be effective during summer months when chum salmon dominate salmon bycatch in the groundfish fisheries. This action would be consistent with the chinook salmon bycatch problem addressed under the analysis for Amendment 21b.

**ALTERNATIVES**

The problem statement and background for a salmon VIP and a description of the alternatives considered for this program are contained in the public review draft of the EA/RIR/IRFA dated May 14, 1993. For purposes of this addendum, however, Options 2a and 2b under Alternative 2 are restated below.

**Alternative 2: Implement a salmon VIP for the BSAI trawl fisheries.**

> **Option 2a.** Specify a salmon bycatch performance standard (observed number of salmon, all species combined) that a vessel would be allowed on a weekly basis, independent of catch. Incidental takes of salmon that exceed the standard would constitute a violation. Fines could be assessed for just exceeding the standard or for each salmon that was counted that exceeded the standard.
>
> **Option 2b.** Specify a salmon bycatch rate standard for all trawl fisheries based on the observed number of salmon, all species combined, and the amount of groundfish retained during a weekly reporting period. Vessels that exceed the specified bycatch rate standard during a week would be subject to prosecution as violators of the incentive program.

**ANALYSIS OF APPROPRIATE BYCATCH STANDARDS UNDER OPTIONS 2A AND 2B OF ALTERNATIVE 2**

In the analysis of Options 2a and 2b contained in the May 14 draft of the EA/RIR/IRFA, all 1992 observer data on salmon bycatch (i.e, non-extrapolated whole haul, partial haul, and basket sample data) were used to assess possible bycatch standards in terms of number of salmon per week (Option 2a) or number of salmon per metric ton of groundfish during a week

(Option 2b). Under both these options, all salmon observed in any haul, would be credited against any bycatch standard established under the VIP. Given this premise, concern was raised whether other than whole haul sample data should be considered when assessing possible salmon bycatch standards under Alternative 2.

Analysis of the 1992 observer data on BSAI salmon bycatch showed that 83.4 percent of the salmon counted by observers were observed in whole haul samples, although only about 40 percent of the observed hauls were sampled in this manner. Salmon bycatch data from the remainder of the sampled hauls were collected using basket or partial haul sampling procedures. Given that relatively few salmon occur in basket or partial haul samples relative to whole haul observations, non-extrapolated observer data would be expected to have a greater proportion of the total observed salmon attributed to whole haul data. Contrary to initial concerns, therefore, use of all 1992 observer data versus only whole haul data would not significantly affect the assessment of different bycatch rate standards under Alternative 2 because whole haul data predominates in either case. For purposes of this addendum, however, only whole haul data was used.

<u>Option 2a</u>. Under this option, a bycatch performance standard would be specified as a maximum number of salmon that could be observed during a weekly reporting period. Vessels that exceed the specified standard would be in violation of the VIP. For vessels delivering to shoreside processors or motherships, all observed salmon would be attributed to the weekly reporting period during which a vessel's groundfish catch was delivered to a processor.

During the winter/fall months of 1992 (January through April and October through December), a total of 5181 salmon were observed in whole haul samples. When vessel weeks are sorted by ascending number of salmon observed during a weekly reported period, the 11 vessel weeks experiencing 60 salmon or more accounted for 22 percent of the total salmon bycatch (Appendix 1 and Figure 3). These same vessel weeks accounted for less than 5 percent of the total groundfish catch in hauls that were whole haul sampled (Appendix 1 and Figure 4).

During the summer months of 1992 (May through September), a total of 17,288 salmon were observed in whole haul samples. When vessel weeks are sorted by ascending number of salmon observed during a weekly reported period, data indicate that relatively few vessels contributed to a disproportionately large amount of the observed salmon bycatch. Appendix 2 and Figure 5 show that 16 vessel weeks experiencing 300 salmon or more accounted for 53 percent of the total salmon bycatch. These same vessel weeks accounted for 4 percent of the total groundfish catch in hauls that were whole haul sampled (Appendix 2 and Figure 6).

Using the above examples as possible bycatch standards under Option 2a, four vessels experienced 2 violations each, and one vessel experienced three violations. The remaining 16 violations were experienced by different vessels. All but three of the 27 vessel weeks that would have been identified as violations during the 1992 trawl fisheries reflect catcher vessel operations that delivered to shoreside facilities. This is not unexpected for two reasons. First, catcher vessels delivering to shoreside facilities typically fish in near shore areas where salmon bycatch rates historically are high. Second, shoreside deliveries typically are whole haul sampled for salmon. Operations that are whole haul sampled have a greater probability of salmon bycatch being counted by an observer and being identified as a violator under the salmon VIP. Conversely, an at-sea operation that is typically basket sampled may have little chance of being identified as a violator of the salmon VIP, particularly if other observer duties prevent even a cursory examination of unsampled portions of the groundfish catch. Notwithstanding the equity issue that this situation may raise, concern also exists that the salmon VIP could frustrate initiatives by the NMFS Observer Program to increase the overall percentage of whole haul sampling in the groundfish fisheries.

Option 2b. Under this option, a bycatch rate standard would be specified as a maximum number of salmon per metric ton of retained groundfish catch during a weekly reporting period. During winter months, 17 vessel weeks that experienced weekly bycatch rates of 0.20 salmon per metric ton groundfish and higher accounted for almost 12 percent of the total winter salmon bycatch (Appendix 3, Figure 1). These same vessel weeks accounted for about 1 percent of the total groundfish catch in hauls that were whole haul sampled (Appendix 3, Figure 7).

During summer months, 19 vessel weeks that experienced weekly bycatch rates of 0.5 salmon per metric ton groundfish and higher accounted for 55 percent of the total summer salmon bycatch (Appendix 4, Figure 2). These same vessel weeks accounted for less than 4 percent of the total groundfish catch in hauls that were whole haul sampled (Appendix 4, Figure 8). Most of the salmon taken by these vessels were chum salmon.

Using the above examples as possible bycatch standards under Option 2b, four vessels experienced 2 violations each, and one vessel experienced three violations. The remaining 25 violations were experienced by different vessels. The 17 violations occurring during winter months were evenly distributed among catcher/processor (7 violations), mothership (6 violations) and shoreside (4 violations) operations. All of the 19 violations occurring during summer months were experienced by vessels delivering to shoreside operations.

**Summary**

The analyses presented in this addendum to the EA/RIR/IRFA prepared on alternatives for a salmon VIP show that most (83 percent) of the salmon bycatch observed in 1992 was observed in whole haul samples. Thus, the data used in the May 14 draft of the EA/RIR/IRFA that included other than whole haul observer would not yield significantly different results from those presented in this addendum. Bycatch rates of chinook salmon and chum salmon vary seasonally (i.e, chum bycatch rates are highest in summer months, whereas chinook salmon bycatch rates are lowest during this period). These differences could justify separate bycatch standards for summer and winter/fall months. Based on 1992 data, examples of bycatch standards are summarized below that would address unusually high salmon bycatch rates.

| | Option 2a (number of salmon/week) | Option 2b (weekly bycatch rate) |
|---|---|---|
| Bycatch Standard | | |
| Summer | 300 | 0.50 |
| Winter/Fall | 60 | 0.20 |
| Violations | | |
| Summer | 16 | 19 |
| Winter/Fall | 11 | 17 |
| Percent of total salmon bycatch attributed to vessels fishing at the bycatch standard and higher | | |
| Summer | 53 | 55 |
| Winter/Fall | 22 | 12 |
| Percent of total groundfish catch attributed to vessels fishing at the bycatch standard and higher | | |
| Summer | 4 | 4 |
| Winter/Fall | 5 | 1 |

The seasonality of chinook salmon bycatch analyzed in the EA/RIR/IRFA for Amendment 21b suggests that a salmon VIP could be implemented only during winter and fall months to address the chinook salmon bycatch problem. A salmon VIP implemented for summer months would address chum salmon bycatch in the groundfish fisheries, even though this bycatch has not been identified by the Council as a significant bycatch problem. Groundfish operations included under a salmon VIP implemented only for winter and fall months would benefit from the analyses presented in the EA/RIR/IRFA prepared for Amendment 21b that identify time/area patterns where high chinook salmon bycatch rates historically have occurred. Constraining a salmon VIP to winter and fall months also partially addresses equity concerns that are raised if catcher vessels delivering to shoreside operations are more prone to be identified as violators of a salmon VIP relative to at-sea operations. This potential inequity is especially apparent during summer months when, based on 1992 observer data, most of the salmon bycatch is composed of chum salmon taken incidentally by vessels delivering to shoreside operations.

FIGURE 1. Percentage of the total salmon bycatch observed in winter months that vessels fishing at different bycatch rates contribute towards

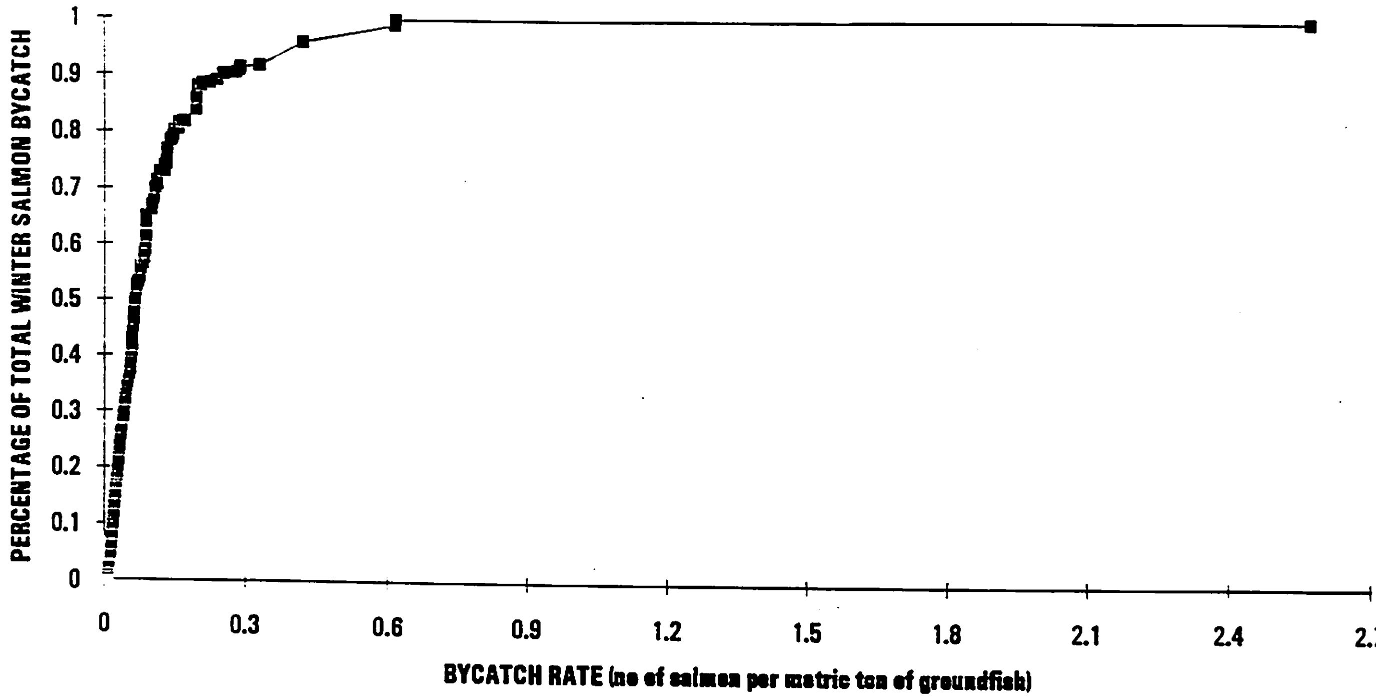



FIGURE 2. Percentage of the total salmon bycatch observed during May - September 1992 contributed by vessels fishing at and below ascending weekly bycatch rates.

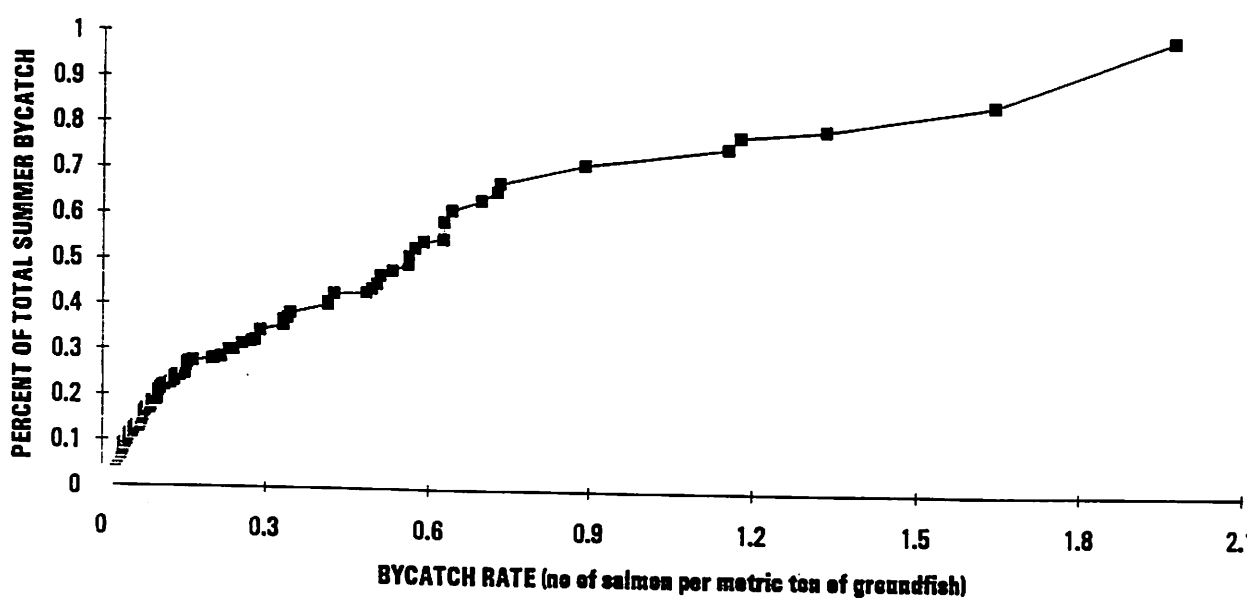


FIGURE 3. Contribution that individual vessel bycatch amounts, sorted in ascending order, made to the cumulative salmon bycatch amount during winter months 1992. Total observed winter bycatch in whole haul samples equaled 5,181 fish

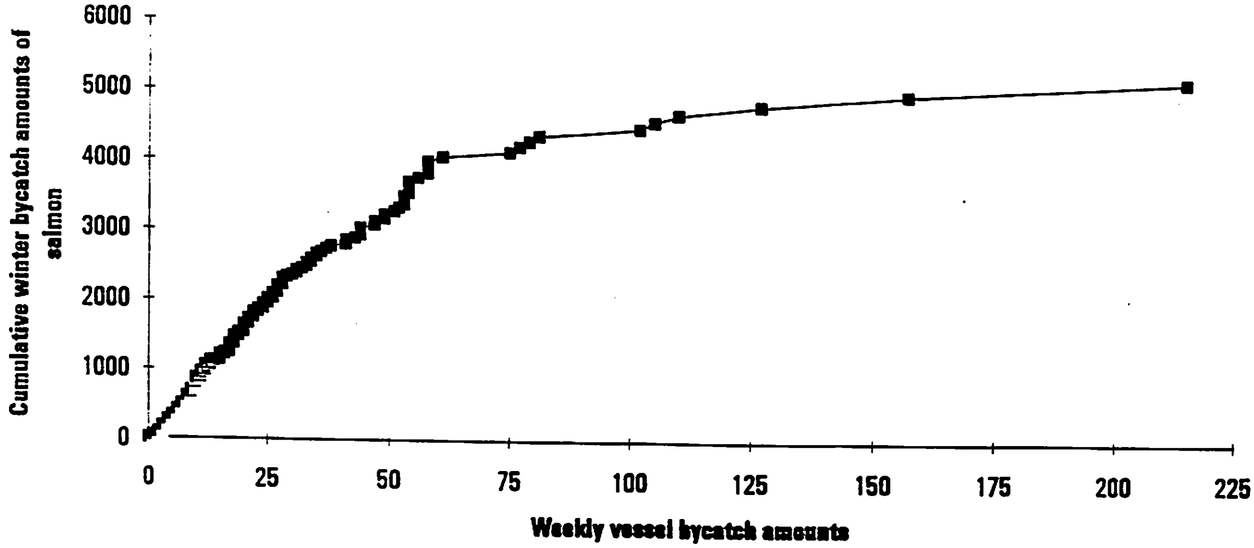



FIGURE 4. Percentage of the total 1992 groundfish catch in whole haul samples during winter months associated with ascending weekly vessel salmon bycatch amounts.

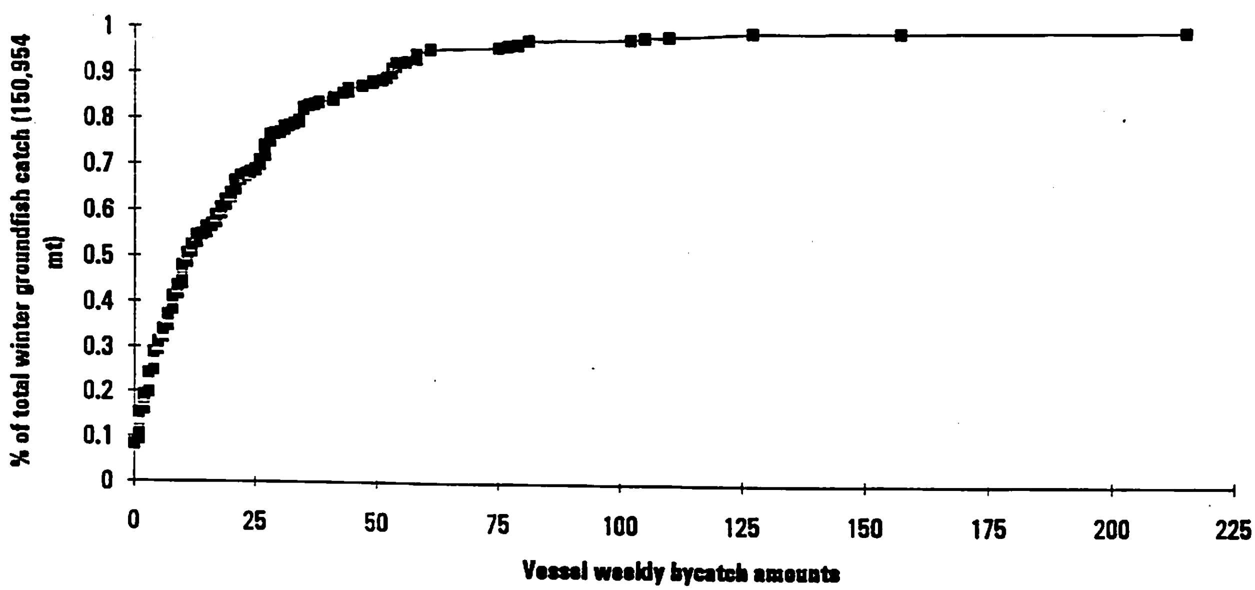


FIGURE 5. Contribution that ascending individual vessel weekly bycatch amounts made to the cumulative salmon bycatch amount during May through September 1992. Total observed summer bycatch in whole haul samples equaled 17,288 fish.

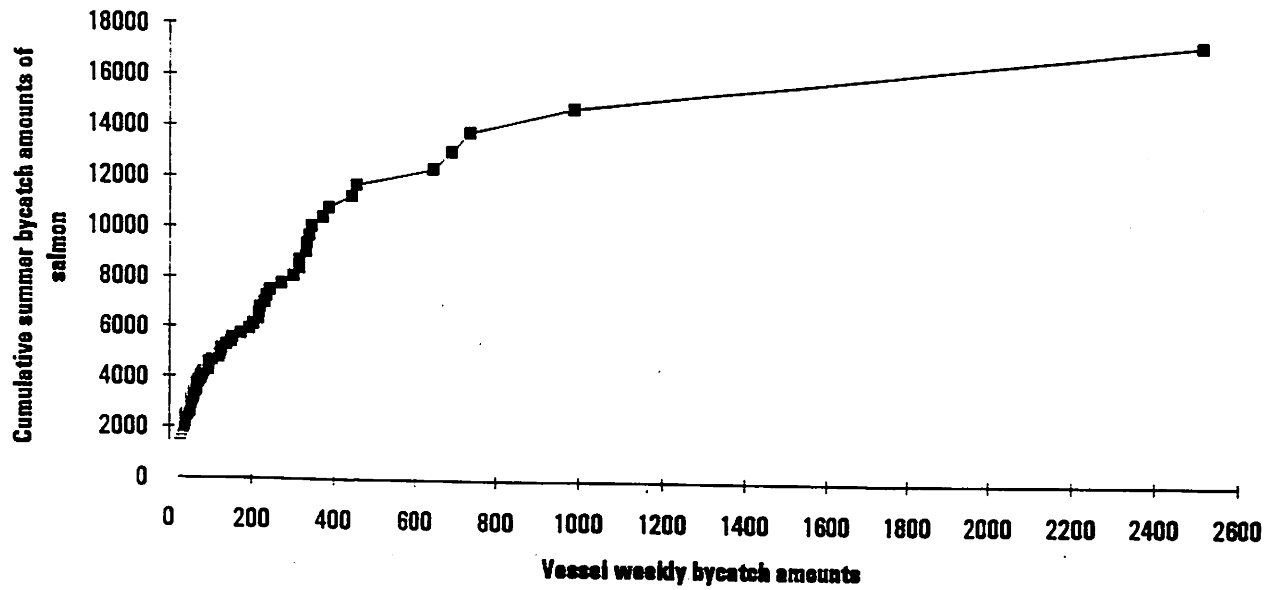



FIGURE 6. Percentage of the total 1992 groundfish catch in whole haul samples during May through September associated with ascending weekly vessel salmon bycatch amounts.

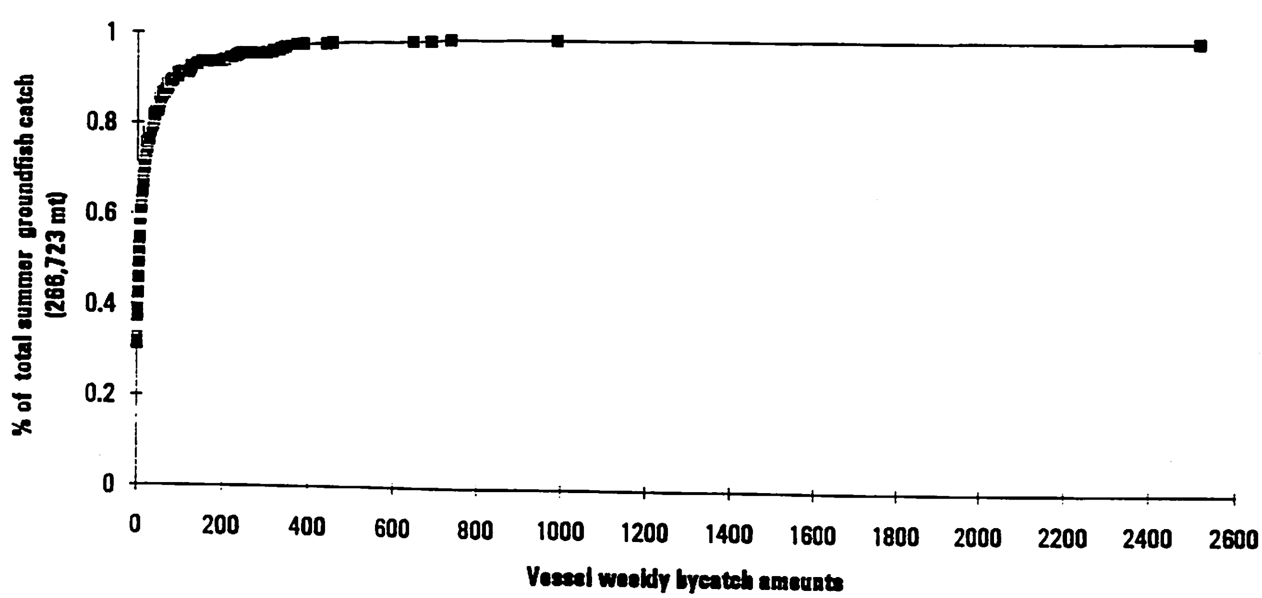


**FIGURE 7. Percentage of the total 1992 groundfish catch in whole haul samples during winter months associated with ascending weekly vessel salmon bycatch rates**

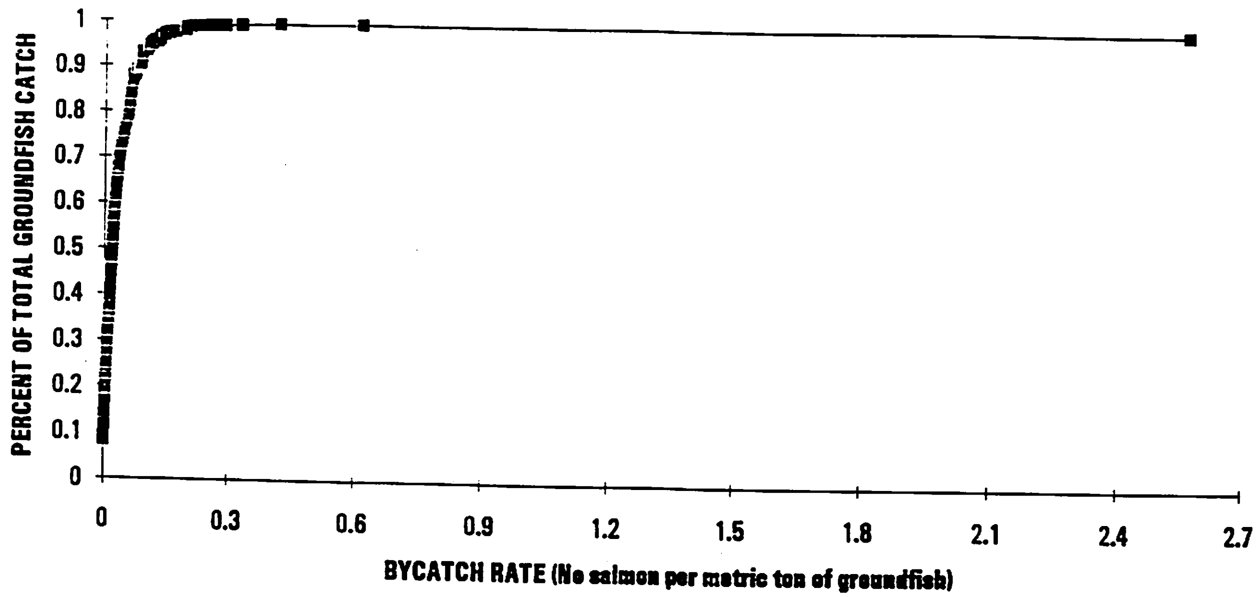
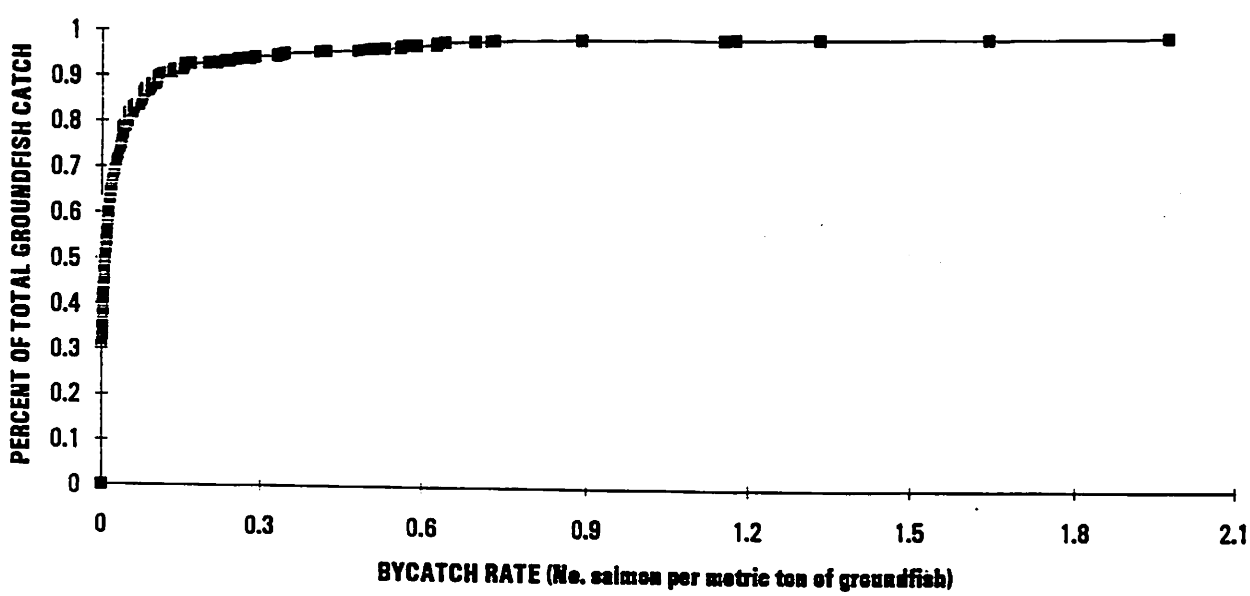



**FIGURE 8. Percentage of the total 1992 groundfish catch in whole haul samples during May through September associated with ascending weekly vessel salmon bycatch rates**



Appendices 1 - 4.

## 1992 SALMON BYCATCH AMOUNTS AND RATES FOR BSAI TRAWL VESSELS BASED ON WHOLE HAUL OBSERVER DATA

TARGET = target groundfish fishery:
- P - midwater pollock
- B - Bottom pollock
- C - Pacific cod

MODE = Processor mode
- P = Factory trawler
- M = Catcher vessels delivering to motherships
- F = Catcher vessels delivering to shoreside facilities

GRDF.TONS = Total weekly observer estimates of groundfish catch in whole haul samples

CUM GRDF.TONS = Cumulative groundfish catch amounts listed in ascending order of either ascending weekly vessel salmon bycatch amounts (Appendices 1 and 2) or salmon bycatch rates (Appendices 3 and 4).

% CUM TONS - The percentage of total observed groundfish catch contributed by vessels fishing at and below ascending salmon bycatch amounts or rates

# SALMON - Total weekly observer counts of all salmon in whole haul samples

CUM #SAL - Cumulative salmon bycatch amounts listed in ascending order of either salmon bycatch amounts or salmon bycatch rates

SAL.RATE - Salmon bycatch rate (# SALMON/GRDF.TONS)

% CUM #SAL - The percentage of total observed salmon bycatch contributed by vessels fishing at and below ascending salmon bycatch amounts or rates.

| APPENDIX 1. VESSEL SPECIFIC WEEKLY SALMON BYCATCH AMOUNTS AND RATES DURING WINTER MONTHS, 1992. DATA SORTED BY ASCENDING BYCATCH AMOUNT. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
| Harvest with 0 salmon | | 12337.3 | 12337.3 | 0.081729 | 0 | 0 | 0 | 0 |
| P | P | 1849.9 | 14187.2 | 0.093984 | 1 | 1 | 0.000541 | 0.000193013 |
| P | P | 645.9 | 14833.1 | 0.098263 | 1 | 2 | 0.001548 | 0.000386026 |
| P | F | 639.5 | 15472.6 | 0.102499 | 1 | 3 | 0.001564 | 0.000579039 |
| C | F | 593.9 | 16066.5 | 0.106433 | 1 | 4 | 0.001684 | 0.000772052 |
| P | M | 521.8 | 16588.3 | 0.10989 | 1 | 5 | 0.001916 | 0.000965065 |
| C | F | 441.5 | 17029.8 | 0.112815 | 1 | 6 | 0.002265 | 0.001158078 |
| P | F | 437.2 | 17467.0 | 0.115711 | 1 | 7 | 0.002287 | 0.001351091 |
| P | F | 426.3 | 17893.3 | 0.118535 | 1 | 8 | 0.002346 | 0.001544103 |
| C | F | 414.3 | 18307.6 | 0.12128 | 1 | 9 | 0.002414 | 0.001737116 |
| C | F | 412.6 | 18720.2 | 0.124013 | 1 | 10 | 0.002424 | 0.001930129 |
| P | F | 362.8 | 19083.0 | 0.126416 | 1 | 11 | 0.002756 | 0.002123142 |
| P | M | 351.8 | 19434.8 | 0.128747 | 1 | 12 | 0.002843 | 0.002316155 |
| P | P | 315.5 | 19750.3 | 0.130837 | 1 | 13 | 0.00317 | 0.002509168 |
| P | P | 255.6 | 20005.9 | 0.13253 | 1 | 14 | 0.003912 | 0.002702181 |
| C | F | 249.9 | 20255.8 | 0.134186 | 1 | 15 | 0.004002 | 0.002895194 |
| C | F | 246.7 | 20502.5 | 0.13582 | 1 | 16 | 0.004054 | 0.003088207 |
| C | M | 244.8 | 20747.3 | 0.137441 | 1 | 17 | 0.004085 | 0.00328122 |
| C | F | 218.3 | 20965.6 | 0.138888 | 1 | 18 | 0.004581 | 0.003474233 |
| P | F | 194.6 | 21160.2 | 0.140177 | 1 | 19 | 0.005139 | 0.003667246 |
| P | P | 178.8 | 21339.0 | 0.141361 | 1 | 20 | 0.005593 | 0.003860259 |
| P | P | 178.2 | 21517.2 | 0.142542 | 1 | 21 | 0.005612 | 0.004053272 |
| C | M | 144.4 | 21661.6 | 0.143498 | 1 | 22 | 0.006925 | 0.004246285 |
| P | P | 140.0 | 21801.6 | 0.144426 | 1 | 23 | 0.007143 | 0.004439297 |
| C | M | 133.0 | 21934.6 | 0.145307 | 1 | 24 | 0.007519 | 0.00463231 |
| P | M | 118.4 | 22053.0 | 0.146091 | 1 | 25 | 0.008446 | 0.004825323 |
| C | M | 114.2 | 22167.2 | 0.146848 | 1 | 26 | 0.008757 | 0.005018336 |
| P | M | 110.6 | 22277.8 | 0.14758 | 1 | 27 | 0.009042 | 0.005211349 |
| P | F | 100.4 | 22378.2 | 0.148245 | 1 | 28 | 0.00996 | 0.005404362 |
| P | P | 92.8 | 22471.0 | 0.14886 | 1 | 29 | 0.010776 | 0.005597375 |
| P | P | 74.3 | 22545.3 | 0.149352 | 1 | 30 | 0.013459 | 0.005790388 |
| P | P | 58.2 | 22603.5 | 0.149738 | 1 | 31 | 0.017182 | 0.005983401 |
| P | P | 54.4 | 22657.9 | 0.150098 | 1 | 32 | 0.018382 | 0.006176414 |
| P | M | 42.0 | 22699.9 | 0.150377 | 1 | 33 | 0.02381 | 0.006369427 |
| P | P | 41.9 | 22741.8 | 0.150654 | 1 | 34 | 0.023866 | 0.00656244 |
| P | P | 36.8 | 22778.6 | 0.150898 | 1 | 35 | 0.027174 | 0.006755453 |
| C | P | 35.3 | 22813.9 | 0.151132 | 1 | 36 | 0.028329 | 0.006948466 |
| C | P | 33.8 | 22847.7 | 0.151356 | 1 | 37 | 0.029586 | 0.007141478 |
| P | P | 29.9 | 22877.6 | 0.151554 | 1 | 38 | 0.033445 | 0.007334491 |
| P | M | 25.1 | 22902.7 | 0.15172 | 1 | 39 | 0.039841 | 0.007527504 |
| B | M | 24.5 | 22927.2 | 0.151882 | 1 | 40 | 0.040816 | 0.007720517 |
| P | P | 13.4 | 22940.6 | 0.151971 | 1 | 41 | 0.074627 | 0.00791353 |
| B | P | 5.9 | 22946.5 | 0.15201 | 1 | 42 | 0.169492 | 0.008106543 |
| P | P | 1420.0 | 24366.5 | 0.161417 | 2 | 44 | 0.001408 | 0.008492569 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 1049.1 | 25415.6 | 0.168367 | 2 | 46 | 0.001906 | 0.008878595 |
| P | M | 675.2 | 26090.8 | 0.17284 | 2 | 48 | 0.002962 | 0.009264621 |
| P | M | 333.0 | 26423.8 | 0.175046 | 2 | 50 | 0.006006 | 0.009650647 |
| P | F | 308.4 | 26732.2 | 0.177089 | 2 | 52 | 0.006485 | 0.010036672 |
| B | F | 279.0 | 27011.2 | 0.178937 | 2 | 54 | 0.007168 | 0.010422698 |
| P | P | 256.7 | 27267.9 | 0.180638 | 2 | 56 | 0.007791 | 0.010808724 |
| P | M | 256.5 | 27524.4 | 0.182337 | 2 | 58 | 0.007797 | 0.01119475 |
| P | F | 252.0 | 27776.4 | 0.184006 | 2 | 60 | 0.007937 | 0.011580776 |
| C | M | 228.0 | 28004.4 | 0.185516 | 2 | 62 | 0.008772 | 0.011966802 |
| P | P | 202.8 | 28207.2 | 0.18686 | 2 | 64 | 0.009862 | 0.012352828 |
| P | M | 161.7 | 28368.9 | 0.187931 | 2 | 66 | 0.012369 | 0.012738854 |
| P | P | 142.9 | 28511.8 | 0.188878 | 2 | 68 | 0.013996 | 0.013124879 |
| P | M | 82.8 | 28594.6 | 0.189426 | 2 | 70 | 0.024155 | 0.013510905 |
| C | M | 66.9 | 28661.5 | 0.189869 | 2 | 72 | 0.029895 | 0.013896931 |
| P | P | 60.9 | 28722.4 | 0.190273 | 2 | 74 | 0.032841 | 0.014282957 |
| P | M | 52.0 | 28774.4 | 0.190617 | 2 | 76 | 0.038462 | 0.014668983 |
| P | P | 47.5 | 28821.9 | 0.190932 | 2 | 78 | 0.042105 | 0.015055009 |
| P | F | 46.4 | 28868.3 | 0.191239 | 2 | 80 | 0.043103 | 0.015441035 |
| P | P | 38.6 | 28906.9 | 0.191495 | 2 | 82 | 0.051813 | 0.01582706 |
| P | M | 34.0 | 28940.9 | 0.19172 | 2 | 84 | 0.058824 | 0.016213086 |
| P | P | 10.0 | 28950.9 | 0.191787 | 2 | 86 | 0.2 | 0.016599112 |
| P | M | 1088.0 | 30038.9 | 0.198994 | 3 | 89 | 0.002757 | 0.017178151 |
| P | F | 952.9 | 30991.8 | 0.205307 | 3 | 92 | 0.003148 | 0.01775719 |
| P | F | 538.2 | 31530.0 | 0.208872 | 3 | 95 | 0.005574 | 0.018336229 |
| P | F | 459.9 | 31989.9 | 0.211919 | 3 | 98 | 0.006523 | 0.018915267 |
| P | F | 405.4 | 32395.3 | 0.214604 | 3 | 101 | 0.0074 | 0.019494306 |
| P | P | 380.4 | 32775.7 | 0.217124 | 3 | 104 | 0.007886 | 0.020073345 |
| P | M | 370.9 | 33146.6 | 0.219581 | 3 | 107 | 0.008088 | 0.020652384 |
| B | P | 358.5 | 33505.1 | 0.221956 | 3 | 110 | 0.008368 | 0.021231423 |
| P | M | 306.0 | 33811.1 | 0.223983 | 3 | 113 | 0.009804 | 0.021810461 |
| P | P | 274.2 | 34085.3 | 0.2258 | 3 | 116 | 0.010941 | 0.0223895 |
| P | M | 249.3 | 34334.6 | 0.227451 | 3 | 119 | 0.012034 | 0.022968539 |
| C | F | 201.0 | 34535.6 | 0.228783 | 3 | 122 | 0.014925 | 0.023547578 |
| P | F | 199.8 | 34735.4 | 0.230106 | 3 | 125 | 0.015015 | 0.024126616 |
| P | F | 179.9 | 34915.3 | 0.231298 | 3 | 128 | 0.016676 | 0.024705655 |
| P | M | 170.8 | 35086.1 | 0.23243 | 3 | 131 | 0.017564 | 0.025284694 |
| B | F | 158.0 | 35244.1 | 0.233476 | 3 | 134 | 0.018987 | 0.025863733 |
| P | M | 150.4 | 35394.5 | 0.234473 | 3 | 137 | 0.019947 | 0.026442772 |
| P | M | 149.2 | 35543.7 | 0.235461 | 3 | 140 | 0.020107 | 0.02702181 |
| B | F | 138.6 | 35682.3 | 0.236379 | 3 | 143 | 0.021645 | 0.027600849 |
| P | M | 121.8 | 35804.1 | 0.237186 | 3 | 146 | 0.024631 | 0.028179888 |
| C | F | 116.9 | 35921.0 | 0.23796 | 3 | 149 | 0.025663 | 0.028758927 |
| P | M | 111.3 | 36032.3 | 0.238698 | 3 | 152 | 0.026954 | 0.029337966 |
| C | P | 89.5 | 36121.8 | 0.239291 | 3 | 155 | 0.03352 | 0.029917004 |
| P | P | 84.9 | 36206.7 | 0.239853 | 3 | 158 | 0.035336 | 0.030496043 |
| C | M | 83.5 | 36290.2 | 0.240406 | 3 | 161 | 0.035928 | 0.031075082 |
| P | P | 78.5 | 36368.7 | 0.240926 | 3 | 164 | 0.038217 | 0.031654121 |
| P | M | 36.0 | 36404.7 | 0.241165 | 3 | 167 | 0.083333 | 0.03223316 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| C | P | 34.4 | 36439.1 | 0.241393 | 3 | 170 | 0.087209 | 0.032812198 |
| P | P | 18.0 | 36457.1 | 0.241512 | 3 | 173 | 0.166667 | 0.033391237 |
| P | P | 11.8 | 36468.9 | 0.24159 | 3 | 176 | 0.254237 | 0.033970276 |
| P | F | 1244.4 | 37713.3 | 0.249834 | 4 | 180 | 0.003214 | 0.034742328 |
| P | F | 1054.5 | 38767.8 | 0.256819 | 4 | 184 | 0.003793 | 0.035514379 |
| P | F | 972.0 | 39739.8 | 0.263258 | 4 | 188 | 0.004115 | 0.036286431 |
| P | F | 549.1 | 40288.9 | 0.266896 | 4 | 192 | 0.007285 | 0.037058483 |
| P | F | 347.8 | 40636.7 | 0.2692 | 4 | 196 | 0.011501 | 0.037830535 |
| P | M | 321.4 | 40958.1 | 0.271329 | 4 | 200 | 0.012446 | 0.038602586 |
| P | M | 320.5 | 41278.6 | 0.273452 | 4 | 204 | 0.01248 | 0.039374638 |
| P | P | 306.7 | 41585.3 | 0.275484 | 4 | 208 | 0.013042 | 0.04014669 |
| P | M | 237.0 | 41822.3 | 0.277054 | 4 | 212 | 0.016878 | 0.040918742 |
| P | M | 206.2 | 42028.5 | 0.27842 | 4 | 216 | 0.019399 | 0.041690793 |
| P | F | 175.4 | 42203.9 | 0.279582 | 4 | 220 | 0.022805 | 0.042462845 |
| P | M | 168.4 | 42372.3 | 0.280697 | 4 | 224 | 0.023753 | 0.043234897 |
| C | F | 164.7 | 42537.0 | 0.281788 | 4 | 228 | 0.024287 | 0.044006948 |
| P | P | 164.3 | 42701.3 | 0.282877 | 4 | 232 | 0.024346 | 0.044779 |
| P | P | 151.7 | 42853.0 | 0.283882 | 4 | 236 | 0.026368 | 0.045551052 |
| B | P | 121.3 | 42974.3 | 0.284685 | 4 | 240 | 0.032976 | 0.046323104 |
| C | F | 118.9 | 43093.2 | 0.285473 | 4 | 244 | 0.033642 | 0.047095155 |
| P | P | 92.5 | 43185.7 | 0.286086 | 4 | 248 | 0.043243 | 0.047867207 |
| C | F | 90.7 | 43276.4 | 0.286687 | 4 | 252 | 0.044101 | 0.048639259 |
| P | M | 65.5 | 43341.9 | 0.28712 | 4 | 256 | 0.061069 | 0.049411311 |
| B | P | 60.2 | 43402.1 | 0.287519 | 4 | 260 | 0.066445 | 0.050183362 |
| C | M | 51.2 | 43453.3 | 0.287858 | 4 | 264 | 0.078125 | 0.050955414 |
| P | P | 47.7 | 43501.0 | 0.288174 | 4 | 268 | 0.083857 | 0.051727466 |
| P | F | 890.7 | 44391.7 | 0.294075 | 5 | 273 | 0.005614 | 0.05269253 |
| P | F | 683.4 | 45075.1 | 0.298602 | 5 | 278 | 0.007316 | 0.053657595 |
| B | F | 449.1 | 45524.2 | 0.301577 | 5 | 283 | 0.011133 | 0.05462266 |
| P | P | 246.2 | 45770.4 | 0.303208 | 5 | 288 | 0.020309 | 0.055587724 |
| P | P | 234.5 | 46004.9 | 0.304762 | 5 | 293 | 0.021322 | 0.056552789 |
| P | P | 199.9 | 46204.8 | 0.306086 | 5 | 298 | 0.025013 | 0.057517854 |
| P | M | 159.9 | 46364.7 | 0.307145 | 5 | 303 | 0.03127 | 0.058482918 |
| P | P | 158.5 | 46523.2 | 0.308195 | 5 | 308 | 0.031546 | 0.059447983 |
| P | F | 81.2 | 46604.4 | 0.308733 | 5 | 313 | 0.061576 | 0.060413048 |
| B | M | 73.3 | 46677.7 | 0.309219 | 5 | 318 | 0.068213 | 0.061378112 |
| C | F | 59.1 | 46736.8 | 0.30961 | 5 | 323 | 0.084602 | 0.062343177 |
| C | P | 56.6 | 46793.4 | 0.309985 | 5 | 328 | 0.088339 | 0.063308242 |
| C | P | 24.3 | 46817.7 | 0.310146 | 5 | 333 | 0.205761 | 0.064273306 |
| P | M | 20.9 | 46838.6 | 0.310285 | 5 | 338 | 0.239234 | 0.065238371 |
| P | P | 1687.0 | 48525.6 | 0.32146 | 6 | 344 | 0.003557 | 0.066396449 |
| P | P | 669.7 | 49195.3 | 0.325897 | 6 | 350 | 0.008959 | 0.067554526 |
| B | F | 367.9 | 49563.2 | 0.328334 | 6 | 356 | 0.016309 | 0.068712604 |
| P | P | 265.9 | 49829.1 | 0.330095 | 6 | 362 | 0.022565 | 0.069870681 |
| C | P | 224.7 | 50053.8 | 0.331584 | 6 | 368 | 0.026702 | 0.071028759 |
| P | M | 194.9 | 50248.7 | 0.332875 | 6 | 374 | 0.030785 | 0.072186837 |
| P | M | 165.6 | 50414.3 | 0.333972 | 6 | 380 | 0.036232 | 0.073344914 |
| B | M | 159.4 | 50573.7 | 0.335028 | 6 | 386 | 0.037641 | 0.074502992 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| P | M | 155.3 | 50729.0 | 0.336057 | 6 | 392 | 0.038635 | 0.075661069 |
| P | M | 121.5 | 50850.5 | 0.336862 | 6 | 398 | 0.049383 | 0.076819147 |
| P | P | 102.2 | 50952.7 | 0.337539 | 6 | 404 | 0.058708 | 0.077977224 |
| B | F | 93.1 | 51045.8 | 0.338155 | 6 | 410 | 0.064447 | 0.079135302 |
| P | P | 73.8 | 51119.6 | 0.338644 | 6 | 416 | 0.081301 | 0.08029338 |
| P | F | 1203.7 | 52323.3 | 0.346618 | 7 | 423 | 0.005815 | 0.08164447 |
| P | M | 864.0 | 53187.3 | 0.352342 | 7 | 430 | 0.008102 | 0.082995561 |
| B | M | 470.9 | 53658.2 | 0.355461 | 7 | 437 | 0.014865 | 0.084346651 |
| P | M | 394.2 | 54052.4 | 0.358073 | 7 | 444 | 0.017757 | 0.085697742 |
| P | P | 331.1 | 54383.5 | 0.360266 | 7 | 451 | 0.021142 | 0.087048832 |
| B | F | 315.2 | 54698.7 | 0.362354 | 7 | 458 | 0.022208 | 0.088399923 |
| P | F | 272.1 | 54970.8 | 0.364157 | 7 | 465 | 0.025726 | 0.089751013 |
| P | P | 250.9 | 55221.7 | 0.365819 | 7 | 472 | 0.0279 | 0.091102104 |
| C | P | 244.0 | 55465.7 | 0.367435 | 7 | 479 | 0.028689 | 0.092453194 |
| P | P | 157.5 | 55623.2 | 0.368479 | 7 | 486 | 0.044444 | 0.093804285 |
| C | M | 152.0 | 55775.2 | 0.369485 | 7 | 493 | 0.046053 | 0.095155375 |
| P | P | 109.1 | 55884.3 | 0.370208 | 7 | 500 | 0.064161 | 0.096506466 |
| P | P | 35.9 | 55920.2 | 0.370446 | 7 | 507 | 0.194986 | 0.097857556 |
| P | P | 1963.4 | 57883.6 | 0.383453 | 8 | 515 | 0.004075 | 0.09940166 |
| P | P | 896.0 | 58779.6 | 0.389388 | 8 | 523 | 0.008929 | 0.100945763 |
| P | M | 577.8 | 59357.4 | 0.393216 | 8 | 531 | 0.013846 | 0.102489867 |
| P | M | 574.6 | 59932.0 | 0.397022 | 8 | 539 | 0.013923 | 0.10403397 |
| P | M | 485.1 | 60417.1 | 0.400236 | 8 | 547 | 0.016491 | 0.105578074 |
| P | F | 421.2 | 60838.3 | 0.403026 | 8 | 555 | 0.018993 | 0.107122177 |
| P | M | 418.6 | 61256.9 | 0.405799 | 8 | 563 | 0.019111 | 0.108666281 |
| P | P | 170.9 | 61427.8 | 0.406931 | 8 | 571 | 0.046811 | 0.110210384 |
| P | F | 157.7 | 61585.5 | 0.407976 | 8 | 579 | 0.050729 | 0.111754488 |
| P | P | 146.7 | 61732.2 | 0.408948 | 8 | 587 | 0.054533 | 0.113298591 |
| P | M | 139.2 | 61871.4 | 0.40987 | 8 | 595 | 0.057471 | 0.114842694 |
| P | P | 62.9 | 61934.3 | 0.410287 | 8 | 603 | 0.127186 | 0.116386798 |
| C | F | 35.7 | 61970.0 | 0.410523 | 8 | 611 | 0.22409 | 0.117930901 |
| P | F | 1166.4 | 63136.4 | 0.41825 | 9 | 620 | 0.007716 | 0.119668018 |
| P | F | 1066.1 | 64202.5 | 0.425313 | 9 | 629 | 0.008442 | 0.121405134 |
| B | P | 384.8 | 64587.3 | 0.427862 | 9 | 638 | 0.023389 | 0.123142251 |
| P | F | 373.5 | 64960.8 | 0.430336 | 9 | 647 | 0.024096 | 0.124879367 |
| P | M | 202.4 | 65163.2 | 0.431677 | 9 | 656 | 0.044466 | 0.126616483 |
| P | M | 161.7 | 65324.9 | 0.432748 | 9 | 665 | 0.055659 | 0.1283536 |
| B | P | 159.0 | 65483.9 | 0.433801 | 9 | 674 | 0.056604 | 0.130090716 |
| P | M | 86.4 | 65570.3 | 0.434374 | 9 | 683 | 0.104167 | 0.131827832 |
| C | P | 3.5 | 65573.8 | 0.434397 | 9 | 692 | 2.571429 | 0.133564949 |
| P | M | 911.5 | 66485.3 | 0.440435 | 10 | 702 | 0.010971 | 0.135495078 |
| P | F | 653.3 | 67138.6 | 0.444763 | 10 | 712 | 0.015307 | 0.137425207 |
| P | F | 629.6 | 67768.2 | 0.448934 | 10 | 722 | 0.015883 | 0.139355337 |
| P | M | 626.7 | 68394.9 | 0.453085 | 10 | 732 | 0.015957 | 0.141285466 |
| P | M | 458.1 | 68853.0 | 0.45612 | 10 | 742 | 0.021829 | 0.143215595 |
| P | P | 427.1 | 69280.1 | 0.458949 | 10 | 752 | 0.023414 | 0.145145725 |
| B | F | 426.1 | 69706.2 | 0.461772 | 10 | 762 | 0.023469 | 0.147075854 |
| P | P | 406.3 | 70112.5 | 0.464464 | 10 | 772 | 0.024612 | 0.149005983 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| P | M | 401.7 | 70514.2 | 0.467125 | 10 | 782 | 0.024894 | 0.150936113 |
| P | M | 325.8 | 70840.0 | 0.469283 | 10 | 792 | 0.030694 | 0.152866242 |
| B | F | 310.5 | 71150.5 | 0.47134 | 10 | 802 | 0.032206 | 0.154796371 |
| P | F | 299.4 | 71449.9 | 0.473323 | 10 | 812 | 0.0334 | 0.156726501 |
| P | M | 253.5 | 71703.4 | 0.475003 | 10 | 822 | 0.039448 | 0.15865663 |
| P | M | 200.8 | 71904.2 | 0.476333 | 10 | 832 | 0.049801 | 0.160586759 |
| P | M | 113.4 | 72017.6 | 0.477084 | 10 | 842 | 0.088183 | 0.162516889 |
| P | P | 92.7 | 72110.3 | 0.477698 | 10 | 852 | 0.107875 | 0.164447018 |
| P | P | 64.2 | 72174.5 | 0.478123 | 10 | 862 | 0.155763 | 0.166377147 |
| B | M | 60.6 | 72235.1 | 0.478525 | 10 | 872 | 0.165017 | 0.168307277 |
| P | F | 1205.3 | 73440.4 | 0.486509 | 11 | 883 | 0.009126 | 0.170430419 |
| P | M | 844.3 | 74284.7 | 0.492103 | 11 | 894 | 0.013029 | 0.172553561 |
| P | F | 784.9 | 75069.6 | 0.497302 | 11 | 905 | 0.014015 | 0.174676703 |
| P | M | 395.9 | 75465.5 | 0.499925 | 11 | 916 | 0.027785 | 0.176799846 |
| B | M | 321.4 | 75786.9 | 0.502054 | 11 | 927 | 0.034225 | 0.178922988 |
| P | M | 243.8 | 76030.7 | 0.503669 | 11 | 938 | 0.045119 | 0.18104613 |
| P | M | 160.0 | 76190.7 | 0.504729 | 11 | 949 | 0.06875 | 0.183169272 |
| P | F | 130.5 | 76321.2 | 0.505593 | 11 | 960 | 0.084291 | 0.185292415 |
| P | F | 639.2 | 76960.4 | 0.509828 | 12 | 972 | 0.018773 | 0.18760857 |
| P | F | 572.8 | 77533.2 | 0.513622 | 12 | 984 | 0.02095 | 0.189924725 |
| P | P | 549.6 | 78082.8 | 0.517263 | 12 | 996 | 0.021834 | 0.19224088 |
| P | M | 395.0 | 78477.8 | 0.51988 | 12 | 1008 | 0.03038 | 0.194557035 |
| P | F | 363.4 | 78841.2 | 0.522287 | 12 | 1020 | 0.033021 | 0.196873191 |
| B | M | 90.9 | 78932.1 | 0.522889 | 12 | 1032 | 0.132013 | 0.199189346 |
| B | P | 83.9 | 79016.0 | 0.523445 | 12 | 1044 | 0.143027 | 0.201505501 |
| P | P | 42.9 | 79058.9 | 0.523729 | 12 | 1056 | 0.27972 | 0.203821656 |
| P | F | 954.0 | 80012.9 | 0.530049 | 13 | 1069 | 0.013627 | 0.206330824 |
| P | F | 947.1 | 80960.0 | 0.536323 | 13 | 1082 | 0.013726 | 0.208839992 |
| P | F | 630.7 | 81590.7 | 0.540501 | 13 | 1095 | 0.020612 | 0.21134916 |
| P | M | 457.7 | 82048.4 | 0.543534 | 13 | 1108 | 0.028403 | 0.213858329 |
| P | M | 227.4 | 82275.8 | 0.54504 | 13 | 1121 | 0.057168 | 0.216367497 |
| P | F | 373.9 | 82649.7 | 0.547517 | 14 | 1135 | 0.037443 | 0.219069678 |
| P | F | 668.2 | 83317.9 | 0.551943 | 15 | 1150 | 0.022448 | 0.221964872 |
| P | F | 521.0 | 83838.9 | 0.555395 | 15 | 1165 | 0.028791 | 0.224860066 |
| P | F | 467.4 | 84306.3 | 0.558491 | 15 | 1180 | 0.032092 | 0.22775526 |
| P | F | 369.8 | 84676.1 | 0.560941 | 15 | 1195 | 0.040562 | 0.230650454 |
| P | F | 335.7 | 85011.8 | 0.563165 | 15 | 1210 | 0.044683 | 0.233545648 |
| P | M | 470.0 | 85481.8 | 0.566278 | 16 | 1226 | 0.034043 | 0.236633854 |
| P | M | 247.1 | 85728.9 | 0.567915 | 16 | 1242 | 0.064751 | 0.239722061 |
| P | F | 899.8 | 86628.7 | 0.573876 | 17 | 1259 | 0.018893 | 0.243003281 |
| P | P | 788.5 | 87417.2 | 0.579099 | 17 | 1276 | 0.02156 | 0.246284501 |
| P | F | 640.7 | 88057.9 | 0.583344 | 17 | 1293 | 0.026533 | 0.249565721 |
| B | F | 322.2 | 88380.1 | 0.585478 | 17 | 1310 | 0.052762 | 0.252846941 |
| P | M | 270.3 | 88650.4 | 0.587269 | 17 | 1327 | 0.062893 | 0.256128161 |
| P | M | 81.7 | 88732.1 | 0.58781 | 17 | 1344 | 0.208078 | 0.25940938 |
| P | P | 51.4 | 88783.5 | 0.588151 | 17 | 1361 | 0.330739 | 0.2626906 |
| P | P | 901.7 | 89685.2 | 0.594124 | 18 | 1379 | 0.019962 | 0.266164833 |
| P | M | 712.5 | 90397.7 | 0.598844 | 18 | 1397 | 0.025263 | 0.269639066 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 301.4 | 90699.1 | 0.600841 | 18 | 1415 | 0.059721 | 0.273113299 |
| P | M | 299.8 | 90998.9 | 0.602827 | 18 | 1433 | 0.06004 | 0.276587531 |
| P | F | 220.6 | 91219.5 | 0.604288 | 18 | 1451 | 0.081596 | 0.280061764 |
| P | M | 76.2 | 91295.7 | 0.604793 | 18 | 1469 | 0.23622 | 0.283535997 |
| P | F | 1107.5 | 92403.2 | 0.612129 | 19 | 1488 | 0.017156 | 0.287203243 |
| P | F | 928.5 | 93331.7 | 0.61828 | 19 | 1507 | 0.020463 | 0.290870488 |
| P | F | 532.8 | 93864.5 | 0.62181 | 19 | 1526 | 0.035661 | 0.294537734 |
| P | P | 849.4 | 94713.9 | 0.627437 | 20 | 1546 | 0.023546 | 0.298397993 |
| P | F | 324.8 | 95038.7 | 0.629588 | 20 | 1566 | 0.061576 | 0.302258251 |
| C | P | 307.9 | 95346.6 | 0.631628 | 20 | 1586 | 0.064956 | 0.30611851 |
| P | M | 306.2 | 95652.8 | 0.633657 | 20 | 1606 | 0.065317 | 0.309978769 |
| P | M | 256.0 | 95908.8 | 0.635352 | 20 | 1626 | 0.078125 | 0.313839027 |
| P | M | 246.9 | 96155.7 | 0.636988 | 20 | 1646 | 0.081004 | 0.317699286 |
| P | P | 1396.7 | 97552.4 | 0.646241 | 21 | 1667 | 0.015035 | 0.321752557 |
| P | P | 1137.1 | 98689.5 | 0.653773 | 21 | 1688 | 0.018468 | 0.325805829 |
| P | M | 932.4 | 99621.9 | 0.65995 | 21 | 1709 | 0.022523 | 0.329859101 |
| B | F | 693.2 | 100315.1 | 0.664542 | 21 | 1730 | 0.030294 | 0.333912372 |
| P | F | 503.8 | 100818.9 | 0.66788 | 22 | 1752 | 0.043668 | 0.338158657 |
| P | P | 445.3 | 101264.2 | 0.67083 | 22 | 1774 | 0.049405 | 0.342404941 |
| P | M | 375.6 | 101639.8 | 0.673318 | 22 | 1796 | 0.058573 | 0.346651226 |
| P | M | 75.9 | 101715.7 | 0.673821 | 22 | 1818 | 0.289855 | 0.35089751 |
| P | M | 385.3 | 102101.0 | 0.676373 | 23 | 1841 | 0.059694 | 0.355336808 |
| P | M | 347.9 | 102448.9 | 0.678678 | 23 | 1864 | 0.066111 | 0.359776105 |
| P | F | 292.8 | 102741.7 | 0.680617 | 24 | 1888 | 0.081967 | 0.364408415 |
| P | F | 228.1 | 102969.8 | 0.682128 | 24 | 1912 | 0.105217 | 0.369040726 |
| B | F | 215.5 | 103185.3 | 0.683556 | 24 | 1936 | 0.111369 | 0.373673036 |
| P | M | 469.8 | 103655.1 | 0.686668 | 25 | 1961 | 0.053214 | 0.378498359 |
| B | F | 282.7 | 103937.8 | 0.688541 | 25 | 1986 | 0.088433 | 0.383323683 |
| P | M | 87.4 | 104025.2 | 0.68912 | 25 | 2011 | 0.286041 | 0.388149006 |
| P | F | 1544.3 | 105569.5 | 0.69935 | 26 | 2037 | 0.016836 | 0.393167342 |
| P | F | 787.8 | 106357.3 | 0.704569 | 26 | 2063 | 0.033003 | 0.398185678 |
| P | F | 559.0 | 106916.3 | 0.708272 | 26 | 2089 | 0.046512 | 0.403204015 |
| P | F | 1770.7 | 108687.0 | 0.720002 | 27 | 2116 | 0.015248 | 0.408415364 |
| B | F | 1403.3 | 110090.3 | 0.729298 | 27 | 2143 | 0.01924 | 0.413626713 |
| B | M | 1173.0 | 111263.3 | 0.737069 | 27 | 2170 | 0.023018 | 0.418838062 |
| B | F | 467.3 | 111730.6 | 0.740165 | 27 | 2197 | 0.057779 | 0.424049411 |
| P | F | 1649.7 | 113380.3 | 0.751093 | 28 | 2225 | 0.016973 | 0.429453773 |
| P | F | 961.6 | 114341.9 | 0.757463 | 28 | 2253 | 0.029118 | 0.434858135 |
| P | F | 701.5 | 115043.4 | 0.762111 | 28 | 2281 | 0.039914 | 0.440262498 |
| P | M | 391.9 | 115435.3 | 0.764707 | 28 | 2309 | 0.071447 | 0.44566686 |
| P | F | 345.3 | 115780.6 | 0.766994 | 29 | 2338 | 0.083985 | 0.451264235 |
| P | F | 616.8 | 116397.4 | 0.77108 | 30 | 2368 | 0.048638 | 0.457054623 |
| B | F | 1030.0 | 117427.4 | 0.777903 | 31 | 2399 | 0.030097 | 0.463038024 |
| B | F | 757.2 | 118184.6 | 0.78292 | 31 | 2430 | 0.04094 | 0.469021424 |
| P | F | 501.0 | 118685.6 | 0.786238 | 32 | 2462 | 0.063872 | 0.475197838 |
| P | M | 443.9 | 119129.5 | 0.789179 | 33 | 2495 | 0.074341 | 0.481567265 |
| P | F | 227.9 | 119357.4 | 0.790689 | 33 | 2528 | 0.1448 | 0.487936692 |
| B | F | 600.1 | 119957.5 | 0.794664 | 34 | 2562 | 0.056657 | 0.494499131 |

| Target | Mode | grdf.tons | cum grdf. tons | % cum ton | #salmon | cum #sal | sal. rate | % cum #sal |
|---|---|---|---|---|---|---|---|---|
| P | M | 500.1 | 120457.6 | 0.797977 | 34 | 2596 | 0.067986 | 0.501061571 |
| P | P | 3526.8 | 123984.4 | 0.821341 | 35 | 2631 | 0.009924 | 0.507817024 |
| P | F | 629.8 | 124614.2 | 0.825513 | 35 | 2666 | 0.055573 | 0.514572476 |
| P | F | 719.9 | 125334.1 | 0.830282 | 36 | 2702 | 0.050007 | 0.521520942 |
| P | M | 416.2 | 125750.3 | 0.833039 | 37 | 2739 | 0.0889 | 0.52866242 |
| P | F | 440.0 | 126190.3 | 0.835954 | 38 | 2777 | 0.086364 | 0.535996912 |
| P | F | 980.8 | 127171.1 | 0.842451 | 41 | 2818 | 0.041803 | 0.543910442 |
| P | M | 692.4 | 127863.5 | 0.847038 | 41 | 2859 | 0.059214 | 0.551823972 |
| P | F | 1564.6 | 129428.1 | 0.857403 | 43 | 2902 | 0.027483 | 0.560123528 |
| B | F | 592.1 | 130020.2 | 0.861325 | 44 | 2946 | 0.074312 | 0.568616097 |
| B | F | 574.9 | 130595.1 | 0.865133 | 44 | 2990 | 0.076535 | 0.577108666 |
| P | F | 390.4 | 130985.5 | 0.86772 | 44 | 3034 | 0.112705 | 0.585601235 |
| P | F | 735.4 | 131720.9 | 0.872591 | 47 | 3081 | 0.063911 | 0.594672843 |
| P | P | 76.1 | 131797.0 | 0.873096 | 47 | 3128 | 0.617608 | 0.603744451 |
| P | F | 1097.4 | 132894.4 | 0.880365 | 49 | 3177 | 0.044651 | 0.613202085 |
| P | F | 487.8 | 133382.2 | 0.883597 | 49 | 3226 | 0.100451 | 0.622659718 |
| P | P | 322.5 | 133704.7 | 0.885733 | 51 | 3277 | 0.15814 | 0.632503378 |
| P | F | 925.0 | 134629.7 | 0.891861 | 52 | 3329 | 0.056216 | 0.64254005 |
| B | F | 1564.1 | 136193.8 | 0.902222 | 53 | 3382 | 0.033885 | 0.652769736 |
| P | F | 845.8 | 137039.6 | 0.907825 | 53 | 3435 | 0.062663 | 0.662999421 |
| B | F | 606.8 | 137646.4 | 0.911845 | 53 | 3488 | 0.087343 | 0.673229106 |
| P | M | 620.5 | 138266.9 | 0.915956 | 54 | 3542 | 0.087027 | 0.683651805 |
| B | F | 524.2 | 138791.1 | 0.919428 | 54 | 3596 | 0.103014 | 0.694074503 |
| P | F | 364.2 | 139155.3 | 0.921841 | 54 | 3650 | 0.14827 | 0.704497201 |
| P | M | 214.3 | 139369.6 | 0.923261 | 54 | 3704 | 0.251983 | 0.7149199 |
| P | P | 439.7 | 139809.3 | 0.926173 | 56 | 3760 | 0.12736 | 0.725728624 |
| P | M | 951.6 | 140760.9 | 0.932477 | 58 | 3818 | 0.06095 | 0.736923374 |
| P | M | 583.8 | 141344.7 | 0.936345 | 58 | 3876 | 0.099349 | 0.748118124 |
| P | F | 544.7 | 141889.4 | 0.939953 | 58 | 3934 | 0.106481 | 0.759312874 |
| P | M | 439.3 | 142328.7 | 0.942863 | 58 | 3992 | 0.132028 | 0.770507624 |
| P | F | 1652.5 | 143981.2 | 0.95381 | 61 | 4053 | 0.036914 | 0.782281413 |
| P | M | 634.9 | 144616.1 | 0.958016 | 75 | 4128 | 0.118129 | 0.796757383 |
| P | M | 582.4 | 145198.5 | 0.961874 | 77 | 4205 | 0.132212 | 0.811619378 |
| P | F | 563.9 | 145762.4 | 0.96561 | 79 | 4284 | 0.140096 | 0.8268674 |
| P | P | 1364.3 | 147126.7 | 0.974648 | 81 | 4365 | 0.059371 | 0.842501448 |
| P | F | 524.7 | 147651.4 | 0.978124 | 102 | 4467 | 0.194397 | 0.862188767 |
| C | F | 542.7 | 148194.1 | 0.981719 | 105 | 4572 | 0.193477 | 0.882455124 |
| P | F | 556.8 | 148750.9 | 0.985407 | 110 | 4682 | 0.197557 | 0.903686547 |
| B | F | 1438.5 | 150189.4 | 0.994937 | 127 | 4809 | 0.088286 | 0.928199189 |
| P | F | 255.1 | 150444.5 | 0.996627 | 157 | 4966 | 0.615445 | 0.95850222 |
| P | F | 509.2 | 150953.7 | 1 | 215 | 5181 | 0.422231 | 1 |
| | | | | | | | | |
| total | | 150444.5 | | | 5,181 | | | |

| APPENDIX 2. VESSEL SPECIFIC WEEKLY SALMON BYCATCH AMOUNTS AND RATES DURING SUMMER MONTHS, 1992. DATA SORTED BY ASCENDING BYCATCH AMOUNT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
| Harvest with 0 salmon | | 83259.0 | 83259.0 | 0.312155 | 0 | 0 | 0 | 0 |
| P | M | 1453.8 | 84712.8 | 0.317606 | 1 | 1 | 0.000688 | 5.78436E-05 |
| P | F | 916.6 | 85629.4 | 0.321042 | 1 | 2 | 0.001091 | 0.000115687 |
| P | M | 853.2 | 86482.6 | 0.324241 | 1 | 3 | 0.001172 | 0.000173531 |
| P | M | 816.2 | 87298.8 | 0.327301 | 1 | 4 | 0.001225 | 0.000231374 |
| P | M | 754.3 | 88053.1 | 0.330129 | 1 | 5 | 0.001326 | 0.000289218 |
| P | F | 660.2 | 88713.3 | 0.332605 | 1 | 6 | 0.001515 | 0.000347062 |
| P | M | 605.9 | 89319.2 | 0.334876 | 1 | 7 | 0.00165 | 0.000404905 |
| P | M | 587.6 | 89906.8 | 0.337079 | 1 | 8 | 0.001702 | 0.000462749 |
| P | P | 584.0 | 90490.8 | 0.339269 | 1 | 9 | 0.001712 | 0.000520592 |
| P | F | 580.7 | 91071.5 | 0.341446 | 1 | 10 | 0.001722 | 0.000578436 |
| P | M | 580.3 | 91651.8 | 0.343622 | 1 | 11 | 0.001723 | 0.00063628 |
| P | P | 504.5 | 92156.3 | 0.345513 | 1 | 12 | 0.001982 | 0.000694123 |
| P | F | 487.0 | 92643.3 | 0.347339 | 1 | 13 | 0.002053 | 0.000751967 |
| P | F | 468.0 | 93111.3 | 0.349094 | 1 | 14 | 0.002137 | 0.00080981 |
| P | F | 457.8 | 93569.1 | 0.35081 | 1 | 15 | 0.002184 | 0.000867654 |
| P | F | 454.2 | 94023.3 | 0.352513 | 1 | 16 | 0.002202 | 0.000925497 |
| P | F | 441.6 | 94464.9 | 0.354169 | 1 | 17 | 0.002264 | 0.000983341 |
| P | M | 435.7 | 94900.6 | 0.355802 | 1 | 18 | 0.002295 | 0.001041185 |
| P | F | 358.2 | 95258.8 | 0.357145 | 1 | 19 | 0.002792 | 0.001099028 |
| P | F | 357.5 | 95616.3 | 0.358485 | 1 | 20 | 0.002797 | 0.001156872 |
| P | F | 328.4 | 95944.7 | 0.359717 | 1 | 21 | 0.003045 | 0.001214715 |
| P | F | 325.4 | 96270.1 | 0.360937 | 1 | 22 | 0.003073 | 0.001272559 |
| P | F | 296.8 | 96566.9 | 0.362049 | 1 | 23 | 0.003369 | 0.001330403 |
| P | F | 295.1 | 96862.0 | 0.363156 | 1 | 24 | 0.003389 | 0.001388246 |
| P | P | 266.0 | 97128.0 | 0.364153 | 1 | 25 | 0.003759 | 0.00144609 |
| P | M | 240.2 | 97368.2 | 0.365054 | 1 | 26 | 0.004163 | 0.001503933 |
| P | F | 236.5 | 97604.7 | 0.36594 | 1 | 27 | 0.004228 | 0.001561777 |
| P | F | 217.9 | 97822.6 | 0.366757 | 1 | 28 | 0.004589 | 0.001619621 |
| P | F | 210.8 | 98033.4 | 0.367548 | 1 | 29 | 0.004744 | 0.001677464 |
| P | F | 204.9 | 98238.3 | 0.368316 | 1 | 30 | 0.00488 | 0.001735308 |
| P | M | 190.7 | 98429.0 | 0.369031 | 1 | 31 | 0.005244 | 0.001793151 |
| P | F | 150.5 | 98579.5 | 0.369595 | 1 | 32 | 0.006645 | 0.001850995 |
| P | F | 143.6 | 98723.1 | 0.370133 | 1 | 33 | 0.006964 | 0.001908839 |
| P | F | 124.0 | 98847.1 | 0.370598 | 1 | 34 | 0.008065 | 0.001966682 |
| P | F | 106.8 | 98953.9 | 0.370999 | 1 | 35 | 0.009363 | 0.002024526 |
| P | M | 96.0 | 99049.9 | 0.371359 | 1 | 36 | 0.010417 | 0.002082369 |
| P | M | 78.1 | 99128.0 | 0.371651 | 1 | 37 | 0.012804 | 0.002140213 |
| B | M | 70.2 | 99198.2 | 0.371915 | 1 | 38 | 0.014245 | 0.002198056 |
| C | M | 32.8 | 99231.0 | 0.372038 | 1 | 39 | 0.030488 | 0.0022559 |
| P | P | 27.2 | 99258.2 | 0.37214 | 1 | 40 | 0.036765 | 0.002313744 |
| P | M | 1409.9 | 100668.1 | 0.377426 | 2 | 42 | 0.001419 | 0.002429431 |
| P | M | 1009.1 | 101677.2 | 0.381209 | 2 | 44 | 0.001982 | 0.002545118 |
| P | M | 999.6 | 102676.8 | 0.384957 | 2 | 46 | 0.002001 | 0.002660805 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 870.2 | 103547.0 | 0.388219 | 2 | 48 | 0.002298 | 0.002776492 |
| P | F | 867.7 | 104414.7 | 0.391472 | 2 | 50 | 0.002305 | 0.00289218 |
| P | F | 720.3 | 105135.0 | 0.394173 | 2 | 52 | 0.002777 | 0.003007867 |
| P | M | 694.7 | 105829.7 | 0.396778 | 2 | 54 | 0.002879 | 0.003123554 |
| P | F | 667.2 | 106496.9 | 0.399279 | 2 | 56 | 0.002998 | 0.003239241 |
| P | M | 636.9 | 107133.8 | 0.401667 | 2 | 58 | 0.00314 | 0.003354928 |
| P | M | 632.2 | 107766.0 | 0.404037 | 2 | 60 | 0.003164 | 0.003470615 |
| P | F | 619.1 | 108385.1 | 0.406358 | 2 | 62 | 0.00323 | 0.003586303 |
| P | M | 599.6 | 108984.7 | 0.408606 | 2 | 64 | 0.003336 | 0.00370199 |
| P | F | 599.6 | 109584.3 | 0.410854 | 2 | 66 | 0.003336 | 0.003817677 |
| P | F | 448.4 | 110032.7 | 0.412535 | 2 | 68 | 0.00446 | 0.003933364 |
| P | M | 374.5 | 110407.2 | 0.41394 | 2 | 70 | 0.00534 | 0.004049051 |
| P | F | 367.0 | 110774.2 | 0.415316 | 2 | 72 | 0.00545 | 0.004164739 |
| P | F | 354.4 | 111128.6 | 0.416644 | 2 | 74 | 0.005643 | 0.004280426 |
| P | F | 341.4 | 111470.0 | 0.417924 | 2 | 76 | 0.005858 | 0.004396113 |
| P | M | 271.4 | 111741.4 | 0.418942 | 2 | 78 | 0.007369 | 0.0045118 |
| P | M | 209.8 | 111951.2 | 0.419728 | 2 | 80 | 0.009533 | 0.004627487 |
| P | M | 208.4 | 112159.6 | 0.42051 | 2 | 82 | 0.009597 | 0.004743174 |
| P | F | 183.7 | 112343.3 | 0.421198 | 2 | 84 | 0.010887 | 0.004858862 |
| P | F | 151.9 | 112495.2 | 0.421768 | 2 | 86 | 0.013167 | 0.004974549 |
| P | M | 140.8 | 112636.0 | 0.422296 | 2 | 88 | 0.014205 | 0.005090236 |
| P | F | 140.6 | 112776.6 | 0.422823 | 2 | 90 | 0.014225 | 0.005205923 |
| P | M | 87.0 | 112863.6 | 0.423149 | 2 | 92 | 0.022989 | 0.00532161 |
| P | M | 1796.4 | 114660.0 | 0.429884 | 3 | 95 | 0.00167 | 0.005495141 |
| P | F | 909.0 | 115569.0 | 0.433292 | 3 | 98 | 0.0033 | 0.005668672 |
| P | F | 746.0 | 116315.0 | 0.436089 | 3 | 101 | 0.004021 | 0.005842203 |
| P | F | 669.5 | 116984.5 | 0.438599 | 3 | 104 | 0.004481 | 0.006015733 |
| P | F | 642.6 | 117627.1 | 0.441008 | 3 | 107 | 0.004669 | 0.006189264 |
| P | M | 603.1 | 118230.2 | 0.44327 | 3 | 110 | 0.004974 | 0.006362795 |
| P | F | 586.3 | 118816.5 | 0.445468 | 3 | 113 | 0.005117 | 0.006536326 |
| P | M | 573.2 | 119389.7 | 0.447617 | 3 | 116 | 0.005234 | 0.006709857 |
| P | M | 501.3 | 119891.0 | 0.449496 | 3 | 119 | 0.005984 | 0.006883387 |
| P | F | 455.5 | 120346.5 | 0.451204 | 3 | 122 | 0.006586 | 0.007056918 |
| P | F | 430.4 | 120776.9 | 0.452818 | 3 | 125 | 0.00697 | 0.007230449 |
| P | M | 334.9 | 121111.8 | 0.454073 | 3 | 128 | 0.008958 | 0.00740398 |
| P | F | 329.8 | 121441.6 | 0.45531 | 3 | 131 | 0.009096 | 0.00757751 |
| P | F | 297.9 | 121739.5 | 0.456427 | 3 | 134 | 0.01007 | 0.007751041 |
| P | M | 215.9 | 121955.4 | 0.457236 | 3 | 137 | 0.013895 | 0.007924572 |
| P | F | 211.8 | 122167.2 | 0.45803 | 3 | 140 | 0.014164 | 0.008098103 |
| B | P | 69.4 | 122236.6 | 0.45829 | 3 | 143 | 0.043228 | 0.008271634 |
| C | P | 57.1 | 122293.7 | 0.458505 | 3 | 146 | 0.052539 | 0.008445164 |
| P | F | 1638.7 | 123932.4 | 0.464648 | 4 | 150 | 0.002441 | 0.008676539 |
| P | F | 1140.9 | 125073.3 | 0.468926 | 4 | 154 | 0.003506 | 0.008907913 |
| P | M | 1103.5 | 126176.8 | 0.473063 | 4 | 158 | 0.003625 | 0.009139287 |
| P | F | 871.7 | 127048.5 | 0.476331 | 4 | 162 | 0.004589 | 0.009370662 |
| P | M | 754.9 | 127803.4 | 0.479162 | 4 | 166 | 0.005299 | 0.009602036 |
| P | F | 588.0 | 128391.4 | 0.481366 | 4 | 170 | 0.006803 | 0.00983341 |
| P | F | 498.5 | 128889.9 | 0.483235 | 4 | 174 | 0.008024 | 0.010064785 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | M | 488.1 | 129378.0 | 0.485065 | 4 | 178 | 0.008195 | 0.010296159 |
| P | F | 474.4 | 129852.4 | 0.486844 | 4 | 182 | 0.008432 | 0.010527534 |
| P | F | 460.6 | 130313.0 | 0.488571 | 4 | 186 | 0.008684 | 0.010758908 |
| P | F | 343.6 | 130656.6 | 0.489859 | 4 | 190 | 0.011641 | 0.010990282 |
| P | F | 334.0 | 130990.6 | 0.491111 | 4 | 194 | 0.011976 | 0.011221657 |
| P | M | 332.5 | 131323.1 | 0.492358 | 4 | 198 | 0.01203 | 0.011453031 |
| P | P | 58.7 | 131381.8 | 0.492578 | 4 | 202 | 0.068143 | 0.011684405 |
| P | M | 2598.3 | 133980.1 | 0.502319 | 5 | 207 | 0.001924 | 0.011973623 |
| P | M | 956.8 | 134936.9 | 0.505907 | 5 | 212 | 0.005226 | 0.012262841 |
| P | F | 853.7 | 135790.6 | 0.509107 | 5 | 217 | 0.005857 | 0.012552059 |
| P | M | 810.8 | 136601.4 | 0.512147 | 5 | 222 | 0.006167 | 0.012841277 |
| P | F | 584.6 | 137186.0 | 0.514339 | 5 | 227 | 0.008553 | 0.013130495 |
| P | F | 435.4 | 137621.4 | 0.515971 | 5 | 232 | 0.011484 | 0.013419713 |
| P | F | 403.2 | 138024.6 | 0.517483 | 5 | 237 | 0.012401 | 0.013708931 |
| P | F | 321.4 | 138346.0 | 0.518688 | 5 | 242 | 0.015557 | 0.013998149 |
| P | M | 271.9 | 138617.9 | 0.519707 | 5 | 247 | 0.018389 | 0.014287367 |
| P | F | 1087.0 | 139704.9 | 0.523783 | 6 | 253 | 0.00552 | 0.014634429 |
| P | M | 1029.0 | 140733.9 | 0.527641 | 6 | 259 | 0.005831 | 0.01498149 |
| P | F | 974.4 | 141708.3 | 0.531294 | 6 | 265 | 0.006158 | 0.015328552 |
| P | F | 783.8 | 142492.1 | 0.534233 | 6 | 271 | 0.007655 | 0.015675613 |
| P | P | 685.7 | 143177.8 | 0.536803 | 6 | 277 | 0.00875 | 0.016022675 |
| P | F | 623.0 | 143800.8 | 0.539139 | 6 | 283 | 0.009631 | 0.016369736 |
| P | F | 388.6 | 144189.4 | 0.540596 | 6 | 289 | 0.01544 | 0.016716798 |
| P | F | 323.0 | 144512.4 | 0.541807 | 6 | 295 | 0.018576 | 0.017063859 |
| P | F | 210.6 | 144723.0 | 0.542597 | 6 | 301 | 0.02849 | 0.017410921 |
| P | M | 2016.8 | 146739.8 | 0.550158 | 7 | 308 | 0.003471 | 0.017815826 |
| P | M | 1206.7 | 147946.5 | 0.554682 | 7 | 315 | 0.005801 | 0.018220731 |
| P | F | 1039.6 | 148986.1 | 0.55858 | 7 | 322 | 0.006733 | 0.018625636 |
| P | F | 1002.3 | 149988.4 | 0.562338 | 7 | 329 | 0.006984 | 0.019030541 |
| P | F | 904.3 | 150892.7 | 0.565728 | 7 | 336 | 0.007741 | 0.019435447 |
| P | M | 680.7 | 151573.4 | 0.56828 | 7 | 343 | 0.010284 | 0.019840352 |
| P | F | 653.8 | 152227.2 | 0.570731 | 7 | 350 | 0.010707 | 0.020245257 |
| P | F | 444.3 | 152671.5 | 0.572397 | 7 | 357 | 0.015755 | 0.020650162 |
| P | F | 431.0 | 153102.5 | 0.574013 | 7 | 364 | 0.016241 | 0.021055067 |
| P | F | 426.2 | 153528.7 | 0.575611 | 7 | 371 | 0.016424 | 0.021459972 |
| P | F | 424.4 | 153953.1 | 0.577202 | 7 | 378 | 0.016494 | 0.021864877 |
| P | F | 421.0 | 154374.1 | 0.578781 | 7 | 385 | 0.016627 | 0.022269783 |
| P | F | 386.2 | 154760.3 | 0.580229 | 7 | 392 | 0.018125 | 0.022674688 |
| P | F | 352.2 | 155112.5 | 0.581549 | 7 | 399 | 0.019875 | 0.023079593 |
| P | M | 286.4 | 155398.9 | 0.582623 | 7 | 406 | 0.024441 | 0.023484498 |
| P | M | 263.2 | 155662.1 | 0.58361 | 7 | 413 | 0.026596 | 0.023889403 |
| P | F | 247.1 | 155909.2 | 0.584536 | 7 | 420 | 0.028329 | 0.024294308 |
| P | F | 240.2 | 156149.4 | 0.585437 | 7 | 427 | 0.029142 | 0.024699213 |
| P | P | 52.6 | 156202.0 | 0.585634 | 7 | 434 | 0.13308 | 0.025104118 |
| P | F | 991.2 | 157193.2 | 0.58935 | 8 | 442 | 0.008071 | 0.025566867 |
| P | M | 857.7 | 158050.9 | 0.592566 | 8 | 450 | 0.009327 | 0.026029616 |
| P | M | 817.4 | 158868.3 | 0.59563 | 8 | 458 | 0.009787 | 0.026492365 |
| P | F | 564.2 | 159432.5 | 0.597746 | 8 | 466 | 0.014179 | 0.026955113 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 479.3 | 159911.8 | 0.599543 | 8 | 474 | 0.016691 | 0.027417862 |
| P | F | 410.4 | 160322.2 | 0.601081 | 8 | 482 | 0.019493 | 0.027880611 |
| P | F | 401.7 | 160723.9 | 0.602587 | 8 | 490 | 0.019915 | 0.02834336 |
| P | F | 399.8 | 161123.7 | 0.604086 | 8 | 498 | 0.02001 | 0.028806108 |
| P | F | 318.8 | 161442.5 | 0.605282 | 8 | 506 | 0.025094 | 0.029268857 |
| P | F | 276.6 | 161719.1 | 0.606319 | 8 | 514 | 0.028923 | 0.029731606 |
| P | F | 249.4 | 161968.5 | 0.607254 | 8 | 522 | 0.032077 | 0.030194354 |
| P | M | 242.6 | 162211.1 | 0.608163 | 8 | 530 | 0.032976 | 0.030657103 |
| P | F | 209.5 | 162420.6 | 0.608949 | 8 | 538 | 0.038186 | 0.031119852 |
| P | F | 637.0 | 163057.6 | 0.611337 | 9 | 547 | 0.014129 | 0.031640444 |
| P | F | 554.1 | 163611.7 | 0.613414 | 9 | 556 | 0.016243 | 0.032161037 |
| P | F | 386.6 | 163998.3 | 0.614864 | 9 | 565 | 0.02328 | 0.032681629 |
| P | M | 246.6 | 164244.9 | 0.615788 | 9 | 574 | 0.036496 | 0.033202221 |
| P | F | 1141.4 | 165386.3 | 0.620068 | 10 | 584 | 0.008761 | 0.033780657 |
| P | M | 1079.2 | 166465.5 | 0.624114 | 10 | 594 | 0.009266 | 0.034359093 |
| P | F | 813.2 | 167278.7 | 0.627163 | 10 | 604 | 0.012297 | 0.034937529 |
| P | F | 812.2 | 168090.9 | 0.630208 | 10 | 614 | 0.012312 | 0.035515965 |
| P | F | 570.1 | 168661.0 | 0.632345 | 10 | 624 | 0.017541 | 0.036094401 |
| P | M | 475.1 | 169136.1 | 0.634126 | 10 | 634 | 0.021048 | 0.036672837 |
| P | F | 474.4 | 169610.5 | 0.635905 | 10 | 644 | 0.021079 | 0.037251273 |
| P | F | 387.5 | 169998.0 | 0.637358 | 10 | 654 | 0.025806 | 0.037829708 |
| P | M | 140.9 | 170138.9 | 0.637886 | 10 | 664 | 0.070972 | 0.038408144 |
| P | M | 541.6 | 170680.5 | 0.639917 | 11 | 675 | 0.02031 | 0.039044424 |
| P | F | 533.4 | 171213.9 | 0.641917 | 11 | 686 | 0.020622 | 0.039680703 |
| P | F | 471.1 | 171685.0 | 0.643683 | 11 | 697 | 0.02335 | 0.040316983 |
| P | F | 447.0 | 172132.0 | 0.645359 | 11 | 708 | 0.024609 | 0.040953262 |
| P | F | 409.2 | 172541.2 | 0.646893 | 12 | 720 | 0.029326 | 0.041647385 |
| P | M | 1274.3 | 173815.5 | 0.65167 | 13 | 733 | 0.010202 | 0.042399352 |
| P | F | 1065.0 | 174880.5 | 0.655663 | 13 | 746 | 0.012207 | 0.043151319 |
| P | F | 972.6 | 175853.1 | 0.65931 | 13 | 759 | 0.013366 | 0.043903286 |
| P | F | 693.5 | 176546.6 | 0.66191 | 13 | 772 | 0.018745 | 0.044655252 |
| P | M | 254.7 | 176801.3 | 0.662865 | 13 | 785 | 0.05104 | 0.045407219 |
| P | F | 1232.3 | 178033.6 | 0.667485 | 14 | 799 | 0.011361 | 0.046217029 |
| P | F | 873.1 | 178906.7 | 0.670758 | 14 | 813 | 0.016035 | 0.047026839 |
| P | F | 822.5 | 179729.2 | 0.673842 | 14 | 827 | 0.017021 | 0.04783665 |
| P | F | 647.9 | 180377.1 | 0.676271 | 14 | 841 | 0.021608 | 0.04864646 |
| P | F | 560.3 | 180937.4 | 0.678372 | 14 | 855 | 0.024987 | 0.04945627 |
| P | F | 413.6 | 181351.0 | 0.679923 | 14 | 869 | 0.033849 | 0.050266081 |
| P | F | 190.4 | 181541.4 | 0.680636 | 14 | 883 | 0.073529 | 0.051075891 |
| P | F | 1582.9 | 183124.3 | 0.686571 | 15 | 898 | 0.009476 | 0.051943545 |
| P | F | 419.9 | 183544.2 | 0.688145 | 15 | 913 | 0.035723 | 0.052811199 |
| P | F | 401.9 | 183946.1 | 0.689652 | 15 | 928 | 0.037323 | 0.053678852 |
| B | M | 131.9 | 184078.0 | 0.690147 | 15 | 943 | 0.113723 | 0.054546506 |
| P | F | 1218.4 | 185296.4 | 0.694715 | 16 | 959 | 0.013132 | 0.055472004 |
| P | F | 395.4 | 185691.8 | 0.696197 | 16 | 975 | 0.040465 | 0.056397501 |
| P | F | 345.6 | 186037.4 | 0.697493 | 16 | 991 | 0.046296 | 0.057322999 |
| P | F | 280.0 | 186317.4 | 0.698543 | 16 | 1007 | 0.057143 | 0.058248496 |
| P | F | 1382.5 | 187699.9 | 0.703726 | 17 | 1024 | 0.012297 | 0.059231837 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 1129.0 | 188828.9 | 0.707959 | 17 | 1041 | 0.015058 | 0.060215178 |
| P | F | 733.4 | 189562.3 | 0.710708 | 17 | 1058 | 0.02318 | 0.061198519 |
| P | F | 591.0 | 190153.3 | 0.712924 | 17 | 1075 | 0.028765 | 0.06218186 |
| P | F | 468.7 | 190622.0 | 0.714682 | 17 | 1092 | 0.036271 | 0.063165201 |
| P | F | 185.1 | 190807.1 | 0.715376 | 17 | 1109 | 0.091842 | 0.064148542 |
| P | M | 170.9 | 190978.0 | 0.716016 | 17 | 1126 | 0.099473 | 0.065131883 |
| P | F | 118.5 | 191096.5 | 0.716461 | 17 | 1143 | 0.14346 | 0.066115224 |
| P | F | 1508.3 | 192604.8 | 0.722115 | 18 | 1161 | 0.011934 | 0.067156409 |
| P | F | 1316.0 | 193920.8 | 0.727049 | 19 | 1180 | 0.014438 | 0.068255437 |
| P | F | 657.1 | 194577.9 | 0.729513 | 20 | 1200 | 0.030437 | 0.069412309 |
| P | F | 418.8 | 194996.7 | 0.731083 | 20 | 1220 | 0.047755 | 0.070569181 |
| P | F | 343.2 | 195339.9 | 0.73237 | 20 | 1240 | 0.058275 | 0.071726053 |
| P | F | 259.4 | 195599.3 | 0.733342 | 20 | 1260 | 0.077101 | 0.072882925 |
| P | F | 760.2 | 196359.5 | 0.736193 | 21 | 1281 | 0.027624 | 0.07409764 |
| P | F | 682.4 | 197041.9 | 0.738751 | 21 | 1302 | 0.030774 | 0.075312355 |
| P | F | 313.4 | 197355.3 | 0.739926 | 22 | 1324 | 0.070198 | 0.076584914 |
| B | M | 167.4 | 197522.7 | 0.740554 | 22 | 1346 | 0.131422 | 0.077857473 |
| P | F | 545.1 | 198067.8 | 0.742597 | 23 | 1369 | 0.042194 | 0.079187876 |
| P | F | 1418.8 | 199486.6 | 0.747917 | 24 | 1393 | 0.016916 | 0.080576122 |
| P | F | 1081.4 | 200568.0 | 0.751971 | 24 | 1417 | 0.022193 | 0.081964368 |
| P | F | 450.4 | 201018.4 | 0.75366 | 24 | 1441 | 0.053286 | 0.083352615 |
| P | M | 429.1 | 201447.5 | 0.755269 | 24 | 1465 | 0.055931 | 0.084740861 |
| P | F | 205.7 | 201653.2 | 0.75604 | 24 | 1489 | 0.116675 | 0.086129107 |
| P | F | 785.6 | 202438.8 | 0.758985 | 26 | 1515 | 0.033096 | 0.08763304 |
| P | M | 358.2 | 202797.0 | 0.760328 | 26 | 1541 | 0.072585 | 0.089136974 |
| P | M | 625.9 | 203422.9 | 0.762675 | 27 | 1568 | 0.043138 | 0.090698751 |
| P | M | 548.4 | 203971.3 | 0.764731 | 27 | 1595 | 0.049234 | 0.092260528 |
| P | F | 1147.6 | 205118.9 | 0.769033 | 28 | 1623 | 0.024399 | 0.093880148 |
| P | F | 599.4 | 205718.3 | 0.771281 | 28 | 1651 | 0.046713 | 0.095499769 |
| P | F | 279.5 | 205997.8 | 0.772329 | 28 | 1679 | 0.100179 | 0.097119389 |
| P | F | 134.9 | 206132.7 | 0.772834 | 28 | 1707 | 0.207561 | 0.09873901 |
| P | F | 807.8 | 206940.5 | 0.775863 | 29 | 1736 | 0.0359 | 0.100416474 |
| P | F | 488.4 | 207428.9 | 0.777694 | 29 | 1765 | 0.059378 | 0.102093938 |
| P | F | 883.0 | 208311.9 | 0.781005 | 31 | 1796 | 0.035108 | 0.103887089 |
| P | F | 802.5 | 209114.4 | 0.784013 | 31 | 1827 | 0.038629 | 0.105680241 |
| P | F | 355.9 | 209470.3 | 0.785348 | 31 | 1858 | 0.087103 | 0.107473392 |
| P | M | 128.6 | 209598.9 | 0.78583 | 31 | 1889 | 0.241058 | 0.109266543 |
| P | F | 628.4 | 210227.3 | 0.788186 | 32 | 1921 | 0.050923 | 0.111117538 |
| P | F | 425.3 | 210652.6 | 0.78978 | 32 | 1953 | 0.075241 | 0.112968533 |
| P | F | 121.4 | 210774.0 | 0.790236 | 34 | 1987 | 0.280066 | 0.114935215 |
| P | F | 1008.7 | 211782.7 | 0.794017 | 36 | 2023 | 0.03569 | 0.117017584 |
| P | F | 400.2 | 212182.9 | 0.795518 | 36 | 2059 | 0.089955 | 0.119099954 |
| P | F | 1394.4 | 213577.3 | 0.800746 | 37 | 2096 | 0.026535 | 0.121240167 |
| P | F | 498.9 | 214076.2 | 0.802616 | 37 | 2133 | 0.074163 | 0.123380379 |
| P | F | 405.1 | 214481.3 | 0.804135 | 37 | 2170 | 0.091335 | 0.125520592 |
| P | F | 1006.7 | 215488.0 | 0.807909 | 38 | 2208 | 0.037747 | 0.127718649 |
| C | F | 804.3 | 216292.3 | 0.810925 | 38 | 2246 | 0.047246 | 0.129916705 |
| P | F | 299.7 | 216592.0 | 0.812048 | 38 | 2284 | 0.126793 | 0.132114762 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 237.9 | 216829.9 | 0.81294 | 38 | 2322 | 0.159731 | 0.134312818 |
| P | F | 313.2 | 217143.1 | 0.814115 | 39 | 2361 | 0.124521 | 0.136568718 |
| P | F | 448.3 | 217591.4 | 0.815795 | 40 | 2401 | 0.089226 | 0.138882462 |
| P | F | 869.6 | 218461.0 | 0.819056 | 41 | 2442 | 0.047148 | 0.141254049 |
| P | F | 920.9 | 219381.9 | 0.822508 | 44 | 2486 | 0.047779 | 0.143799167 |
| P | F | 415.0 | 219796.9 | 0.824064 | 45 | 2531 | 0.108434 | 0.146402129 |
| P | F | 812.2 | 220609.1 | 0.827109 | 48 | 2579 | 0.059099 | 0.149178621 |
| P | F | 1708.5 | 222317.6 | 0.833515 | 50 | 2629 | 0.029265 | 0.152070801 |
| P | F | 691.5 | 223009.1 | 0.836107 | 50 | 2679 | 0.072307 | 0.15496298 |
| P | F | 639.7 | 223648.8 | 0.838506 | 50 | 2729 | 0.078162 | 0.15785516 |
| P | M | 621.9 | 224270.7 | 0.840837 | 50 | 2779 | 0.080399 | 0.160747339 |
| P | F | 609.2 | 224879.9 | 0.843122 | 50 | 2829 | 0.082075 | 0.163639519 |
| P | F | 332.9 | 225212.8 | 0.84437 | 52 | 2881 | 0.156203 | 0.166647385 |
| P | F | 1346.5 | 226559.3 | 0.849418 | 53 | 2934 | 0.039361 | 0.169713096 |
| P | F | 316.0 | 226875.3 | 0.850603 | 53 | 2987 | 0.167722 | 0.172778806 |
| P | F | 391.8 | 227267.1 | 0.852072 | 54 | 3041 | 0.137825 | 0.17590236 |
| P | F | 540.5 | 227807.6 | 0.854098 | 55 | 3096 | 0.101758 | 0.179083758 |
| P | F | 992.8 | 228800.4 | 0.85782 | 57 | 3153 | 0.057413 | 0.182380842 |
| P | F | 754.2 | 229554.6 | 0.860648 | 57 | 3210 | 0.075577 | 0.185677927 |
| P | F | 565.8 | 230120.4 | 0.862769 | 59 | 3269 | 0.104277 | 0.189090699 |
| P | F | 782.3 | 230902.7 | 0.865702 | 60 | 3329 | 0.076697 | 0.192561314 |
| P | F | 179.6 | 231082.3 | 0.866376 | 61 | 3390 | 0.339644 | 0.196089773 |
| P | F | 132.7 | 231215.0 | 0.866873 | 64 | 3454 | 0.482291 | 0.199791763 |
| P | F | 589.5 | 231804.5 | 0.869083 | 66 | 3520 | 0.111959 | 0.20360944 |
| P | F | 512.1 | 232316.6 | 0.871003 | 66 | 3586 | 0.128881 | 0.207427117 |
| P | F | 433.4 | 232750.0 | 0.872628 | 66 | 3652 | 0.152284 | 0.211244794 |
| P | F | 333.7 | 233083.7 | 0.873879 | 68 | 3720 | 0.203776 | 0.215178158 |
| P | F | 1560.1 | 234643.8 | 0.879728 | 71 | 3791 | 0.04551 | 0.219285053 |
| P | M | 1956.7 | 236600.5 | 0.887064 | 72 | 3863 | 0.036797 | 0.223449792 |
| P | F | 347.1 | 236947.6 | 0.888366 | 76 | 3939 | 0.218957 | 0.227845905 |
| P | F | 713.5 | 237661.1 | 0.891041 | 77 | 4016 | 0.107919 | 0.232299861 |
| P | F | 191.5 | 237852.6 | 0.891759 | 79 | 4095 | 0.412533 | 0.236869505 |
| P | F | 1127.2 | 238979.8 | 0.895985 | 83 | 4178 | 0.073634 | 0.241670523 |
| P | F | 1357.3 | 240337.1 | 0.901074 | 94 | 4272 | 0.069255 | 0.24710782 |
| P | M | 609.0 | 240946.1 | 0.903357 | 94 | 4366 | 0.154351 | 0.252545118 |
| B | F | 1483.7 | 242429.8 | 0.90892 | 96 | 4462 | 0.064703 | 0.258098103 |
| P | F | 349.7 | 242779.5 | 0.910231 | 96 | 4558 | 0.274521 | 0.263651087 |
| P | F | 658.3 | 243437.8 | 0.912699 | 103 | 4661 | 0.156464 | 0.269608977 |
| P | F | 189.9 | 243627.7 | 0.913411 | 119 | 4780 | 0.626646 | 0.276492365 |
| P | F | 1168.1 | 244795.8 | 0.91779 | 121 | 4901 | 0.103587 | 0.283491439 |
| P | F | 924.0 | 245719.8 | 0.921255 | 124 | 5025 | 0.134199 | 0.290664044 |
| P | F | 1376.1 | 247095.9 | 0.926414 | 125 | 5150 | 0.090836 | 0.297894493 |
| P | F | 1357.7 | 248453.6 | 0.931504 | 139 | 5289 | 0.102379 | 0.305934752 |
| P | F | 970.3 | 249423.9 | 0.935142 | 149 | 5438 | 0.153561 | 0.314553447 |
| P | F | 310.9 | 249734.8 | 0.936308 | 153 | 5591 | 0.49212 | 0.323403517 |
| P | F | 344.7 | 250079.5 | 0.9376 | 173 | 5764 | 0.501886 | 0.333410458 |
| P | F | 365.6 | 250445.1 | 0.938971 | 194 | 5958 | 0.530635 | 0.344632115 |
| P | F | 589.8 | 251034.9 | 0.941182 | 203 | 6161 | 0.344184 | 0.356374364 |

| target | mode | grdf. tons | cum grdf. tons | % cum ton | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 644.9 | 251679.8 | 0.9436 | 214 | 6375 | 0.331834 | 0.368752892 |
| P | F | 647.7 | 252327.5 | 0.946028 | 215 | 6590 | 0.331944 | 0.381189264 |
| P | F | 371.7 | 252699.2 | 0.947422 | 219 | 6809 | 0.589185 | 0.393857011 |
| P | F | 889.4 | 253588.6 | 0.950756 | 229 | 7038 | 0.257477 | 0.407103193 |
| P | F | 1004.6 | 254593.2 | 0.954523 | 234 | 7272 | 0.232929 | 0.420638593 |
| P | F | 431.8 | 255025.0 | 0.956142 | 242 | 7514 | 0.560445 | 0.434636742 |
| P | F | 202.6 | 255227.6 | 0.956901 | 270 | 7784 | 1.332675 | 0.450254512 |
| P | F | 410.4 | 255638.0 | 0.95844 | 300 | 8084 | 0.730994 | 0.467607589 |
| P | F | 558.9 | 256196.9 | 0.960535 | 314 | 8398 | 0.561818 | 0.485770477 |
| P | F | 743.7 | 256940.6 | 0.963324 | 315 | 8713 | 0.423558 | 0.503991208 |
| P | F | 651.4 | 257592.0 | 0.965766 | 331 | 9044 | 0.508136 | 0.523137436 |
| P | F | 580.4 | 258172.4 | 0.967942 | 333 | 9377 | 0.573742 | 0.542399352 |
| P | F | 465.5 | 258637.9 | 0.969687 | 338 | 9715 | 0.726101 | 0.561950486 |
| P | F | 837.1 | 259475.0 | 0.972826 | 345 | 10060 | 0.412137 | 0.581906525 |
| P | F | 1282.6 | 260757.6 | 0.977634 | 371 | 10431 | 0.289256 | 0.603366497 |
| P | F | 553.9 | 261311.5 | 0.979711 | 386 | 10817 | 0.696877 | 0.625694123 |
| P | F | 375.6 | 261687.1 | 0.981119 | 442 | 11259 | 1.176784 | 0.65126099 |
| P | F | 707.6 | 262394.7 | 0.983772 | 454 | 11713 | 0.641605 | 0.677521981 |
| P | F | 1027.2 | 263421.9 | 0.987623 | 645 | 12358 | 0.627921 | 0.714831097 |
| P | F | 597.6 | 264019.5 | 0.989864 | 690 | 13048 | 1.154618 | 0.754743174 |
| P | F | 827.1 | 264846.6 | 0.992965 | 736 | 13784 | 0.889856 | 0.797316057 |
| P | F | 602.1 | 265448.7 | 0.995222 | 989 | 14773 | 1.642584 | 0.854523369 |
| P | F | 1274.4 | 266723.1 | 1 | 2515 | 17288 | 1.973478 | 1 |
| | | | | | | | | |
| TOTAL | | 266723.1 | | | 17288 | | | |

APPENDIX 3. VESSEL SPECIFIC SALMON BYCATCH RATES AND AMOUNTS DURING WINTER MONTHS, 1992. DATA SORTED BY ASCENDING BYCATCH RATE

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| Harvest with 0 salmon | | 12337.3 | 12337.3 | 0.081729 | 0 | 0 | 0 | 0 |
| P | P | 1849.9 | 14187.2 | 0.093984 | 1 | 1 | 0.000541 | 0.000193013 |
| P | P | 1420.0 | 15607.2 | 0.103391 | 2 | 3 | 0.001408 | 0.000579039 |
| P | P | 645.9 | 16253.1 | 0.107669 | 1 | 4 | 0.001548 | 0.000772052 |
| P | F | 639.5 | 16892.6 | 0.111906 | 1 | 5 | 0.001564 | 0.000965065 |
| C | F | 593.9 | 17486.5 | 0.11584 | 1 | 6 | 0.001684 | 0.001158078 |
| P | F | 1049.1 | 18535.6 | 0.12279 | 2 | 8 | 0.001906 | 0.001544103 |
| P | M | 521.8 | 19057.4 | 0.126247 | 1 | 9 | 0.001916 | 0.001737116 |
| C | F | 441.5 | 19498.9 | 0.129171 | 1 | 10 | 0.002265 | 0.001930129 |
| P | F | 437.2 | 19936.1 | 0.132068 | 1 | 11 | 0.002287 | 0.002123142 |
| P | F | 426.3 | 20362.4 | 0.134892 | 1 | 12 | 0.002346 | 0.002316155 |
| C | F | 414.3 | 20776.7 | 0.137636 | 1 | 13 | 0.002414 | 0.002509168 |
| C | F | 412.6 | 21189.3 | 0.14037 | 1 | 14 | 0.002424 | 0.002702181 |
| P | F | 362.8 | 21552.1 | 0.142773 | 1 | 15 | 0.002756 | 0.002895194 |
| P | M | 1088.0 | 22640.1 | 0.14998 | 3 | 18 | 0.002757 | 0.003474233 |
| P | M | 351.8 | 22991.9 | 0.152311 | 1 | 19 | 0.002843 | 0.003667246 |
| P | M | 675.2 | 23667.1 | 0.156784 | 2 | 21 | 0.002962 | 0.004053272 |
| P | F | 952.9 | 24620.0 | 0.163096 | 3 | 24 | 0.003148 | 0.00463231 |
| P | P | 315.5 | 24935.5 | 0.165186 | 1 | 25 | 0.00317 | 0.004825323 |
| P | F | 1244.4 | 26179.9 | 0.17343 | 4 | 29 | 0.003214 | 0.005597375 |
| P | P | 1687.0 | 27866.9 | 0.184606 | 6 | 35 | 0.003557 | 0.006755453 |
| P | F | 1054.5 | 28921.4 | 0.191591 | 4 | 39 | 0.003793 | 0.007527504 |
| P | P | 255.6 | 29177.0 | 0.193284 | 1 | 40 | 0.003912 | 0.007720517 |
| C | F | 249.9 | 29426.9 | 0.19494 | 1 | 41 | 0.004002 | 0.00791353 |
| C | F | 246.7 | 29673.6 | 0.196574 | 1 | 42 | 0.004054 | 0.008106543 |
| P | P | 1963.4 | 31637.0 | 0.209581 | 8 | 50 | 0.004075 | 0.009650647 |
| C | M | 244.8 | 31881.8 | 0.211203 | 1 | 51 | 0.004085 | 0.00984366 |
| P | F | 972.0 | 32853.8 | 0.217642 | 4 | 55 | 0.004115 | 0.010615711 |
| C | F | 218.3 | 33072.1 | 0.219088 | 1 | 56 | 0.004581 | 0.010808724 |
| P | F | 194.6 | 33266.7 | 0.220377 | 1 | 57 | 0.005139 | 0.011001737 |
| P | F | 538.2 | 33804.9 | 0.223942 | 3 | 60 | 0.005574 | 0.011580776 |
| P | P | 178.8 | 33983.7 | 0.225127 | 1 | 61 | 0.005593 | 0.011773789 |
| P | P | 178.2 | 34161.9 | 0.226307 | 1 | 62 | 0.005612 | 0.011966802 |
| P | F | 890.7 | 35052.6 | 0.232208 | 5 | 67 | 0.005614 | 0.012931866 |
| P | F | 1203.7 | 36256.3 | 0.240182 | 7 | 74 | 0.005815 | 0.014282957 |
| P | M | 333.0 | 36589.3 | 0.242388 | 2 | 76 | 0.006006 | 0.014668983 |
| P | F | 308.4 | 36897.7 | 0.244431 | 2 | 78 | 0.006485 | 0.015055009 |
| P | F | 459.9 | 37357.6 | 0.247477 | 3 | 81 | 0.006523 | 0.015634047 |
| C | M | 144.4 | 37502.0 | 0.248434 | 1 | 82 | 0.006925 | 0.01582706 |
| P | P | 140.0 | 37642.0 | 0.249361 | 1 | 83 | 0.007143 | 0.016020073 |
| B | F | 279.0 | 37921.0 | 0.251209 | 2 | 85 | 0.007168 | 0.016406099 |
| P | F | 549.1 | 38470.1 | 0.254847 | 4 | 89 | 0.007285 | 0.017178151 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| P | F | 683.4 | 39153.5 | 0.259374 | 5 | 94 | 0.007316 | 0.018143216 |
| P | F | 405.4 | 39558.9 | 0.26206 | 3 | 97 | 0.0074 | 0.018722254 |
| C | M | 133.0 | 39691.9 | 0.262941 | 1 | 98 | 0.007519 | 0.018915267 |
| P | F | 1166.4 | 40858.3 | 0.270668 | 9 | 107 | 0.007716 | 0.020652384 |
| P | P | 256.7 | 41115.0 | 0.272368 | 2 | 109 | 0.007791 | 0.02103841 |
| P | M | 256.5 | 41371.5 | 0.274067 | 2 | 111 | 0.007797 | 0.021424435 |
| P | P | 380.4 | 41751.9 | 0.276587 | 3 | 114 | 0.007886 | 0.022003474 |
| P | F | 252.0 | 42003.9 | 0.278257 | 2 | 116 | 0.007937 | 0.0223895 |
| P | M | 370.9 | 42374.8 | 0.280714 | 3 | 119 | 0.008088 | 0.022968539 |
| P | M | 864.0 | 43238.8 | 0.286437 | 7 | 126 | 0.008102 | 0.024319629 |
| B | P | 358.5 | 43597.3 | 0.288812 | 3 | 129 | 0.008368 | 0.024898668 |
| P | F | 1066.1 | 44663.4 | 0.295875 | 9 | 138 | 0.008442 | 0.026635785 |
| P | M | 118.4 | 44781.8 | 0.296659 | 1 | 139 | 0.008446 | 0.026828798 |
| C | M | 114.2 | 44896.0 | 0.297416 | 1 | 140 | 0.008757 | 0.02702181 |
| C | M | 228.0 | 45124.0 | 0.298926 | 2 | 142 | 0.008772 | 0.027407836 |
| P | P | 896.0 | 46020.0 | 0.304862 | 8 | 150 | 0.008929 | 0.02895194 |
| P | P | 669.7 | 46689.7 | 0.309298 | 6 | 156 | 0.008959 | 0.030110017 |
| P | M | 110.6 | 46800.3 | 0.310031 | 1 | 157 | 0.009042 | 0.03030303 |
| P | F | 1205.3 | 48005.6 | 0.318015 | 11 | 168 | 0.009126 | 0.032426173 |
| P | M | 306.0 | 48311.6 | 0.320043 | 3 | 171 | 0.009804 | 0.033005211 |
| P | P | 202.8 | 48514.4 | 0.321386 | 2 | 173 | 0.009862 | 0.033391237 |
| P | P | 3526.8 | 52041.2 | 0.344749 | 35 | 208 | 0.009924 | 0.04014669 |
| P | F | 100.4 | 52141.6 | 0.345415 | 1 | 209 | 0.00996 | 0.040339703 |
| P | P | 92.8 | 52234.4 | 0.346029 | 1 | 210 | 0.010776 | 0.040532716 |
| P | P | 274.2 | 52508.6 | 0.347846 | 3 | 213 | 0.010941 | 0.041111754 |
| P | M | 911.5 | 53420.1 | 0.353884 | 10 | 223 | 0.010971 | 0.043041884 |
| B | F | 449.1 | 53869.2 | 0.356859 | 5 | 228 | 0.011133 | 0.044006948 |
| P | F | 347.8 | 54217.0 | 0.359163 | 4 | 232 | 0.011501 | 0.044779 |
| P | M | 249.3 | 54466.3 | 0.360815 | 3 | 235 | 0.012034 | 0.045358039 |
| P | M | 161.7 | 54628.0 | 0.361886 | 2 | 237 | 0.012369 | 0.045744065 |
| P | M | 321.4 | 54949.4 | 0.364015 | 4 | 241 | 0.012446 | 0.046516117 |
| P | M | 320.5 | 55269.9 | 0.366138 | 4 | 245 | 0.01248 | 0.047288168 |
| P | M | 844.3 | 56114.2 | 0.371731 | 11 | 256 | 0.013029 | 0.049411311 |
| P | P | 306.7 | 56420.9 | 0.373763 | 4 | 260 | 0.013042 | 0.050183362 |
| P | P | 74.3 | 56495.2 | 0.374255 | 1 | 261 | 0.013459 | 0.050376375 |
| P | F | 954.0 | 57449.2 | 0.380575 | 13 | 274 | 0.013627 | 0.052885543 |
| P | F | 947.1 | 58396.3 | 0.386849 | 13 | 287 | 0.013726 | 0.055394711 |
| P | M | 577.8 | 58974.1 | 0.390677 | 8 | 295 | 0.013846 | 0.056938815 |
| P | M | 574.6 | 59548.7 | 0.394483 | 8 | 303 | 0.013923 | 0.058482918 |
| P | P | 142.9 | 59691.6 | 0.39543 | 2 | 305 | 0.013996 | 0.058868944 |
| P | F | 784.9 | 60476.5 | 0.400629 | 11 | 316 | 0.014015 | 0.060992086 |
| B | M | 470.9 | 60947.4 | 0.403749 | 7 | 323 | 0.014865 | 0.062343177 |
| C | F | 201.0 | 61148.4 | 0.40508 | 3 | 326 | 0.014925 | 0.062922216 |
| P | F | 199.8 | 61348.2 | 0.406404 | 3 | 329 | 0.015015 | 0.063501255 |
| P | P | 1396.7 | 62744.9 | 0.415657 | 21 | 350 | 0.015035 | 0.067554526 |
| P | F | 1770.7 | 64515.6 | 0.427387 | 27 | 377 | 0.015248 | 0.072765875 |
| P | F | 653.3 | 65168.9 | 0.431714 | 10 | 387 | 0.015307 | 0.074696005 |
| P | F | 629.6 | 65798.5 | 0.435885 | 10 | 397 | 0.015883 | 0.076626134 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| P | M | 626.7 | 66425.2 | 0.440037 | 10 | 407 | 0.015957 | 0.078556263 |
| B | F | 367.9 | 66793.1 | 0.442474 | 6 | 413 | 0.016309 | 0.079714341 |
| P | M | 485.1 | 67278.2 | 0.445688 | 8 | 421 | 0.016491 | 0.081258444 |
| P | F | 179.9 | 67458.1 | 0.446879 | 3 | 424 | 0.016676 | 0.081837483 |
| P | F | 1544.3 | 69002.4 | 0.45711 | 26 | 450 | 0.016836 | 0.086855819 |
| P | M | 237.0 | 69239.4 | 0.45868 | 4 | 454 | 0.016878 | 0.087627871 |
| P | F | 1649.7 | 70889.1 | 0.469608 | 28 | 482 | 0.016973 | 0.093032233 |
| P | F | 1107.5 | 71996.6 | 0.476945 | 19 | 501 | 0.017156 | 0.096699479 |
| P | P | 58.2 | 72054.8 | 0.47733 | 1 | 502 | 0.017182 | 0.096892492 |
| P | M | 170.8 | 72225.6 | 0.478462 | 3 | 505 | 0.017564 | 0.097471531 |
| P | M | 394.2 | 72619.8 | 0.481073 | 7 | 512 | 0.017757 | 0.098822621 |
| P | P | 54.4 | 72674.2 | 0.481434 | 1 | 513 | 0.018382 | 0.099015634 |
| P | P | 1137.1 | 73811.3 | 0.488966 | 21 | 534 | 0.018468 | 0.103068906 |
| P | F | 639.2 | 74450.5 | 0.493201 | 12 | 546 | 0.018773 | 0.105385061 |
| P | F | 899.8 | 75350.3 | 0.499162 | 17 | 563 | 0.018893 | 0.108666281 |
| B | F | 158.0 | 75508.3 | 0.500208 | 3 | 566 | 0.018987 | 0.109245319 |
| P | F | 421.2 | 75929.5 | 0.502999 | 8 | 574 | 0.018993 | 0.110789423 |
| P | M | 418.6 | 76348.1 | 0.505772 | 8 | 582 | 0.019111 | 0.112333526 |
| B | F | 1403.3 | 77751.4 | 0.515068 | 27 | 609 | 0.01924 | 0.117544876 |
| P | M | 206.2 | 77957.6 | 0.516434 | 4 | 613 | 0.019399 | 0.118316927 |
| P | M | 150.4 | 78108.0 | 0.51743 | 3 | 616 | 0.019947 | 0.118895966 |
| P | P | 901.7 | 79009.7 | 0.523404 | 18 | 634 | 0.019962 | 0.122370199 |
| P | M | 149.2 | 79158.9 | 0.524392 | 3 | 637 | 0.020107 | 0.122949238 |
| P | P | 246.2 | 79405.1 | 0.526023 | 5 | 642 | 0.020309 | 0.123914302 |
| P | F | 928.5 | 80333.6 | 0.532174 | 19 | 661 | 0.020463 | 0.127581548 |
| P | F | 630.7 | 80964.3 | 0.536352 | 13 | 674 | 0.020612 | 0.130090716 |
| P | F | 572.8 | 81537.1 | 0.540146 | 12 | 686 | 0.02095 | 0.132406871 |
| P | P | 331.1 | 81868.2 | 0.54234 | 7 | 693 | 0.021142 | 0.133757962 |
| P | P | 234.5 | 82102.7 | 0.543893 | 5 | 698 | 0.021322 | 0.134723026 |
| P | P | 788.5 | 82891.2 | 0.549117 | 17 | 715 | 0.02156 | 0.138004246 |
| B | F | 138.6 | 83029.8 | 0.550035 | 3 | 718 | 0.021645 | 0.138583285 |
| P | M | 458.1 | 83487.9 | 0.55307 | 10 | 728 | 0.021829 | 0.140513414 |
| P | P | 549.6 | 84037.5 | 0.55671 | 12 | 740 | 0.021834 | 0.14282957 |
| B | F | 315.2 | 84352.7 | 0.558798 | 7 | 747 | 0.022208 | 0.14418066 |
| P | F | 668.2 | 85020.9 | 0.563225 | 15 | 762 | 0.022448 | 0.147075854 |
| P | M | 932.4 | 85953.3 | 0.569402 | 21 | 783 | 0.022523 | 0.151129126 |
| P | P | 265.9 | 86219.2 | 0.571163 | 6 | 789 | 0.022565 | 0.152287203 |
| P | F | 175.4 | 86394.6 | 0.572325 | 4 | 793 | 0.022805 | 0.153059255 |
| B | M | 1173.0 | 87567.6 | 0.580096 | 27 | 820 | 0.023018 | 0.158270604 |
| B | P | 384.8 | 87952.4 | 0.582645 | 9 | 829 | 0.023389 | 0.160007721 |
| P | P | 427.1 | 88379.5 | 0.585474 | 10 | 839 | 0.023414 | 0.16193785 |
| B | F | 426.1 | 88805.6 | 0.588297 | 10 | 849 | 0.023469 | 0.163867979 |
| P | P | 849.4 | 89655.0 | 0.593924 | 20 | 869 | 0.023546 | 0.167728238 |
| P | M | 168.4 | 89823.4 | 0.595039 | 4 | 873 | 0.023753 | 0.16850029 |
| P | M | 42.0 | 89865.4 | 0.595318 | 1 | 874 | 0.02381 | 0.168693302 |
| P | P | 41.9 | 89907.3 | 0.595595 | 1 | 875 | 0.023866 | 0.168886315 |
| P | F | 373.5 | 90280.8 | 0.598069 | 9 | 884 | 0.024096 | 0.170623432 |
| P | M | 82.8 | 90363.6 | 0.598618 | 2 | 886 | 0.024155 | 0.171009458 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| C | F | 164.7 | 90528.3 | 0.599709 | 4 | 890 | 0.024287 | 0.171781509 |
| P | P | 164.3 | 90692.6 | 0.600797 | 4 | 894 | 0.024346 | 0.172553561 |
| P | P | 406.3 | 91098.9 | 0.603489 | 10 | 904 | 0.024612 | 0.17448369 |
| P | M | 121.8 | 91220.7 | 0.604296 | 3 | 907 | 0.024631 | 0.175062729 |
| P | M | 401.7 | 91622.4 | 0.606957 | 10 | 917 | 0.024894 | 0.176992859 |
| P | P | 199.9 | 91822.3 | 0.608281 | 5 | 922 | 0.025013 | 0.177957923 |
| P | M | 712.5 | 92534.8 | 0.613001 | 18 | 940 | 0.025263 | 0.181432156 |
| C | F | 116.9 | 92651.7 | 0.613776 | 3 | 943 | 0.025663 | 0.182011195 |
| P | F | 272.1 | 92923.8 | 0.615578 | 7 | 950 | 0.025726 | 0.183362285 |
| P | P | 151.7 | 93075.5 | 0.616583 | 4 | 954 | 0.026368 | 0.184134337 |
| P | F | 640.7 | 93716.2 | 0.620827 | 17 | 971 | 0.026533 | 0.187415557 |
| C | P | 224.7 | 93940.9 | 0.622316 | 6 | 977 | 0.026702 | 0.188573634 |
| P | M | 111.3 | 94052.2 | 0.623053 | 3 | 980 | 0.026954 | 0.189152673 |
| P | P | 36.8 | 94089.0 | 0.623297 | 1 | 981 | 0.027174 | 0.189345686 |
| P | F | 1564.6 | 95653.6 | 0.633662 | 43 | 1024 | 0.027483 | 0.197645242 |
| P | M | 395.9 | 96049.5 | 0.636285 | 11 | 1035 | 0.027785 | 0.199768384 |
| P | P | 250.9 | 96300.4 | 0.637947 | 7 | 1042 | 0.0279 | 0.201119475 |
| C | P | 35.3 | 96335.7 | 0.63818 | 1 | 1043 | 0.028329 | 0.201312488 |
| P | M | 457.7 | 96793.4 | 0.641213 | 13 | 1056 | 0.028403 | 0.203821656 |
| C | P | 244.0 | 97037.4 | 0.642829 | 7 | 1063 | 0.028689 | 0.205172747 |
| P | F | 521.0 | 97558.4 | 0.64628 | 15 | 1078 | 0.028791 | 0.208067941 |
| P | F | 961.6 | 98520.0 | 0.65265 | 28 | 1106 | 0.029118 | 0.213472303 |
| C | P | 33.8 | 98553.8 | 0.652874 | 1 | 1107 | 0.029586 | 0.213665316 |
| C | M | 66.9 | 98620.7 | 0.653318 | 2 | 1109 | 0.029895 | 0.214051341 |
| B | F | 1030.0 | 99650.7 | 0.660141 | 31 | 1140 | 0.030097 | 0.220034742 |
| B | F | 693.2 | 100343.9 | 0.664733 | 21 | 1161 | 0.030294 | 0.224088014 |
| P | M | 395.0 | 100738.9 | 0.66735 | 12 | 1173 | 0.03038 | 0.226404169 |
| P | M | 325.8 | 101064.7 | 0.669508 | 10 | 1183 | 0.030694 | 0.228334298 |
| P | M | 194.9 | 101259.6 | 0.670799 | 6 | 1189 | 0.030785 | 0.229492376 |
| P | M | 159.9 | 101419.5 | 0.671858 | 5 | 1194 | 0.03127 | 0.230457441 |
| P | P | 158.5 | 101578.0 | 0.672908 | 5 | 1199 | 0.031546 | 0.231422505 |
| P | F | 467.4 | 102045.4 | 0.676005 | 15 | 1214 | 0.032092 | 0.234317699 |
| B | F | 310.5 | 102355.9 | 0.678062 | 10 | 1224 | 0.032206 | 0.236247829 |
| P | P | 60.9 | 102416.8 | 0.678465 | 2 | 1226 | 0.032841 | 0.236633854 |
| B | P | 121.3 | 102538.1 | 0.679269 | 4 | 1230 | 0.032976 | 0.237405906 |
| P | F | 787.8 | 103325.9 | 0.684487 | 26 | 1256 | 0.033003 | 0.242424242 |
| P | F | 363.4 | 103689.3 | 0.686895 | 12 | 1268 | 0.033021 | 0.244740398 |
| P | F | 299.4 | 103988.7 | 0.688878 | 10 | 1278 | 0.0334 | 0.246670527 |
| P | P | 29.9 | 104018.6 | 0.689076 | 1 | 1279 | 0.033445 | 0.24686354 |
| C | P | 89.5 | 104108.1 | 0.689669 | 3 | 1282 | 0.03352 | 0.247442579 |
| C | F | 118.9 | 104227.0 | 0.690457 | 4 | 1286 | 0.033642 | 0.24821463 |
| B | F | 1564.1 | 105791.1 | 0.700818 | 53 | 1339 | 0.033885 | 0.258444316 |
| P | M | 470.0 | 106261.1 | 0.703932 | 16 | 1355 | 0.034043 | 0.261532523 |
| B | M | 321.4 | 106582.5 | 0.706061 | 11 | 1366 | 0.034225 | 0.263655665 |
| P | P | 84.9 | 106667.4 | 0.706623 | 3 | 1369 | 0.035336 | 0.264234704 |
| P | F | 532.8 | 107200.2 | 0.710153 | 19 | 1388 | 0.035661 | 0.267901949 |
| C | M | 83.5 | 107283.7 | 0.710706 | 3 | 1391 | 0.035928 | 0.268480988 |
| P | M | 165.6 | 107449.3 | 0.711803 | 6 | 1397 | 0.036232 | 0.269639066 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| P | F | 1652.5 | 109101.8 | 0.72275 | 61 | 1458 | 0.036914 | 0.281412855 |
| P | F | 373.9 | 109475.7 | 0.725227 | 14 | 1472 | 0.037443 | 0.284115036 |
| B | M | 159.4 | 109635.1 | 0.726283 | 6 | 1478 | 0.037641 | 0.285273113 |
| P | P | 78.5 | 109713.6 | 0.726803 | 3 | 1481 | 0.038217 | 0.285852152 |
| P | M | 52.0 | 109765.6 | 0.727147 | 2 | 1483 | 0.038462 | 0.286238178 |
| P | M | 155.3 | 109920.9 | 0.728176 | 6 | 1489 | 0.038635 | 0.287396256 |
| P | M | 253.5 | 110174.4 | 0.729856 | 10 | 1499 | 0.039448 | 0.289326385 |
| P | M | 25.1 | 110199.5 | 0.730022 | 1 | 1500 | 0.039841 | 0.289519398 |
| P | F | 701.5 | 110901.0 | 0.734669 | 28 | 1528 | 0.039914 | 0.29492376 |
| P | F | 369.8 | 111270.8 | 0.737119 | 15 | 1543 | 0.040562 | 0.297818954 |
| B | M | 24.5 | 111295.3 | 0.737281 | 1 | 1544 | 0.040816 | 0.298011967 |
| B | F | 757.2 | 112052.5 | 0.742297 | 31 | 1575 | 0.04094 | 0.303995368 |
| P | F | 980.8 | 113033.3 | 0.748794 | 41 | 1616 | 0.041803 | 0.311908898 |
| P | P | 47.5 | 113080.8 | 0.749109 | 2 | 1618 | 0.042105 | 0.312294924 |
| P | F | 46.4 | 113127.2 | 0.749417 | 2 | 1620 | 0.043103 | 0.31268095 |
| P | P | 92.5 | 113219.7 | 0.750029 | 4 | 1624 | 0.043243 | 0.313453001 |
| P | F | 503.8 | 113723.5 | 0.753367 | 22 | 1646 | 0.043668 | 0.317699286 |
| C | F | 90.7 | 113814.2 | 0.753968 | 4 | 1650 | 0.044101 | 0.318471338 |
| P | P | 157.5 | 113971.7 | 0.755011 | 7 | 1657 | 0.044444 | 0.319822428 |
| P | M | 202.4 | 114174.1 | 0.756352 | 9 | 1666 | 0.044466 | 0.321559544 |
| P | F | 1097.4 | 115271.5 | 0.763622 | 49 | 1715 | 0.044651 | 0.331017178 |
| P | F | 335.7 | 115607.2 | 0.765845 | 15 | 1730 | 0.044683 | 0.333912372 |
| P | M | 243.8 | 115851.0 | 0.76746 | 11 | 1741 | 0.045119 | 0.336035514 |
| C | M | 152.0 | 116003.0 | 0.768467 | 7 | 1748 | 0.046053 | 0.337386605 |
| P | F | 559.0 | 116562.0 | 0.772171 | 26 | 1774 | 0.046512 | 0.342404941 |
| P | P | 170.9 | 116732.9 | 0.773303 | 8 | 1782 | 0.046811 | 0.343949045 |
| P | F | 616.8 | 117349.7 | 0.777389 | 30 | 1812 | 0.048638 | 0.349739433 |
| P | M | 121.5 | 117471.2 | 0.778194 | 6 | 1818 | 0.049383 | 0.35089751 |
| P | P | 445.3 | 117916.5 | 0.781143 | 22 | 1840 | 0.049405 | 0.355143795 |
| P | M | 200.8 | 118117.3 | 0.782474 | 10 | 1850 | 0.049801 | 0.357073924 |
| P | F | 719.9 | 118837.2 | 0.787243 | 36 | 1886 | 0.050007 | 0.36402239 |
| P | F | 157.7 | 118994.9 | 0.788287 | 8 | 1894 | 0.050729 | 0.365566493 |
| P | P | 38.6 | 119033.5 | 0.788543 | 2 | 1896 | 0.051813 | 0.365952519 |
| B | F | 322.2 | 119355.7 | 0.790678 | 17 | 1913 | 0.052762 | 0.369233739 |
| P | M | 469.8 | 119825.5 | 0.79379 | 25 | 1938 | 0.053214 | 0.374059062 |
| P | P | 146.7 | 119972.2 | 0.794762 | 8 | 1946 | 0.054533 | 0.375603165 |
| P | F | 629.8 | 120602.0 | 0.798934 | 35 | 1981 | 0.055573 | 0.382358618 |
| P | M | 161.7 | 120763.7 | 0.800005 | 9 | 1990 | 0.055659 | 0.384095734 |
| P | F | 925.0 | 121688.7 | 0.806133 | 52 | 2042 | 0.056216 | 0.394132407 |
| B | P | 159.0 | 121847.7 | 0.807186 | 9 | 2051 | 0.056604 | 0.395869523 |
| B | F | 600.1 | 122447.8 | 0.811161 | 34 | 2085 | 0.056657 | 0.402431963 |
| P | M | 227.4 | 122675.2 | 0.812668 | 13 | 2098 | 0.057168 | 0.404941131 |
| P | M | 139.2 | 122814.4 | 0.81359 | 8 | 2106 | 0.057471 | 0.406485235 |
| B | F | 467.3 | 123281.7 | 0.816686 | 27 | 2133 | 0.057779 | 0.411696584 |
| P | M | 375.6 | 123657.3 | 0.819174 | 22 | 2155 | 0.058573 | 0.415942868 |
| P | P | 102.2 | 123759.5 | 0.819851 | 6 | 2161 | 0.058708 | 0.417100946 |
| P | M | 34.0 | 123793.5 | 0.820076 | 2 | 2163 | 0.058824 | 0.417486972 |
| P | M | 692.4 | 124485.9 | 0.824663 | 41 | 2204 | 0.059214 | 0.425400502 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| P | P | 1364.3 | 125850.2 | 0.833701 | 81 | 2285 | 0.059371 | 0.441034549 |
| P | M | 385.3 | 126235.5 | 0.836253 | 23 | 2308 | 0.059694 | 0.445473847 |
| P | F | 301.4 | 126536.9 | 0.83825 | 18 | 2326 | 0.059721 | 0.44894808 |
| P | M | 299.8 | 126836.7 | 0.840236 | 18 | 2344 | 0.06004 | 0.452422312 |
| P | M | 951.6 | 127788.3 | 0.84654 | 58 | 2402 | 0.06095 | 0.463617062 |
| P | M | 65.5 | 127853.8 | 0.846974 | 4 | 2406 | 0.061069 | 0.464389114 |
| P | F | 81.2 | 127935.0 | 0.847512 | 5 | 2411 | 0.061576 | 0.465354179 |
| P | F | 324.8 | 128259.8 | 0.849663 | 20 | 2431 | 0.061576 | 0.469214437 |
| P | F | 845.8 | 129105.6 | 0.855266 | 53 | 2484 | 0.062663 | 0.479444123 |
| P | M | 270.3 | 129375.9 | 0.857057 | 17 | 2501 | 0.062893 | 0.482725343 |
| P | F | 501.0 | 129876.9 | 0.860376 | 32 | 2533 | 0.063872 | 0.488901756 |
| P | F | 735.4 | 130612.3 | 0.865247 | 47 | 2580 | 0.063911 | 0.497973364 |
| P | P | 109.1 | 130721.4 | 0.86597 | 7 | 2587 | 0.064161 | 0.499324455 |
| B | F | 93.1 | 130814.5 | 0.866587 | 6 | 2593 | 0.064447 | 0.500482532 |
| P | M | 247.1 | 131061.6 | 0.868224 | 16 | 2609 | 0.064751 | 0.503570739 |
| C | P | 307.9 | 131369.5 | 0.870264 | 20 | 2629 | 0.064956 | 0.507430998 |
| P | M | 306.2 | 131675.7 | 0.872292 | 20 | 2649 | 0.065317 | 0.511291257 |
| P | M | 347.9 | 132023.6 | 0.874597 | 23 | 2672 | 0.066111 | 0.515730554 |
| B | P | 60.2 | 132083.8 | 0.874995 | 4 | 2676 | 0.066445 | 0.516502606 |
| P | M | 500.1 | 132583.9 | 0.878308 | 34 | 2710 | 0.067986 | 0.523065045 |
| B | M | 73.3 | 132657.2 | 0.878794 | 5 | 2715 | 0.068213 | 0.52403011 |
| P | M | 160.0 | 132817.2 | 0.879854 | 11 | 2726 | 0.06875 | 0.526153252 |
| P | M | 391.9 | 133209.1 | 0.88245 | 28 | 2754 | 0.071447 | 0.531557614 |
| B | F | 592.1 | 133801.2 | 0.886372 | 44 | 2798 | 0.074312 | 0.540050183 |
| P | M | 443.9 | 134245.1 | 0.889313 | 33 | 2831 | 0.074341 | 0.54641961 |
| P | P | 13.4 | 134258.5 | 0.889402 | 1 | 2832 | 0.074627 | 0.546612623 |
| B | F | 574.9 | 134833.4 | 0.89321 | 44 | 2876 | 0.076535 | 0.555105192 |
| C | M | 51.2 | 134884.6 | 0.893549 | 4 | 2880 | 0.078125 | 0.555877244 |
| P | M | 256.0 | 135140.6 | 0.895245 | 20 | 2900 | 0.078125 | 0.559737502 |
| P | M | 246.9 | 135387.5 | 0.896881 | 20 | 2920 | 0.081004 | 0.563597761 |
| P | P | 73.8 | 135461.3 | 0.89737 | 6 | 2926 | 0.081301 | 0.564755839 |
| P | F | 220.6 | 135681.9 | 0.898831 | 18 | 2944 | 0.081596 | 0.568230071 |
| P | F | 292.8 | 135974.7 | 0.900771 | 24 | 2968 | 0.081967 | 0.572862382 |
| P | M | 36.0 | 136010.7 | 0.901009 | 3 | 2971 | 0.083333 | 0.573441421 |
| P | P | 47.7 | 136058.4 | 0.901325 | 4 | 2975 | 0.083857 | 0.574213472 |
| P | F | 345.3 | 136403.7 | 0.903613 | 29 | 3004 | 0.083985 | 0.579810847 |
| P | F | 130.5 | 136534.2 | 0.904477 | 11 | 3015 | 0.084291 | 0.58193399 |
| C | F | 59.1 | 136593.3 | 0.904869 | 5 | 3020 | 0.084602 | 0.582899054 |
| P | F | 440.0 | 137033.3 | 0.907784 | 38 | 3058 | 0.086364 | 0.590233546 |
| P | M | 620.5 | 137653.8 | 0.911894 | 54 | 3112 | 0.087027 | 0.600656244 |
| C | P | 34.4 | 137688.2 | 0.912122 | 3 | 3115 | 0.087209 | 0.601235283 |
| B | F | 606.8 | 138295.0 | 0.916142 | 53 | 3168 | 0.087343 | 0.611464968 |
| P | M | 113.4 | 138408.4 | 0.916893 | 10 | 3178 | 0.088183 | 0.613395097 |
| B | F | 1438.5 | 139846.9 | 0.926422 | 127 | 3305 | 0.088286 | 0.63790774 |
| C | P | 56.6 | 139903.5 | 0.926797 | 5 | 3310 | 0.088339 | 0.638872804 |
| B | F | 282.7 | 140186.2 | 0.92867 | 25 | 3335 | 0.088433 | 0.643698128 |
| P | M | 416.2 | 140602.4 | 0.931427 | 37 | 3372 | 0.0889 | 0.650839606 |
| P | M | 583.8 | 141186.2 | 0.935295 | 58 | 3430 | 0.099349 | 0.662034356 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal. |
|---|---|---|---|---|---|---|---|---|
| P | F | 487.8 | 141674.0 | 0.938526 | 49 | 3479 | 0.100451 | 0.67149199 |
| B | F | 524.2 | 142198.2 | 0.941999 | 54 | 3533 | 0.103014 | 0.681914688 |
| P | M | 86.4 | 142284.6 | 0.942571 | 9 | 3542 | 0.104167 | 0.683651805 |
| P | F | 228.1 | 142512.7 | 0.944082 | 24 | 3566 | 0.105217 | 0.688284115 |
| P | F | 544.7 | 143057.4 | 0.947691 | 58 | 3624 | 0.106481 | 0.699478865 |
| P | P | 92.7 | 143150.1 | 0.948305 | 10 | 3634 | 0.107875 | 0.701408994 |
| B | F | 215.5 | 143365.6 | 0.949732 | 24 | 3658 | 0.111369 | 0.706041305 |
| P | F | 390.4 | 143756.0 | 0.952318 | 44 | 3702 | 0.112705 | 0.714533874 |
| P | M | 634.9 | 144390.9 | 0.956524 | 75 | 3777 | 0.118129 | 0.729009844 |
| P | P | 62.9 | 144453.8 | 0.956941 | 8 | 3785 | 0.127186 | 0.730553947 |
| P | P | 439.7 | 144893.5 | 0.959854 | 56 | 3841 | 0.12736 | 0.741362671 |
| B | M | 90.9 | 144984.4 | 0.960456 | 12 | 3853 | 0.132013 | 0.743678826 |
| P | M | 439.3 | 145423.7 | 0.963366 | 58 | 3911 | 0.132028 | 0.754873577 |
| P | M | 582.4 | 146006.1 | 0.967224 | 77 | 3988 | 0.132212 | 0.769735572 |
| P | F | 563.9 | 146570.0 | 0.97096 | 79 | 4067 | 0.140096 | 0.784983594 |
| B | P | 83.9 | 146653.9 | 0.971516 | 12 | 4079 | 0.143027 | 0.787299749 |
| P | F | 227.9 | 146881.8 | 0.973026 | 33 | 4112 | 0.1448 | 0.793669176 |
| P | F | 364.2 | 147246.0 | 0.975438 | 54 | 4166 | 0.14827 | 0.804091874 |
| P | P | 64.2 | 147310.2 | 0.975863 | 10 | 4176 | 0.155763 | 0.806022003 |
| P | P | 322.5 | 147632.7 | 0.978 | 51 | 4227 | 0.15814 | 0.815865663 |
| B | M | 60.6 | 147693.3 | 0.978401 | 10 | 4237 | 0.165017 | 0.817795792 |
| P | P | 18.0 | 147711.3 | 0.978521 | 3 | 4240 | 0.166667 | 0.818374831 |
| B | P | 5.9 | 147717.2 | 0.97856 | 1 | 4241 | 0.169492 | 0.818567844 |
| C | F | 542.7 | 148259.9 | 0.982155 | 105 | 4346 | 0.193477 | 0.838834202 |
| P | F | 524.7 | 148784.6 | 0.985631 | 102 | 4448 | 0.194397 | 0.858521521 |
| P | P | 35.9 | 148820.5 | 0.985869 | 7 | 4455 | 0.194986 | 0.859872611 |
| P | F | 556.8 | 149377.3 | 0.989557 | 110 | 4565 | 0.197557 | 0.881104034 |
| P | P | 10.0 | 149387.3 | 0.989623 | 2 | 4567 | 0.2 | 0.88149006 |
| C | P | 24.3 | 149411.6 | 0.989784 | 5 | 4572 | 0.205761 | 0.882455124 |
| P | M | 81.7 | 149493.3 | 0.990326 | 17 | 4589 | 0.208078 | 0.885736344 |
| C | F | 35.7 | 149529.0 | 0.990562 | 8 | 4597 | 0.22409 | 0.887280448 |
| P | M | 76.2 | 149605.2 | 0.991067 | 18 | 4615 | 0.23622 | 0.890754681 |
| P | M | 20.9 | 149626.1 | 0.991205 | 5 | 4620 | 0.239234 | 0.891719745 |
| P | M | 214.3 | 149840.4 | 0.992625 | 54 | 4674 | 0.251983 | 0.902142444 |
| P | P | 11.8 | 149852.2 | 0.992703 | 3 | 4677 | 0.254237 | 0.902721482 |
| P | P | 42.9 | 149895.1 | 0.992987 | 12 | 4689 | 0.27972 | 0.905037638 |
| P | M | 87.4 | 149982.5 | 0.993566 | 25 | 4714 | 0.286041 | 0.909862961 |
| P | M | 75.9 | 150058.4 | 0.994069 | 22 | 4736 | 0.289855 | 0.914109245 |
| P | P | 51.4 | 150109.8 | 0.99441 | 17 | 4753 | 0.330739 | 0.917390465 |
| P | F | 509.2 | 150619.0 | 0.997783 | 215 | 4968 | 0.422231 | 0.958888246 |
| P | F | 255.1 | 150874.1 | 0.999473 | 157 | 5125 | 0.615445 | 0.989191276 |
| P | P | 76.1 | 150950.2 | 0.999977 | 47 | 5172 | 0.617608 | 0.998262884 |
| C | P | 3.5 | 150953.7 | 1 | 9 | 5181 | 2.571429 | 1 |
| | | | | | | | | |
| TOTAL | | 150953.7 | | | 5181 | | | |

| APPENDIX 4. VESSEL SPECIFIC SALMON BYCATCH RATES AND AMOUNTS DURING SUMMER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MONTHS, 1992. DATA SORTED BY ASCENDING BYCATCH RATE | | | | | | | | |
| | | | | | | | | |
| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
| | | | | | | | | |
| | | | | | | | | |
| Harvest with 0 salmon | | 83259.0 | 83259.0 | 0.312155 | 0 | 0 | 0 | 0 |
| P | M | 1453.8 | 84712.8 | 0.317606 | 1 | 1 | 0.000688 | 5.78436E-05 |
| P | F | 916.6 | 85629.4 | 0.321042 | 1 | 2 | 0.001091 | 0.000115687 |
| P | M | 853.2 | 86482.6 | 0.324241 | 1 | 3 | 0.001172 | 0.000173531 |
| P | M | 816.2 | 87298.8 | 0.327301 | 1 | 4 | 0.001225 | 0.000231374 |
| P | M | 754.3 | 88053.1 | 0.330129 | 1 | 5 | 0.001326 | 0.000289218 |
| P | M | 1409.9 | 89463.0 | 0.335415 | 2 | 7 | 0.001419 | 0.000404905 |
| P | F | 660.2 | 90123.2 | 0.337891 | 1 | 8 | 0.001515 | 0.000462749 |
| P | M | 605.9 | 90729.1 | 0.340162 | 1 | 9 | 0.00165 | 0.000520592 |
| P | M | 1796.4 | 92525.5 | 0.346897 | 3 | 12 | 0.00167 | 0.000694123 |
| P | M | 587.6 | 93113.1 | 0.3491 | 1 | 13 | 0.001702 | 0.000751967 |
| P | P | 584.0 | 93697.1 | 0.35129 | 1 | 14 | 0.001712 | 0.00080981 |
| P | F | 580.7 | 94277.8 | 0.353467 | 1 | 15 | 0.001722 | 0.000867654 |
| P | M | 580.3 | 94858.1 | 0.355643 | 1 | 16 | 0.001723 | 0.000925497 |
| P | M | 2598.3 | 97456.4 | 0.365384 | 5 | 21 | 0.001924 | 0.001214715 |
| P | M | 1009.1 | 98465.5 | 0.369168 | 2 | 23 | 0.001982 | 0.001330403 |
| P | P | 504.5 | 98970.0 | 0.371059 | 1 | 24 | 0.001982 | 0.001388246 |
| P | M | 999.6 | 99969.6 | 0.374807 | 2 | 26 | 0.002001 | 0.001503933 |
| P | F | 487.0 | 100456.6 | 0.376633 | 1 | 27 | 0.002053 | 0.001561777 |
| P | F | 468.0 | 100924.6 | 0.378387 | 1 | 28 | 0.002137 | 0.001619621 |
| P | F | 457.8 | 101382.4 | 0.380104 | 1 | 29 | 0.002184 | 0.001677464 |
| P | F | 454.2 | 101836.6 | 0.381807 | 1 | 30 | 0.002202 | 0.001735308 |
| P | F | 441.6 | 102278.2 | 0.383462 | 1 | 31 | 0.002264 | 0.001793151 |
| P | M | 435.7 | 102713.9 | 0.385096 | 1 | 32 | 0.002295 | 0.001850995 |
| P | F | 870.2 | 103584.1 | 0.388358 | 2 | 34 | 0.002298 | 0.001966682 |
| P | F | 867.7 | 104451.8 | 0.391612 | 2 | 36 | 0.002305 | 0.002082369 |
| P | F | 1638.7 | 106090.5 | 0.397755 | 4 | 40 | 0.002441 | 0.002313744 |
| P | F | 720.3 | 106810.8 | 0.400456 | 2 | 42 | 0.002777 | 0.002429431 |
| P | F | 358.2 | 107169.0 | 0.401799 | 1 | 43 | 0.002792 | 0.002487274 |
| P | F | 357.5 | 107526.5 | 0.403139 | 1 | 44 | 0.002797 | 0.002545118 |
| P | M | 694.7 | 108221.2 | 0.405744 | 2 | 46 | 0.002879 | 0.002660805 |
| P | F | 667.2 | 108888.4 | 0.408245 | 2 | 48 | 0.002998 | 0.002776492 |
| P | F | 328.4 | 109216.8 | 0.409476 | 1 | 49 | 0.003045 | 0.002834336 |
| P | F | 325.4 | 109542.2 | 0.410696 | 1 | 50 | 0.003073 | 0.00289218 |
| P | M | 636.9 | 110179.1 | 0.413084 | 2 | 52 | 0.00314 | 0.003007867 |
| P | M | 632.2 | 110811.3 | 0.415455 | 2 | 54 | 0.003164 | 0.003123554 |
| P | F | 619.1 | 111430.4 | 0.417776 | 2 | 56 | 0.00323 | 0.003239241 |
| P | F | 909.0 | 112339.4 | 0.421184 | 3 | 59 | 0.0033 | 0.003412772 |
| P | M | 599.6 | 112939.0 | 0.423432 | 2 | 61 | 0.003336 | 0.003528459 |
| P | F | 599.6 | 113538.6 | 0.42568 | 2 | 63 | 0.003336 | 0.003644146 |
| P | F | 296.8 | 113835.4 | 0.426793 | 1 | 64 | 0.003369 | 0.00370199 |
| P | F | 295.1 | 114130.5 | 0.427899 | 1 | 65 | 0.003389 | 0.003759833 |
| P | M | 2016.8 | 116147.3 | 0.43546 | 7 | 72 | 0.003471 | 0.004164739 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 1140.9 | 117288.2 | 0.439738 | 4 | 76 | 0.003506 | 0.004396113 |
| P | M | 1103.5 | 118391.7 | 0.443875 | 4 | 80 | 0.003625 | 0.004627487 |
| P | P | 266.0 | 118657.7 | 0.444872 | 1 | 81 | 0.003759 | 0.004685331 |
| P | F | 746.0 | 119403.7 | 0.447669 | 3 | 84 | 0.004021 | 0.004858862 |
| P | M | 240.2 | 119643.9 | 0.44857 | 1 | 85 | 0.004163 | 0.004916705 |
| P | F | 236.5 | 119880.4 | 0.449457 | 1 | 86 | 0.004228 | 0.004974549 |
| P | F | 448.4 | 120328.8 | 0.451138 | 2 | 88 | 0.00446 | 0.005090236 |
| P | F | 669.5 | 120998.3 | 0.453648 | 3 | 91 | 0.004481 | 0.005263767 |
| P | F | 871.7 | 121870.0 | 0.456916 | 4 | 95 | 0.004589 | 0.005495141 |
| P | F | 217.9 | 122087.9 | 0.457733 | 1 | 96 | 0.004589 | 0.005552985 |
| P | F | 642.6 | 122730.5 | 0.460142 | 3 | 99 | 0.004669 | 0.005726516 |
| P | F | 210.8 | 122941.3 | 0.460933 | 1 | 100 | 0.004744 | 0.005784359 |
| P | F | 204.9 | 123146.2 | 0.461701 | 1 | 101 | 0.00488 | 0.005842203 |
| P | M | 603.1 | 123749.3 | 0.463962 | 3 | 104 | 0.004974 | 0.006015733 |
| P | F | 586.3 | 124335.6 | 0.46616 | 3 | 107 | 0.005117 | 0.006189264 |
| P | M | 956.8 | 125292.4 | 0.469747 | 5 | 112 | 0.005226 | 0.006478482 |
| P | M | 573.2 | 125865.6 | 0.471896 | 3 | 115 | 0.005234 | 0.006652013 |
| P | M | 190.7 | 126056.3 | 0.472611 | 1 | 116 | 0.005244 | 0.006709857 |
| P | M | 754.9 | 126811.2 | 0.475442 | 4 | 120 | 0.005299 | 0.006941231 |
| P | M | 374.5 | 127185.7 | 0.476846 | 2 | 122 | 0.00534 | 0.007056918 |
| P | F | 367.0 | 127552.7 | 0.478222 | 2 | 124 | 0.00545 | 0.007172605 |
| P | F | 1087.0 | 128639.7 | 0.482297 | 6 | 130 | 0.00552 | 0.007519667 |
| P | F | 354.4 | 128994.1 | 0.483626 | 2 | 132 | 0.005643 | 0.007635354 |
| P | M | 1206.7 | 130200.8 | 0.48815 | 7 | 139 | 0.005801 | 0.008040259 |
| P | M | 1029.0 | 131229.8 | 0.492008 | 6 | 145 | 0.005831 | 0.008387321 |
| P | F | 853.7 | 132083.5 | 0.495209 | 5 | 150 | 0.005857 | 0.008676539 |
| P | F | 341.4 | 132424.9 | 0.496488 | 2 | 152 | 0.005858 | 0.008792226 |
| P | M | 501.3 | 132926.2 | 0.498368 | 3 | 155 | 0.005984 | 0.008965757 |
| P | F | 974.4 | 133900.6 | 0.502021 | 6 | 161 | 0.006158 | 0.009312818 |
| P | M | 810.8 | 134711.4 | 0.505061 | 5 | 166 | 0.006167 | 0.009602036 |
| P | F | 455.5 | 135166.9 | 0.506769 | 3 | 169 | 0.006586 | 0.009775567 |
| P | F | 150.5 | 135317.4 | 0.507333 | 1 | 170 | 0.006645 | 0.00983341 |
| P | F | 1039.6 | 136357.0 | 0.511231 | 7 | 177 | 0.006733 | 0.010238316 |
| P | F | 588.0 | 136945.0 | 0.513435 | 4 | 181 | 0.006803 | 0.01046969 |
| P | F | 143.6 | 137088.6 | 0.513974 | 1 | 182 | 0.006964 | 0.010527534 |
| P | F | 430.4 | 137519.0 | 0.515587 | 3 | 185 | 0.00697 | 0.010701064 |
| P | F | 1002.3 | 138521.3 | 0.519345 | 7 | 192 | 0.006984 | 0.011105969 |
| P | M | 271.4 | 138792.7 | 0.520363 | 2 | 194 | 0.007369 | 0.011221657 |
| P | F | 783.8 | 139576.5 | 0.523301 | 6 | 200 | 0.007655 | 0.011568718 |
| P | F | 904.3 | 140480.8 | 0.526692 | 7 | 207 | 0.007741 | 0.011973623 |
| P | F | 498.5 | 140979.3 | 0.528561 | 4 | 211 | 0.008024 | 0.012204998 |
| P | F | 124.0 | 141103.3 | 0.529026 | 1 | 212 | 0.008065 | 0.012262841 |
| P | F | 991.2 | 142094.5 | 0.532742 | 8 | 220 | 0.008071 | 0.01272559 |
| P | M | 488.1 | 142582.6 | 0.534572 | 4 | 224 | 0.008195 | 0.012956964 |
| P | F | 474.4 | 143057.0 | 0.53635 | 4 | 228 | 0.008432 | 0.013188339 |
| P | F | 584.6 | 143641.6 | 0.538542 | 5 | 233 | 0.008553 | 0.013477557 |
| P | F | 460.6 | 144102.2 | 0.540269 | 4 | 237 | 0.008684 | 0.013708931 |
| P | P | 685.7 | 144787.9 | 0.54284 | 6 | 243 | 0.00875 | 0.014055993 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 1141.4 | 145929.3 | 0.547119 | 10 | 253 | 0.008761 | 0.014634429 |
| P | M | 334.9 | 146264.2 | 0.548375 | 3 | 256 | 0.008958 | 0.014807959 |
| P | F | 329.8 | 146594.0 | 0.549611 | 3 | 259 | 0.009096 | 0.01498149 |
| P | M | 1079.2 | 147673.2 | 0.553658 | 10 | 269 | 0.009266 | 0.015559926 |
| P | M | 857.7 | 148530.9 | 0.556873 | 8 | 277 | 0.009327 | 0.016022675 |
| P | F | 106.8 | 148637.7 | 0.557274 | 1 | 278 | 0.009363 | 0.016080518 |
| P | F | 1582.9 | 150220.6 | 0.563208 | 15 | 293 | 0.009476 | 0.016948172 |
| P | M | 209.8 | 150430.4 | 0.563995 | 2 | 295 | 0.009533 | 0.017063859 |
| P | M | 208.4 | 150638.8 | 0.564776 | 2 | 297 | 0.009597 | 0.017179547 |
| P | F | 623.0 | 151261.8 | 0.567112 | 6 | 303 | 0.009631 | 0.017526608 |
| P | M | 817.4 | 152079.2 | 0.570177 | 8 | 311 | 0.009787 | 0.017989357 |
| P | F | 297.9 | 152377.1 | 0.571293 | 3 | 314 | 0.01007 | 0.018162888 |
| P | M | 1274.3 | 153651.4 | 0.576071 | 13 | 327 | 0.010202 | 0.018914854 |
| P | M | 680.7 | 154332.1 | 0.578623 | 7 | 334 | 0.010284 | 0.019319759 |
| P | M | 96.0 | 154428.1 | 0.578983 | 1 | 335 | 0.010417 | 0.019377603 |
| P | F | 653.8 | 155081.9 | 0.581434 | 7 | 342 | 0.010707 | 0.019782508 |
| P | F | 183.7 | 155265.6 | 0.582123 | 2 | 344 | 0.010887 | 0.019898195 |
| P | F | 1232.3 | 156497.9 | 0.586743 | 14 | 358 | 0.011361 | 0.020708006 |
| P | F | 435.4 | 156933.3 | 0.588376 | 5 | 363 | 0.011484 | 0.020997224 |
| P | F | 343.6 | 157276.9 | 0.589664 | 4 | 367 | 0.011641 | 0.021228598 |
| P | F | 1508.3 | 158785.2 | 0.595319 | 18 | 385 | 0.011934 | 0.022269783 |
| P | F | 334.0 | 159119.2 | 0.596571 | 4 | 389 | 0.011976 | 0.022501157 |
| P | M | 332.5 | 159451.7 | 0.597818 | 4 | 393 | 0.01203 | 0.022732531 |
| P | F | 1065.0 | 160516.7 | 0.60181 | 13 | 406 | 0.012207 | 0.023484498 |
| P | F | 1382.5 | 161899.2 | 0.606994 | 17 | 423 | 0.012297 | 0.024467839 |
| P | F | 813.2 | 162712.4 | 0.610043 | 10 | 433 | 0.012297 | 0.025046275 |
| P | F | 812.2 | 163524.6 | 0.613088 | 10 | 443 | 0.012312 | 0.025624711 |
| P | F | 403.2 | 163927.8 | 0.614599 | 5 | 448 | 0.012401 | 0.025913929 |
| P | M | 78.1 | 164005.9 | 0.614892 | 1 | 449 | 0.012804 | 0.025971772 |
| P | F | 1218.4 | 165224.3 | 0.61946 | 16 | 465 | 0.013132 | 0.02689727 |
| P | F | 151.9 | 165376.2 | 0.62003 | 2 | 467 | 0.013167 | 0.027012957 |
| P | F | 972.6 | 166348.8 | 0.623676 | 13 | 480 | 0.013366 | 0.027764924 |
| P | M | 215.9 | 166564.7 | 0.624486 | 3 | 483 | 0.013895 | 0.027938454 |
| P | F | 637.0 | 167201.7 | 0.626874 | 9 | 492 | 0.014129 | 0.028459047 |
| P | F | 211.8 | 167413.5 | 0.627668 | 3 | 495 | 0.014164 | 0.028632578 |
| P | F | 564.2 | 167977.7 | 0.629783 | 8 | 503 | 0.014179 | 0.029095326 |
| P | M | 140.8 | 168118.5 | 0.630311 | 2 | 505 | 0.014205 | 0.029211013 |
| P | F | 140.6 | 168259.1 | 0.630838 | 2 | 507 | 0.014225 | 0.029326701 |
| B | M | 70.2 | 168329.3 | 0.631102 | 1 | 508 | 0.014245 | 0.029384544 |
| P | F | 1316.0 | 169645.3 | 0.636036 | 19 | 527 | 0.014438 | 0.030483572 |
| P | F | 1129.0 | 170774.3 | 0.640268 | 17 | 544 | 0.015058 | 0.031466913 |
| P | F | 388.6 | 171162.9 | 0.641725 | 6 | 550 | 0.01544 | 0.031813975 |
| P | F | 321.4 | 171484.3 | 0.64293 | 5 | 555 | 0.015557 | 0.032103193 |
| P | F | 444.3 | 171928.6 | 0.644596 | 7 | 562 | 0.015755 | 0.032508098 |
| P | F | 873.1 | 172801.7 | 0.64787 | 14 | 576 | 0.016035 | 0.033317908 |
| P | F | 431.0 | 173232.7 | 0.649485 | 7 | 583 | 0.016241 | 0.033722814 |
| P | F | 554.1 | 173786.8 | 0.651563 | 9 | 592 | 0.016243 | 0.034243406 |
| P | F | 426.2 | 174213.0 | 0.653161 | 7 | 599 | 0.016424 | 0.034648311 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 424.4 | 174637.4 | 0.654752 | 7 | 606 | 0.016494 | 0.035053216 |
| P | F | 421.0 | 175058.4 | 0.65633 | 7 | 613 | 0.016627 | 0.035458121 |
| P | F | 479.3 | 175537.7 | 0.658127 | 8 | 621 | 0.016691 | 0.03592087 |
| P | F | 1418.8 | 176956.5 | 0.663447 | 24 | 645 | 0.016916 | 0.037309116 |
| P | F | 822.5 | 177779.0 | 0.66653 | 14 | 659 | 0.017021 | 0.038118926 |
| P | F | 570.1 | 178349.1 | 0.668668 | 10 | 669 | 0.017541 | 0.038697362 |
| P | F | 386.2 | 178735.3 | 0.670116 | 7 | 676 | 0.018125 | 0.039102267 |
| P | M | 271.9 | 179007.2 | 0.671135 | 5 | 681 | 0.018389 | 0.039391485 |
| P | F | 323.0 | 179330.2 | 0.672346 | 6 | 687 | 0.018576 | 0.039738547 |
| P | F | 693.5 | 180023.7 | 0.674946 | 13 | 700 | 0.018745 | 0.040490514 |
| P | F | 410.4 | 180434.1 | 0.676485 | 8 | 708 | 0.019493 | 0.040953262 |
| P | F | 352.2 | 180786.3 | 0.677805 | 7 | 715 | 0.019875 | 0.041358168 |
| P | F | 401.7 | 181188.0 | 0.679311 | 8 | 723 | 0.019915 | 0.041820916 |
| P | F | 399.8 | 181587.8 | 0.68081 | 8 | 731 | 0.02001 | 0.042283665 |
| P | M | 541.6 | 182129.4 | 0.682841 | 11 | 742 | 0.02031 | 0.042919944 |
| P | F | 533.4 | 182662.8 | 0.684841 | 11 | 753 | 0.020622 | 0.043556224 |
| P | M | 475.1 | 183137.9 | 0.686622 | 10 | 763 | 0.021048 | 0.04413466 |
| P | F | 474.4 | 183612.3 | 0.688401 | 10 | 773 | 0.021079 | 0.044713096 |
| P | F | 647.9 | 184260.2 | 0.69083 | 14 | 787 | 0.021608 | 0.045522906 |
| P | F | 1081.4 | 185341.6 | 0.694884 | 24 | 811 | 0.022193 | 0.046911152 |
| P | M | 87.0 | 185428.6 | 0.69521 | 2 | 813 | 0.022989 | 0.047026839 |
| P | F | 733.4 | 186162.0 | 0.69796 | 17 | 830 | 0.02318 | 0.04801018 |
| P | F | 386.6 | 186548.6 | 0.699409 | 9 | 839 | 0.02328 | 0.048530773 |
| P | F | 471.1 | 187019.7 | 0.701176 | 11 | 850 | 0.02335 | 0.049167052 |
| P | F | 1147.6 | 188167.3 | 0.705478 | 28 | 878 | 0.024399 | 0.050786673 |
| P | M | 286.4 | 188453.7 | 0.706552 | 7 | 885 | 0.024441 | 0.051191578 |
| P | F | 447.0 | 188900.7 | 0.708228 | 11 | 896 | 0.024609 | 0.051827857 |
| P | F | 560.3 | 189461.0 | 0.710329 | 14 | 910 | 0.024987 | 0.052637668 |
| P | F | 318.8 | 189779.8 | 0.711524 | 8 | 918 | 0.025094 | 0.053100416 |
| P | F | 387.5 | 190167.3 | 0.712977 | 10 | 928 | 0.025806 | 0.053678852 |
| P | F | 1394.4 | 191561.7 | 0.718205 | 37 | 965 | 0.026535 | 0.055819065 |
| P | M | 263.2 | 191824.9 | 0.719191 | 7 | 972 | 0.026596 | 0.05622397 |
| P | F | 760.2 | 192585.1 | 0.722042 | 21 | 993 | 0.027624 | 0.057438686 |
| P | F | 247.1 | 192832.2 | 0.722968 | 7 | 1000 | 0.028329 | 0.057843591 |
| P | F | 210.6 | 193042.8 | 0.723758 | 6 | 1006 | 0.02849 | 0.058190652 |
| P | F | 591.0 | 193633.8 | 0.725973 | 17 | 1023 | 0.028765 | 0.059173994 |
| P | F | 276.6 | 193910.4 | 0.72701 | 8 | 1031 | 0.028923 | 0.059636742 |
| P | F | 240.2 | 194150.6 | 0.727911 | 7 | 1038 | 0.029142 | 0.060041647 |
| P | F | 1708.5 | 195859.1 | 0.734317 | 50 | 1088 | 0.029265 | 0.062933827 |
| P | F | 409.2 | 196268.3 | 0.735851 | 12 | 1100 | 0.029326 | 0.06362795 |
| P | F | 657.1 | 196925.4 | 0.738314 | 20 | 1120 | 0.030437 | 0.064784822 |
| C | M | 32.8 | 196958.2 | 0.738437 | 1 | 1121 | 0.030488 | 0.064842665 |
| P | F | 682.4 | 197640.6 | 0.740996 | 21 | 1142 | 0.030774 | 0.066057381 |
| P | F | 249.4 | 197890.0 | 0.741931 | 8 | 1150 | 0.032077 | 0.06652013 |
| P | M | 242.6 | 198132.6 | 0.74284 | 8 | 1158 | 0.032976 | 0.066982878 |
| P | F | 785.6 | 198918.2 | 0.745786 | 26 | 1184 | 0.033096 | 0.068486812 |
| P | F | 413.6 | 199331.8 | 0.747336 | 14 | 1198 | 0.033849 | 0.069296622 |
| P | F | 883.0 | 200214.8 | 0.750647 | 31 | 1229 | 0.035108 | 0.071089773 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 1008.7 | 201223.5 | 0.754429 | 36 | 1265 | 0.03569 | 0.073172143 |
| P | F | 419.9 | 201643.4 | 0.756003 | 15 | 1280 | 0.035723 | 0.074039796 |
| P | F | 807.8 | 202451.2 | 0.759032 | 29 | 1309 | 0.0359 | 0.075717261 |
| P | F | 468.7 | 202919.9 | 0.760789 | 17 | 1326 | 0.036271 | 0.076700602 |
| P | M | 246.6 | 203166.5 | 0.761713 | 9 | 1335 | 0.036496 | 0.077221194 |
| P | P | 27.2 | 203193.7 | 0.761815 | 1 | 1336 | 0.036765 | 0.077279037 |
| P | M | 1956.7 | 205150.4 | 0.769152 | 72 | 1408 | 0.036797 | 0.081443776 |
| P | F | 401.9 | 205552.3 | 0.770658 | 15 | 1423 | 0.037323 | 0.08231143 |
| P | F | 1006.7 | 206559.0 | 0.774433 | 38 | 1461 | 0.037747 | 0.084509486 |
| P | F | 209.5 | 206768.5 | 0.775218 | 8 | 1469 | 0.038186 | 0.084972235 |
| P | F | 802.5 | 207571.0 | 0.778227 | 31 | 1500 | 0.038629 | 0.086765386 |
| P | F | 1346.5 | 208917.5 | 0.783275 | 53 | 1553 | 0.039361 | 0.089831097 |
| P | F | 395.4 | 209312.9 | 0.784758 | 16 | 1569 | 0.040465 | 0.090756594 |
| P | F | 545.1 | 209858.0 | 0.786801 | 23 | 1592 | 0.042194 | 0.092086997 |
| P | M | 625.9 | 210483.9 | 0.789148 | 27 | 1619 | 0.043138 | 0.093648774 |
| B | P | 69.4 | 210553.3 | 0.789408 | 3 | 1622 | 0.043228 | 0.093822304 |
| P | F | 1560.1 | 212113.4 | 0.795257 | 71 | 1693 | 0.04551 | 0.097929199 |
| P | F | 345.6 | 212459.0 | 0.796553 | 16 | 1709 | 0.046296 | 0.098854697 |
| P | F | 599.4 | 213058.4 | 0.7988 | 28 | 1737 | 0.046713 | 0.100474317 |
| P | F | 869.6 | 213928.0 | 0.802061 | 41 | 1778 | 0.047148 | 0.102845905 |
| C | F | 804.3 | 214732.3 | 0.805076 | 38 | 1816 | 0.047246 | 0.105043961 |
| P | F | 418.8 | 215151.1 | 0.806646 | 20 | 1836 | 0.047755 | 0.106200833 |
| P | F | 920.9 | 216072.0 | 0.810099 | 44 | 1880 | 0.047779 | 0.108745951 |
| P | M | 548.4 | 216620.4 | 0.812155 | 27 | 1907 | 0.049234 | 0.110307728 |
| P | F | 628.4 | 217248.8 | 0.814511 | 32 | 1939 | 0.050923 | 0.112158723 |
| P | M | 254.7 | 217503.5 | 0.815466 | 13 | 1952 | 0.05104 | 0.112910689 |
| C | P | 57.1 | 217560.6 | 0.81568 | 3 | 1955 | 0.052539 | 0.11308422 |
| P | F | 450.4 | 218011.0 | 0.817369 | 24 | 1979 | 0.053286 | 0.114472466 |
| P | M | 429.1 | 218440.1 | 0.818977 | 24 | 2003 | 0.055931 | 0.115860713 |
| P | F | 280.0 | 218720.1 | 0.820027 | 16 | 2019 | 0.057143 | 0.11678621 |
| P | F | 992.8 | 219712.9 | 0.823749 | 57 | 2076 | 0.057413 | 0.120083295 |
| P | F | 343.2 | 220056.1 | 0.825036 | 20 | 2096 | 0.058275 | 0.121240167 |
| P | F | 812.2 | 220868.3 | 0.828081 | 48 | 2144 | 0.059099 | 0.124016659 |
| P | F | 488.4 | 221356.7 | 0.829912 | 29 | 2173 | 0.059378 | 0.125694123 |
| B | F | 1483.7 | 222840.4 | 0.835475 | 96 | 2269 | 0.064703 | 0.131247108 |
| P | P | 58.7 | 222899.1 | 0.835695 | 4 | 2273 | 0.068143 | 0.131478482 |
| P | F | 1357.3 | 224256.4 | 0.840784 | 94 | 2367 | 0.069255 | 0.13691578 |
| P | F | 313.4 | 224569.8 | 0.841959 | 22 | 2389 | 0.070198 | 0.138188339 |
| P | M | 140.9 | 224710.7 | 0.842487 | 10 | 2399 | 0.070972 | 0.138766775 |
| P | F | 691.5 | 225402.2 | 0.84508 | 50 | 2449 | 0.072307 | 0.141658954 |
| P | M | 358.2 | 225760.4 | 0.846423 | 26 | 2475 | 0.072585 | 0.143162888 |
| P | F | 190.4 | 225950.8 | 0.847137 | 14 | 2489 | 0.073529 | 0.143972698 |
| P | F | 1127.2 | 227078.0 | 0.851363 | 83 | 2572 | 0.073634 | 0.148773716 |
| P | F | 498.9 | 227576.9 | 0.853233 | 37 | 2609 | 0.074163 | 0.150913929 |
| P | F | 425.3 | 228002.2 | 0.854828 | 32 | 2641 | 0.075241 | 0.152764924 |
| P | F | 754.2 | 228756.4 | 0.857655 | 57 | 2698 | 0.075577 | 0.156062008 |
| P | F | 782.3 | 229538.7 | 0.860588 | 60 | 2758 | 0.076697 | 0.159532624 |
| P | F | 259.4 | 229798.1 | 0.861561 | 20 | 2778 | 0.077101 | 0.160689496 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 639.7 | 230437.8 | 0.863959 | 50 | 2828 | 0.078162 | 0.163581675 |
| P | M | 621.9 | 231059.7 | 0.866291 | 50 | 2878 | 0.080399 | 0.166473855 |
| P | F | 609.2 | 231668.9 | 0.868575 | 50 | 2928 | 0.082075 | 0.169366034 |
| P | F | 355.9 | 232024.8 | 0.869909 | 31 | 2959 | 0.087103 | 0.171159186 |
| P | F | 448.3 | 232473.1 | 0.87159 | 40 | 2999 | 0.089226 | 0.173472929 |
| P | F | 400.2 | 232873.3 | 0.87309 | 36 | 3035 | 0.089955 | 0.175555298 |
| P | F | 1376.1 | 234249.4 | 0.87825 | 125 | 3160 | 0.090836 | 0.182785747 |
| P | F | 405.1 | 234654.5 | 0.879769 | 37 | 3197 | 0.091335 | 0.18492596 |
| P | F | 185.1 | 234839.6 | 0.880463 | 17 | 3214 | 0.091842 | 0.185909301 |
| P | M | 170.9 | 235010.5 | 0.881103 | 17 | 3231 | 0.099473 | 0.186892642 |
| P | F | 279.5 | 235290.0 | 0.882151 | 28 | 3259 | 0.100179 | 0.188512263 |
| P | F | 540.5 | 235830.5 | 0.884178 | 55 | 3314 | 0.101758 | 0.19169366 |
| P | F | 1357.7 | 237188.2 | 0.889268 | 139 | 3453 | 0.102379 | 0.199733919 |
| P | F | 1168.1 | 238356.3 | 0.893647 | 121 | 3574 | 0.103587 | 0.206732994 |
| P | F | 565.8 | 238922.1 | 0.895769 | 59 | 3633 | 0.104277 | 0.210145766 |
| P | F | 713.5 | 239635.6 | 0.898444 | 77 | 3710 | 0.107919 | 0.214599722 |
| P | F | 415.0 | 240050.6 | 0.9 | 45 | 3755 | 0.108434 | 0.217202684 |
| P | F | 589.5 | 240640.1 | 0.90221 | 66 | 3821 | 0.111959 | 0.221020361 |
| B | M | 131.9 | 240772.0 | 0.902704 | 15 | 3836 | 0.113723 | 0.221888015 |
| P | F | 205.7 | 240977.7 | 0.903476 | 24 | 3860 | 0.116675 | 0.223276261 |
| P | F | 313.2 | 241290.9 | 0.90465 | 39 | 3899 | 0.124521 | 0.225532161 |
| P | F | 299.7 | 241590.6 | 0.905773 | 38 | 3937 | 0.126793 | 0.227730217 |
| P | F | 512.1 | 242102.7 | 0.907693 | 66 | 4003 | 0.128881 | 0.231547894 |
| B | M | 167.4 | 242270.1 | 0.908321 | 22 | 4025 | 0.131422 | 0.232820453 |
| P | P | 52.6 | 242322.7 | 0.908518 | 7 | 4032 | 0.13308 | 0.233225359 |
| P | F | 924.0 | 243246.7 | 0.911982 | 124 | 4156 | 0.134199 | 0.240397964 |
| P | F | 391.8 | 243638.5 | 0.913451 | 54 | 4210 | 0.137825 | 0.243521518 |
| P | F | 118.5 | 243757.0 | 0.913896 | 17 | 4227 | 0.14346 | 0.244504859 |
| P | F | 433.4 | 244190.4 | 0.915521 | 66 | 4293 | 0.152284 | 0.248322536 |
| P | F | 970.3 | 245160.7 | 0.919158 | 149 | 4442 | 0.153561 | 0.256941231 |
| P | M | 609.0 | 245769.7 | 0.921442 | 94 | 4536 | 0.154351 | 0.262378528 |
| P | F | 332.9 | 246102.6 | 0.92269 | 52 | 4588 | 0.156203 | 0.265386395 |
| P | F | 658.3 | 246760.9 | 0.925158 | 103 | 4691 | 0.156464 | 0.271344285 |
| P | F | 237.9 | 246998.8 | 0.92605 | 38 | 4729 | 0.159731 | 0.273542342 |
| P | F | 316.0 | 247314.8 | 0.927235 | 53 | 4782 | 0.167722 | 0.276608052 |
| P | F | 333.7 | 247648.5 | 0.928486 | 68 | 4850 | 0.203776 | 0.280541416 |
| P | F | 134.9 | 247783.4 | 0.928992 | 28 | 4878 | 0.207561 | 0.282161037 |
| P | F | 347.1 | 248130.5 | 0.930293 | 76 | 4954 | 0.218957 | 0.286557149 |
| P | F | 1004.6 | 249135.1 | 0.934059 | 234 | 5188 | 0.232929 | 0.30009255 |
| P | M | 128.6 | 249263.7 | 0.934541 | 31 | 5219 | 0.241058 | 0.301885701 |
| P | F | 889.4 | 250153.1 | 0.937876 | 229 | 5448 | 0.257477 | 0.315131883 |
| P | F | 349.7 | 250502.8 | 0.939187 | 96 | 5544 | 0.274521 | 0.320684868 |
| P | F | 121.4 | 250624.2 | 0.939642 | 34 | 5578 | 0.280066 | 0.32265155 |
| P | F | 1282.6 | 251906.8 | 0.944451 | 371 | 5949 | 0.289256 | 0.344111522 |
| P | F | 644.9 | 252551.7 | 0.946869 | 214 | 6163 | 0.331834 | 0.356490051 |
| P | F | 647.7 | 253199.4 | 0.949297 | 215 | 6378 | 0.331944 | 0.368926423 |
| P | F | 179.6 | 253379.0 | 0.949971 | 61 | 6439 | 0.339644 | 0.372454882 |
| P | F | 589.8 | 253968.8 | 0.952182 | 203 | 6642 | 0.344184 | 0.384197131 |

| target | mode | grdf. tons | cum grdf. tons | % cum tons | # salmon | cum # salmon | sal. rate | % cum # sal |
|---|---|---|---|---|---|---|---|---|
| P | F | 837.1 | 254805.9 | 0.95532 | 345 | 6987 | 0.412137 | 0.40415317 |
| P | F | 191.5 | 254997.4 | 0.956038 | 79 | 7066 | 0.412533 | 0.408722814 |
| P | F | 743.7 | 255741.1 | 0.958827 | 315 | 7381 | 0.423558 | 0.426943545 |
| P | F | 132.7 | 255873.8 | 0.959324 | 64 | 7445 | 0.482291 | 0.430645534 |
| P | F | 310.9 | 256184.7 | 0.96049 | 153 | 7598 | 0.49212 | 0.439495604 |
| P | F | 344.7 | 256529.4 | 0.961782 | 173 | 7771 | 0.501886 | 0.449502545 |
| P | F | 651.4 | 257180.8 | 0.964224 | 331 | 8102 | 0.508136 | 0.468648774 |
| P | F | 365.6 | 257546.4 | 0.965595 | 194 | 8296 | 0.530635 | 0.47987043 |
| P | F | 431.8 | 257978.2 | 0.967214 | 242 | 8538 | 0.560445 | 0.493868579 |
| P | F | 558.9 | 258537.1 | 0.969309 | 314 | 8852 | 0.561818 | 0.512031467 |
| P | F | 580.4 | 259117.5 | 0.971485 | 333 | 9185 | 0.573742 | 0.531293383 |
| P | F | 371.7 | 259489.2 | 0.972879 | 219 | 9404 | 0.589185 | 0.543961129 |
| P | F | 189.9 | 259679.1 | 0.973591 | 119 | 9523 | 0.626646 | 0.550844516 |
| P | F | 1027.2 | 260706.3 | 0.977442 | 645 | 10168 | 0.627921 | 0.588153633 |
| P | F | 707.6 | 261413.9 | 0.980095 | 454 | 10622 | 0.641605 | 0.614414623 |
| P | F | 553.9 | 261967.8 | 0.982172 | 386 | 11008 | 0.696877 | 0.636742249 |
| P | F | 465.5 | 262433.3 | 0.983917 | 338 | 11346 | 0.726101 | 0.656293383 |
| P | F | 410.4 | 262843.7 | 0.985456 | 300 | 11646 | 0.730994 | 0.67364646 |
| P | F | 827.1 | 263670.8 | 0.988557 | 736 | 12382 | 0.889856 | 0.716219343 |
| P | F | 597.6 | 264268.4 | 0.990797 | 690 | 13072 | 1.154618 | 0.756131421 |
| P | F | 375.6 | 264644.0 | 0.992205 | 442 | 13514 | 1.176784 | 0.781698288 |
| P | F | 202.6 | 264846.6 | 0.992965 | 270 | 13784 | 1.332675 | 0.797316057 |
| P | F | 602.1 | 265448.7 | 0.995222 | 989 | 14773 | 1.642584 | 0.854523369 |
| P | F | 1274.4 | 266723.1 | 1 | 2515 | 17288 | 1.973478 | 1 |
| | | | | | | | | |
| Total | | 266723.1 | | | 17288 | | | |

Joe Sullivan + Group
D-26 "Slm Foundation" Proposal

Industry Initiative
Concerning
Bering Sea Chinook Bycatch Management

The industry initiative is composed of the following elements:

1. Adoption of regulations requiring:

   1.1 retention of all chinook bycatch;

   1.2 posting on the NMFS bulletin board of chinook bycatch numbers on a vessel-by-vessel basis; and

   1.3 implementation of more specific data gathering and/or logbook procedures as appropriate to develop bycatch pattern analysis.

2. Sampling retained chinook as appropriate to conduct bycatch pattern and stream of origin analysis.

3. After sampling, preserving retained chinook in a "food grade" state, and turning them over at point of landing for distribution to food banks or related public use, provided that such fish are not placed "in commerce."

4. A "critical mass" of vessel owners paying an assessment of $20.00 per chinook to a private research foundation to support development of data concerning marine chinook bycatch patterns and avoidance, and stream of origin identification. The Foundation board is to be composed of marine fishery and terminal fishery representatives, and others as appropriate. The Foundation is to recommend appropriate conservation-oriented bycatch management measures based on data developed within the scope of its research program.

# Coastal and In-River Fisheries Alliance

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June 23, 1993

Industry/Terminal Area Initiative
Concerning Bering Sea Salmon Bycatch Management

For the record my name is Frank Charles, I am the Executive Director of the Coastal and In-River fisheries Alliance which is a statewide fisheries organization, representing terminal area commercial, recreational, subsistence, and personal use fisheries in the state of Alaska.

I am also the Director of Natural Resources of the Orutsararnuit Native Council, representing the native community of Bethel.

With me I have John Jemewouk, the President of the Norton Sound Economic Development Commission.

And Tate Hayes, Deputy Director of CIRFA and board member of the Northern District Setnetters, Assn. of Cook Inlet

I am here to comment on the industry initiative which you received in April and which was related to the AP this last week.

We have met with representatives of PSPA, AFTA, AHSFA regarding a joint effort to address the problem of salmon by-catch in the BS/AI. We are in agreement with the four elements laid out in the framework.

We have also reached consensus on several additional points. These include:

1. Retention of ALL salmon, not just chinook, shall be required of the trawl fleet.

2. A stiff penalty (greater than $10,000) for discards shall be assessed by NMFS.

3. All salmon shall be retained in a food-grade state and donated to food banks.

4. The implementation of an expanded, mandatory logbook program. This program shall apply to the entire trawl fleet.

5. If a critical number of boats do not join the voluntary initiative by September, then a Vessel Incentive Program shall be implemented by NMFS prior to January 1994. The success and performance of this program is dependent on including the majority of the fleet. This critical mass should be in the range of 70 to 80% of the fleet.

6. The development and execution of the research program shall be implemented by a consortium consisting of ADF&G, NMFS and FRI and shall be directed by the Foundation.

7. The Foundation shall be composed of representatives from the marine trawl fisheries, affected fisheries in the state of Alaska, and scientific personnel. Primary among the tasks assigned to the Foundation shall be the development of accurate estimates of bycatch numbers, stock composition, spatial and temporal distributions, as well as developing management practices aimed at reducing by-catch.

8. In addition to the $20 assessment on chinook, we agree that matching funds should be drawn from all Alaskan and Northwestern groundfish, mining, logging, oil development industries that negatively impact the resource.

9. As our understanding of the bycatch composition and distribution patterns increases with the expanded research initiative, the fishing practices of the trawl fleet shall be modified where possible to decrease the overall bycatch and impact on discrete stocks. This shall be facilitated by the utilization of smaller management areas, increasing management flexibility. This should be developed by fishery managers in conjunction with Foundation representatives.

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In addition to the points of consensus CIRFA has these additional points.

We can agree with an assessment of $20/chinook although we must stress that we feel this is far lower than it should be. We would prefer a stiffer assessment of $50 which we feel would offer a greater disincentive and provide additional funds for research. Additionally we would like to see ALL other salmon species included in the assessment at $5/fish.

This initiative will ultimately result in a penalty box system that will finally address the problem of salmon bycatch in the BS/AI. Such a system will ensure that dirty fishers do not exceed acceptable levels of bycatch.

It is essential that this initiative be continually monitored to assess its performance. Since this program can fail without the implementation of all of its components as well as the attainment of a "critical mass" in the voluntary portion, we recognize that it may be necessary to implement a VIP program such as the ones outlined by NMFS or in conjunction with the options presented by the state. It would be necessary that such a program include a total fleet cap of salmon.

Although our discussion today has not explicitly addressed the issue of total social cost we want the council to realize that there are social costs that include the possible loss of cultural and traditional ways of life. When balanced against a potential economic loss to the nation, the loss of a cultural and a traditional way of life has global implications. These losses encompass impacts on individual human lives, families and cultures. We recommend that the foundation proposed in the initiative address the definition of this concept of total social cost with the intent of restitution in some form, to the impacted areas.

In conclusion, we appreciate the opportunity extended by the Council to the Bering Sea trawl fleet and terminal area fishers, providing us with an opportunity to voice our concerns and present you with our alternative consensus-driven proposal.

To: NPFMC
From: david fraser
Re: Salmon VIP

Dear Rick,

VIP programs are an attempt to require fishers to modify their fishing behaviour to meet a set of preselected standards. This presumes that fishers have the knowledge and skills to do so, or that they can obtain them. It is in essence information based fishing. The more access to information on factors which may correlate with bycatch, the more likely that fishers will be able to modify their behaviour.

To date federal VIPs have been a failure, no cases have been succesfully prosecuted and the bycatch situation in the yellowfin sole fishery has deteriorated badly as a result. Past industry-run programs, both in JV and DAP, have been more sucessful. However, they have depended in great measure upon peer pressure. The failure to publish the bycatch rates by vessel name has undermined the ability of the industry to maintain an effective voluntary VIP for halibut.

It is absolutely essential to an industry VIP/Foundation that NMFS commit to publishing salmon bycatch amounts by vessel name.

Lisa Lindeman raised an important question at the council meeting when she asked what fishers can do to reduce their bycatch of salmon. If it isn't something one has a reasonable level of control over, then it is hardly fair to impose punative fines for having encountered a random event. There are several layers to examining this question.

The first step would be a review of the "Fishermen's Guide" (Norris, et al Ap. 92) to look for avoidable patterns. My own appraisal isn't too promising. Time is the obvious factor which correlates to chinook bycatch. July is the month with the lowest probability of chinook bycatch; however under the olympic system one does not have a choice of fishing in July. The "Guide" can also be used to look at area by month. Unfortunately, in a month like October the critical "horseshoe" block in the Mid-water Pollock fishery can have a 50/50 chance of being better or worse than the BSAI average (see Good/Bad Index). Other months such as March show a somewhat clearer pattern of good & bad areas, but when contrasted with CPUEs by block (Norris, et al Ap. 91) it is apparent that in the bad months there are few alternative areas to move to that have sustained any volume of catch at reasonable CPUE. If one is in the horseshoe area fishing bottom trawl pollock in September, moving away from the contour decrease the probabiltiy of chinook encounters but raises the probability of halibut rates above the halibut VIP standard.

If there are time/area movements that fishers can reasonably be expected to make, the data must be reviewed on a finer resolution than the 1/2x1 degree block scale. This leads to the third step which is to expand on Dave Ackley's work in which he did basic regression analysis of several possible correlating factors over which fishers would have control. As the analysis for Amendment 21b indicates there are no apparent correlations of practical significance (pg 2-49). However, i don't think this avenue has been exhausted. In talking with both Ackley and Norris it appears there are other regression techniques which may be better suited to the type of data with the characteristics of salmon bycatch rates. Also, there may be potential in looking at the synergistic effects of two factors. (ie: the rate may not significantly correlate with bottom depth - though one would expect it to if contour is a surrogate for depth - but it may correlate with the interaction of the proximity of the net to bottom along a certain depth contour.)

This sort of analysis requires access to the haul by haul data, which is currently unavailabe to the public for independent analysis. No individual fisher has compiled enough data through their own fishing activity to undertake a viable statistical analysis. However, the combination of the intuitive knowledge of fishers with access to the full data set might lead to a more interactive ability to follow leads in the data than the tedious iterative process whereby the AP, SSC and others make suggestion to the council which then may or may not instruct the agency analysts to follow them up.

Even if the data were more intensively reviewed with more sophisticated statistical methodology i have my doubts that strong correlations of factors contained within the fields of observer data will emerge. To carry this process through, additional "pallets" of information need to be examined in conjunction with the observer data in a combination statistical/GIS approach. This would allow extracting and exploring localized time/area subsets of the data to "scope" for factors that differ between a bad tow in an area and it's neighbors. Moving into a GIS approach would allow bringing in multiple pallets of other data such as sea surface temperature data, bottom contour data and tide/current data (these are the factors that lead to identifying upwellings, which salmon trollers - who collect this sort of information intensively over the years - will tell you is key to predicting where salmon may be).

Assuming this latter approach yeilded positive results in showing salmon bycatch rates to have a predictable nature (aside from pollock and salmon being in the same general area during the A-season and separating during the closure between the A and B seasons) a question arises. Is the agency willing or able to collect and disseminate surface and bottom temperature data in a real time mode even if the industry willingly submitted it through the obsever program?

Demonstating the existance of predictable correlations over which fishers have control is likely to require an extensive and expensive analysis which is unlikely to yield useful results at its less complex levels. Imposing a penalty-based VIP absent such positive results is, as Lisa Lindeman indicated, difficult to justify. A research foundation funded as per the AP proposal may yield positive results over time if we don't get hung up on demanding a quick fix.

The key to making a program such as this work is clearing up the questions concerning the constraints that block the flow of historical bycatch data (not associated by vessel name), current bycatch rate performance (debriefed and by vessel name), and real time bycatch rate information (not by vessel name, but in a format that could be used in GIS).

If the public and the council are going to demand cleaner fishing from fishers then they must take a role in lobbying the agency and Congress if necessary to create the information base that allows fishers to fish intellegently.

Thank you.

dave fraser

Industry/Terminal Area Initiative
Concerning Bering Sea Salmon Bycatch Management

Thursday morning

1. Adoption of regulations requiring:

1.1 Retention of all salmon bycatch.

1.2 Posting on the NMFS bulletin board of chinook bycatch numbers on a vessel-by-vessel basis.

1.3 Implementation of more specific data gathering and/or logbook procedures as appropriate to develop bycatch pattern analysis.

1.4 A stiff penalty (greater than $10,000) for discards shall be assessed by NMFS.

2. Sampling retained chinook as appropriate to conduct bycatch pattern and stream of origin analysis.

3. After sampling, preserving retained chinook in a "food grade" state, and turning them over at point of landing for distribution to food banks or related public use, provided that such fish are not placed "in commerce."

4. A "critical mass" of vessel owners paying an assessment of $20.00 per chinook to a private research foundation to support development of data concerning marine chinook bycatch patterns and avoidance, and stream of origin identification.

4.1 The Foundation shall be composed of representatives from the marine trawl fisheries, affected fisheries in the state of Alaska, and scientific personnel. Primary among the tasks assigned to the Foundation shall be the development of accurate estimates of bycatch numbers, stock composition, spatial and temporal distributions, as well as developing management practices aimed at reducing by-catch.

4.2 The development and execution of the research program shall be implemented by a consortium consisting of ADF&G, NMFS and FRI and shall be directed by the Foundation.

4.3 If a critical number of boats do not join the voluntary initiative by September, then a Vessel Incentive Program shall be implemented by NMFS prior to January 1994. The success and performance of this program is dependent on including the majority of the fleet. This critical mass should be in the range of 70 to 80% of the fleet.

5. Matching funds should be drawn from all Alaskan and Northwestern groundfish, mining, logging, oil development industries that negatively impact the resource.

6. As our understanding of the bycatch composition and distribution patterns increases with the expanded research initiative, the fishing practices of the trawl fleet shall be modified where possible to decrease the overall bycatch and impact on discrete stocks. This shall be facilitated by the utilization of smaller management areas, increasing management flexibility. This should be developed by fishery managers in conjunction with Foundation representatives.