

MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director



ESTIMATED TIME
4 Hours

DATE: April 11, 1995

SUBJECT: Chinook Salmon Bycatch

ACTION REQUIRED

- (a) Receive progress report from Salmon Research Foundation.
- (b) Take final action on amendment to reduce chinook salmon bycatch.

BACKGROUND

Progress of the Salmon Research Foundation

Among the provisions of the Council's salmon bycatch control policy is an endorsement of the Salmon Research Foundation, a non-profit corporation. The purpose of the Foundation is to use income generated from salmon bycatch assessment payments to develop a salmon bycatch avoidance program for the BSAI trawl fisheries, and to fund research on stock origin to salmon taken as bycatch. In January, the Council received a report on 1994 Foundation activities, achievements, and funding. Approximately \$120,000 was collected in 1994 from assessment payments based on a \$20 per chinook taken as bycatch on participating vessels. The Foundation will provide an update of its activities at this meeting.

Chinook salmon bycatch reduction

Salmon bycatch controls originally were part of Amendment 21 to the BSAI FMP. In April 1992, the Council reviewed a draft document and requested additional analysis. A revised analysis, which included time and area patterns in chinook bycatch, was reviewed in January 1993. Further revisions were made and the document was reviewed in April 1993. Although the analysis was released for public review, no action was taken in part due to the development of the Salmon Research Foundation. In September 1994, the Council reviewed two separate analyses of salmon bycatch reduction measures, with one analysis addressing chum salmon bycatch, and the other addressing chinook bycatch. Both were released for public review. A chum salmon savings area (Amendment 35) was adopted by the Council in January. Final Action on the chinook salmon bycatch reduction analysis can be taken at this meeting.

The chinook salmon bycatch analysis was released for public review on December 14, 1994. The proposed action would provide a means to control chinook salmon bycatch in the BSAI area groundfish trawl fisheries. This analysis addresses two alternatives in addition to the status quo, as follows:

Alternative 1. Status quo. Under the status quo alternative, no additional actions would be taken to prevent or reduce the bycatch of chinook salmon.

Alternative 2. This alternative would implement a prohibited species catch (PSC) limit for BSAI trawl fisheries, which would trigger a time/area closure. Options considered would close the entire BSAI, selected three digit statistical areas, or selected geographical areas, based on a PSC cap on chinook salmon. The PSC options would be based on a range of annual chinook salmon bycatch rates (annual rate of 0.004-0.024 chinook per metric ton of groundfish), or roughly 8,000 to 48,000 chinook. The caps would be apportioned to target fisheries.

Alternative 3. This alternative would implement time/area closures on the BSAI trawl fisheries in the absence of PSC limits. Closures would be based on historical chinook bycatch patterns, which indicate high bycatch along the 200 m contour line (shelf break), the Horseshoe area, and the area north of Unimak Island. Chinook salmon bycatch would be monitored and invoke a triggering mechanism that would close these areas to a fishery during certain times of the year which have historically exhibited high bycatch (January - April, and September-December). The closures would be selectively applied to those fisheries that account for the vast majority of the salmon bycatch (i.e., midwater trawl and bottom trawl pollock, and possibly Pacific cod).

There are several different options and sub-options for closed areas under both alternative 2 and alternative 3, and these are:

Area Options

Option 1. Entire BSAI area.

Option 2. Specific federal statistical areas.

Area sub-options:

- 1) Areas 511, 517, and 519 as one zone; all other areas as a second zone.
- 2) Five independent zones: (a) area 511; (b) areas 517 and 519; (c) area 540; (d) area 518; (e) all other areas.

Time sub-option:

Divide all closures into two time periods: January through April, and May through December.

Option 3. Close areas which do not conform to statistical areas, including a buffer zone on either side of the 200 m contour, and to a few blocks in the vicinity of Unimak Island. Closures would be triggered by a chinook PSC cap in specific fisheries. Closed areas would re-open May-August.

An executive summary, along with selected figures, is provided as agenda Item D-2(a)(1). The Council can review the draft EA/RIR for adequacy, receive public testimony on this issue, and take final action at this meeting. If final action is taken at this meeting, implementation could occur in January 1996.

Update: As of April 1, 1995, bycatch in BSAI trawl fisheries totaled 14,058 chinook salmon. An additional 2,543 chinook salmon have been bycaught in GOA trawl fisheries. Because a majority of chinook salmon are bycaught during winter months, the 1995 chinook bycatch is expected to be much lower than in previous years.

	<u>BSAI</u>	<u>GOA</u>
1991	35,776	37,592
1992	37,372	15,964
1993	46,483	19,193
1994	44,366	13,976
1995	14,058	2,543

DRAFT FOR PUBLIC REVIEW

ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW/

INITIAL REGULATORY FLEXIBILITY ANALYSIS

FOR

AMENDMENT 21b

Chinook Salmon Bycatch Management

TO THE FISHERY MANAGEMENT PLAN FOR

THE GROUND FISH FISHERY OF THE

BERING SEA AND ALEUTIAN ISLANDS

Prepared by the staffs of the

Alaska Department of Fish and Game
Alaska Commercial Fisheries Entry Commission
North Pacific Fishery Management Council

December 1, 1994

EXECUTIVE SUMMARY

This document provides a report on the recent status of chinook salmon stocks in western Alaska, the origins of chinook salmon bycaught in various fisheries of the Bering Sea, the potential impacts of trawl bycatch on specific chinook stocks, socioeconomic considerations, and statistics on chinook salmon bycatch in the Bering Sea in recent years. The Council had also requested that information be provided on time and area patterns in chinook salmon bycatch, with recommendations on specific times and areas which could be closed to help prevent the interception of chinook salmon in the trawl fisheries of the Bering Sea. In addition to this information the effects of prohibited species caps of various magnitudes is also provided.

The domestic fleet operating in the Bering Sea has caught an increasing number of chinook salmon in every year since 1990, and has exceeded 30,000 chinook in each year since 1991. The 1992 bycatch of chinook salmon by domestic trawl fisheries of 37,372 fish was surpassed in 1993 with an estimated bycatch of 46,483 fish as reported by the NMFS Bulletin Board. The preliminary 1994 chinook salmon bycatch is estimated to be 40,732 chinook salmon through the week ending 9/10/94. With bycatch of chinook salmon highest from January - April and September - December, more chinook can potentially be taken in the remainder of 1994.

Managers have been concerned about the health of chinook salmon stocks on the Yukon River, Kuskokwim River and portions of Bristol Bay with minimum escapement goals not met in several systems in the mid and late 1980's. Although improved over the last few years, escapements in several systems are only being met through careful management of directed fisheries by time and area, and gear restrictions and through increased abundance of chinook salmon.

The current analysis primarily examines historical bycatch patterns to determine possible effective time and area closures to reduce chinook salmon bycatch in the trawl fisheries. Haul by haul observer data from trawl fisheries in the Bering Sea were collected from foreign vessels during the years 1981-1989, from Joint Venture (JV) operations during the same years, and from domestic fisheries from 1989 to 1993. The specific haul locations from these data were analyzed using a geographical information system.

Chinook salmon bycatch is largely associated with groundfish catches in the "Horseshoe", in the area north of Unimak Island, and along the 200 m contour that demarks the shelf break. It is notable that chinook salmon bycatch does not extend, for the most part, far from the contour, from the horseshoe, or from the north of Unimak Island. This is especially true for chinook salmon encounters during the months of January-April and September-December, and there is little apparent bycatch during the summer season. Although very apparent across years, the spatial bycatch pattern within a given year appears to be more patchy within these defined areas. Therefore, it would be very difficult to predict "hot spots" of high salmon bycatch in terms of specific $1/2^{\circ}$ latitude by 1° longitude blocks.

Given these patterns in chinook salmon bycatch, the catch and bycatch within specific defined areas was analyzed. The catch and bycatch from the entire Bering Sea in a fishery and year was compared to catch and bycatch within the following areas: a buffer which extended for 15 miles on either side of the 200 m contour; three blocks which made up the major portion of the horseshoe; the corner or core block of the horseshoe; and two blocks which were located to the north of Unimak Island.

In the foreign fishery, the majority of the chinook salmon bycatch was taken within the buffer around the contour, and virtually all of the chinook salmon were encountered during the months of January-April and September-December. The majority of the chinook salmon intercepted by the domestic fishery were taken in the horseshoe blocks, and the highest bycatch rate and mean number of chinook occurred in the corner block of the horseshoe. In the JV fishery, the highest proportion of chinook salmon bycatch was taken in the Unimak Island blocks and the corner block of the horseshoe in the early years of the JV fishery, and in the Unimak Island blocks and the contour buffer in later years. In the early 1980's the JV fisheries encountered a larger proportion of chinook salmon during the summer months than was seen in the foreign or domestic fisheries.

The proportion of chinook salmon intercepted in the contour buffer, the horseshoe, or the Unimak Island blocks was much higher than the proportion of groundfish catch which came from the same areas in almost all cases. Chinook salmon were also predominantly taken during the bycatch season (January-April and September-December). Chinook salmon intercepted during the summer months tended to be found in the horseshoe or the Unimak Island blocks.

The analysis has indicated higher chinook salmon bycatch occurs along the 200 m contour, at the horseshoe, and to the north of Unimak Island. The closure of one, or a portion of these areas is not likely to effectively reduce chinook salmon bycatch if fishing effort moves into the remaining open portions of these areas.

The Bering Sea Bycatch Model was used to assess the economic impacts of closures designed to reduce chinook salmon bycatch. Costs to the groundfish fishery were estimated to be large when large area closures were implemented. The model has suggested that the cost to the fisheries might be reduced from the high costs of a NMFS three digit statistical area-wide closure by the closure of a smaller more well defined area as discussed above. It would also be expected that the costs in moving to areas adjacent to the "Horseshoe" and a contour buffer would be greatly reduced when compared to movement to an entirely different statistical area.

The potential effects of closing the areas in the alternatives considered does not include an analysis of changes in bycatch of other species. Although the model indicates a slight increase in the anticipated bycatch of halibut and crab by closing the area approximating the 200 m contour for the entire bycatch season, the extent of the changes in bycatch have not been addressed. It is possible that the movement of vessels away from the 200 m contour could put them into areas of higher or lower bycatch of other species.

In addition to time and area patterns in chinook bycatch, other factors, such as depth of tow, size of tow, and tow duration, which might affect chinook salmon bycatch were analyzed as well. Very little of the variance in chinook salmon bycatch was explained by these variables, and no explicit relationship was discovered. Although some of the correlations between depth or size of tow and bycatch were statistically significant, the weak relationship between the variables and bycatch indicated that they were of no practical significance.

Figure 1-16. Bering Sea chinook salmon bycatch in foreign, JV and domestic fisheries, 1980 - 1994.

Chinook Salmon Bycatch in Bering Sea Trawl Fisheries

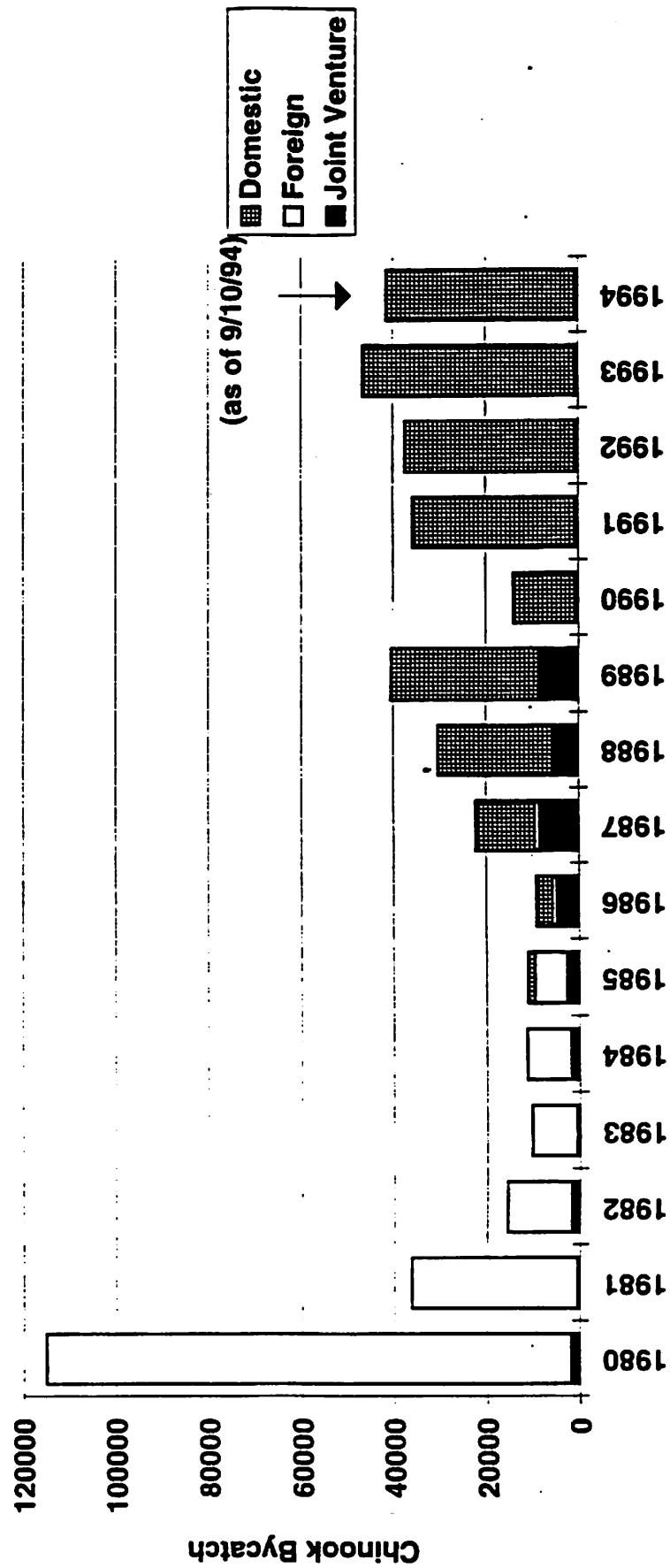


Figure 1-19. Cumulative chinook bycatch in the Bering Sea in the domestic fisheries, 1990-1994.

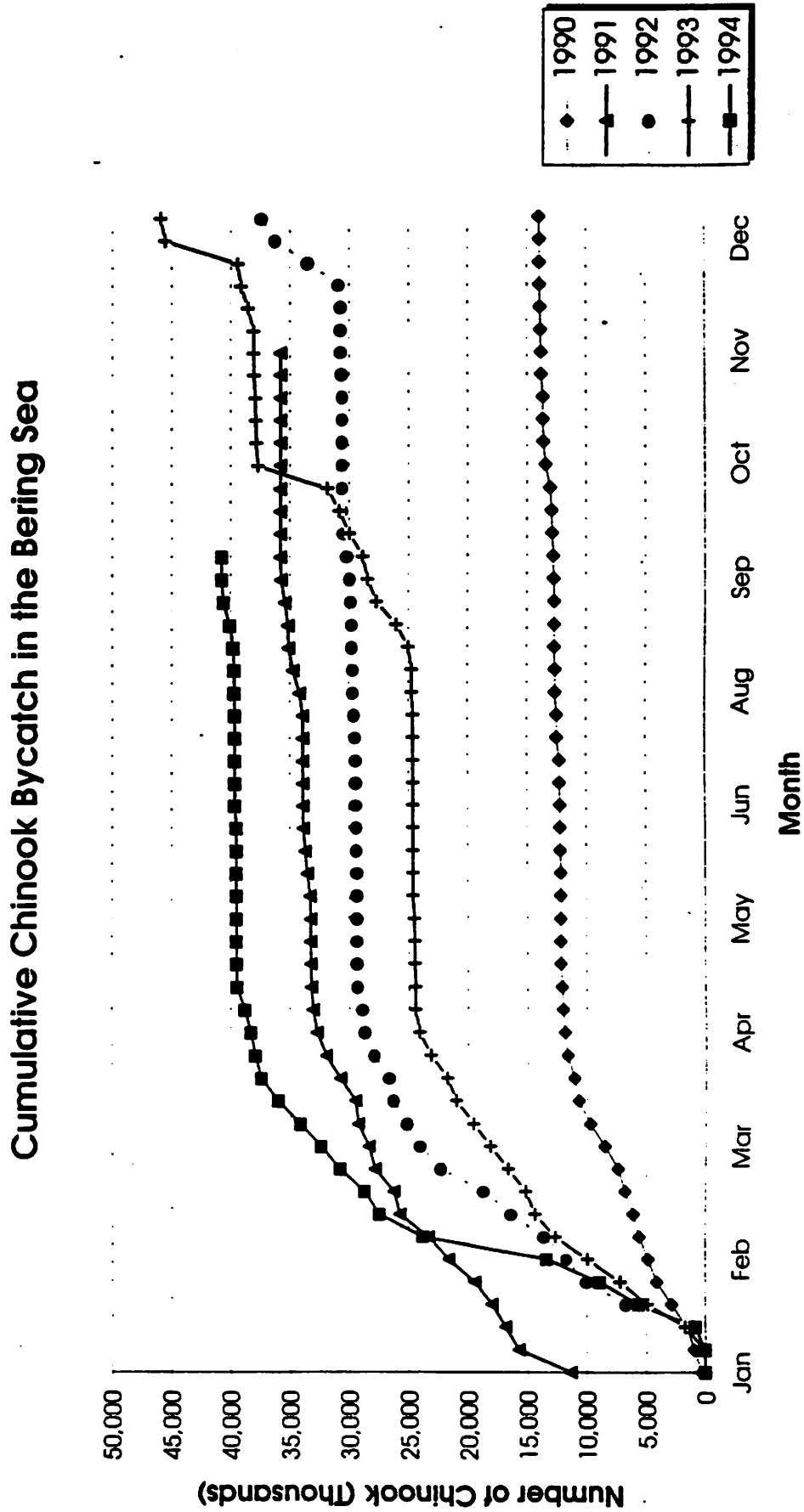


Figure 1-36. Domestic pollock and cod trawl fisheries bycatch by month, 1990-1993. From haul by haul observer data (unexpanded).

Observed Domestic Fisheries Bycatch by Month

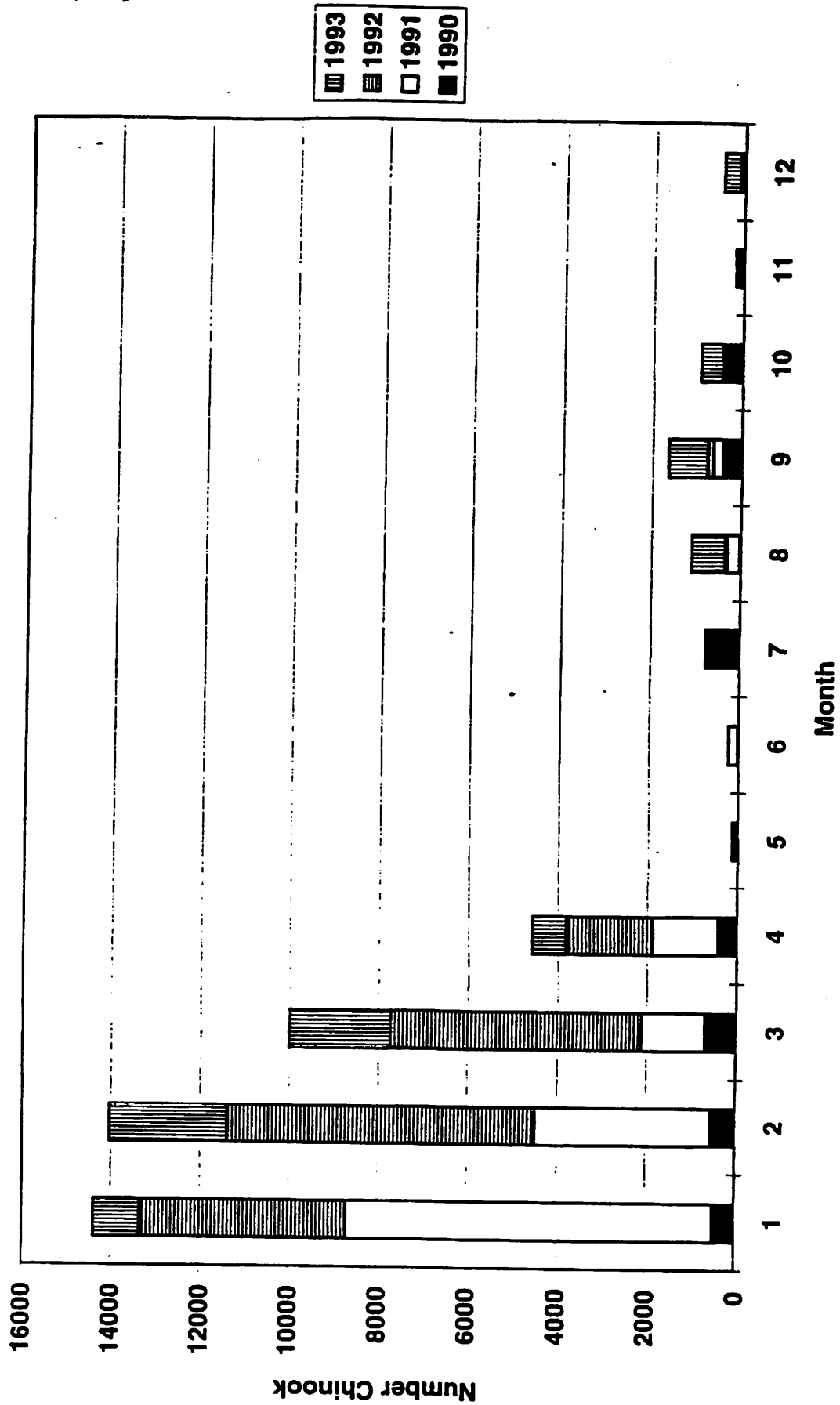


Figure 1-37. Domestic pollock and cod trawl fisheries groundfish catch by month, 1990-1993. From haul by haul observer data (unexpanded).

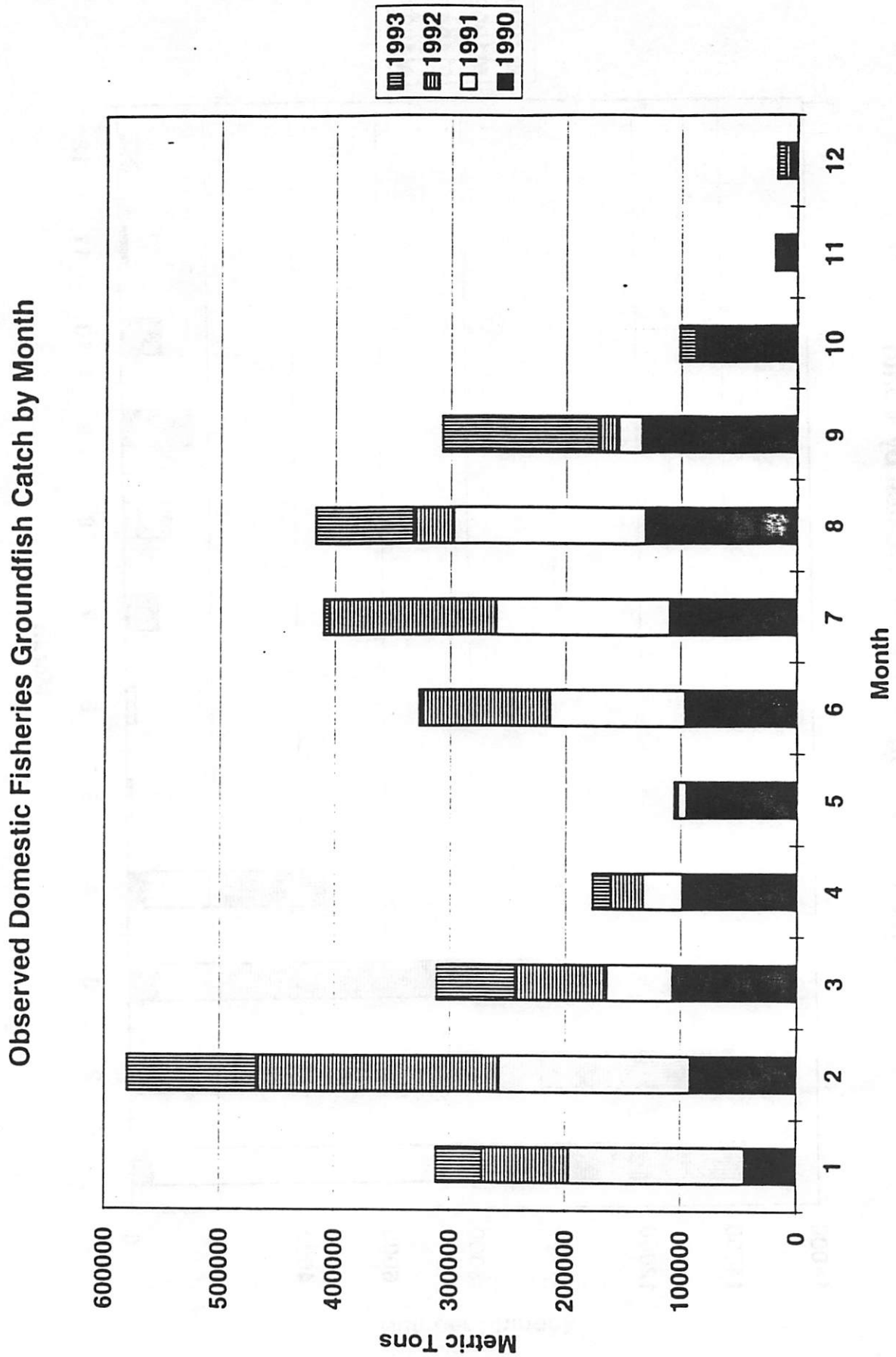


Figure 1-58. The distribution of tows in the domestic fisheries (1990-1993) with a chinook salmon bycatch of more than 5 fish during the months January-April.

Domestic Fisheries with > 5 chinook
January - April

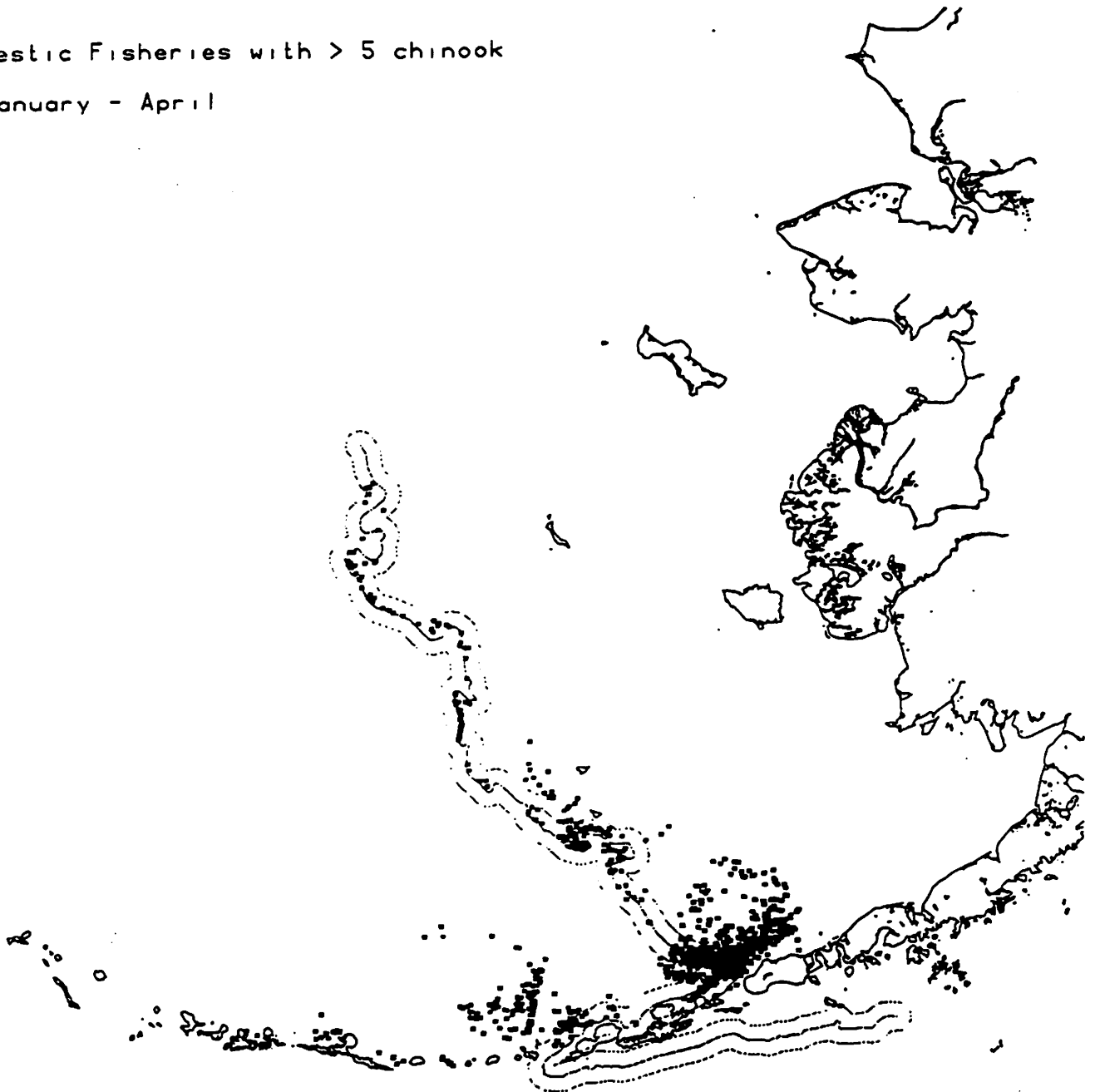


Figure 1-60. The distribution of tows in the domestic fisheries (1990-1993) with a chinook salmon bycatch of more than 5 fish during the months May-August.

Domestic Fisheries with > 5 chinook
May - August

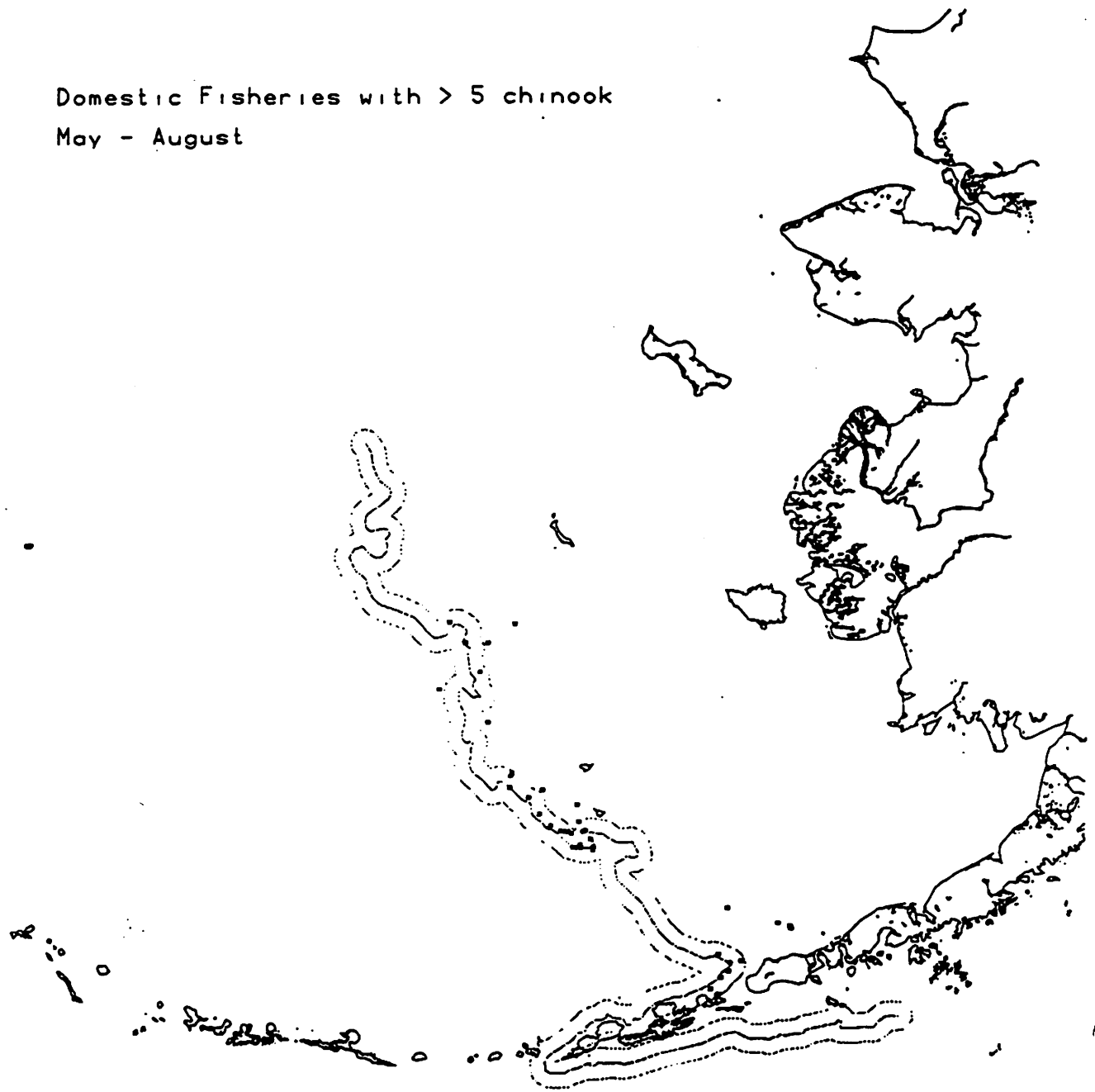
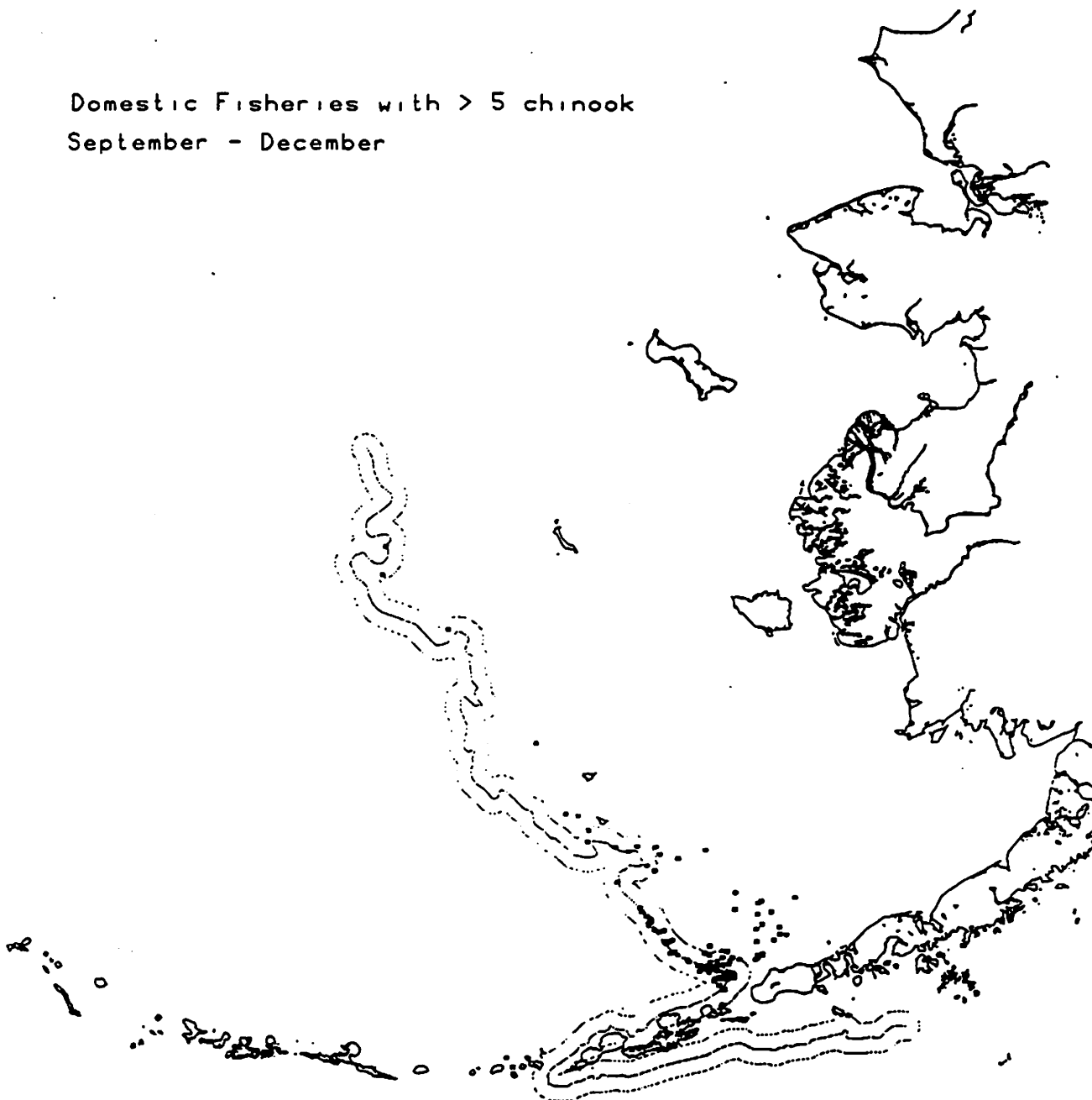


Figure 1-62. The distribution of tows in the domestic fisheries (1990-1993) with a chinook salmon bycatch of more than 5 fish during the months September-December.

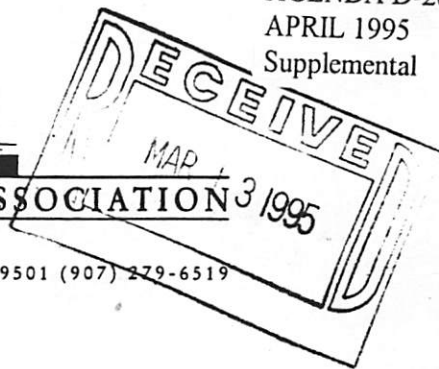
Domestic Fisheries with > 5 chinook
September - December





YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

733 WEST 4TH AVENUE SUITE 881 ANCHORAGE, ALASKA 99501 (907) 279-6519



RESOLUTION 95-3

Recommending reductions and limits to chinook salmon bycatch in the Bering Sea / Aleutian Islands pollock trawl fishery

WHEREAS the Yukon River Drainage Fisheries Association represents commercial, subsistence and sport users of salmon and other fish in the U.S. portion of the Yukon drainage;

WHEREAS available data indicates that Yukon chinook salmon are intercepted and wasted as bycatch in the Bering Sea / Aleutian Islands pollock A season fishery; and

WHEREAS the recently signed Interim Agreement on Yukon River Salmon calls upon both the U.S. and Canada to identify, quantify and undertake efforts to reduce the marine catches and bycatches of Yukon River salmon;

BE IT RESOLVED that the North Pacific Fishery Management Council adopt strict bycatch control measures to reduce chinook salmon bycatch in the pollock A season fishery including time and area closures as well as an overall cap on chinook bycatch for the A season.

COPIES of this resolution to be sent to the members of the North Pacific Fishery Management Council, to the members of the Alaska Congressional Delegation and to the Honorable Tony Knowles, Governor of Alaska,

APPROVED unanimously this 14th day of February 1995 by the Board and Delegates of the Association at their Fifth Annual Meeting held at Scammon Bay.

CERTIFIED: Harry O. Wilde, Sr. Gilbert Huntington
Harry Wilde, Sr. co-chair Gilbert Huntington, co-chair

ATTEST: Daniel Senecal-Albrecht 2/17/95
Daniel Senecal-Albrecht, executive director

Salmon Research Foundation

Report to the North Pacific Fishery Management Council
April 23, 1995

This report summarizes Salmon Research Foundation ("Foundation") activity since the January, 1995 Council meeting.

I. Board Membership. Mr. Thomas Tilden has replaced Mr. Victor Sissos as the Bristol Bay representative on the Foundation Board. Mr. Tilden is a long-time Bristol Bay fisherman, former Mayor of Dillingham, and has been actively involved in Bristol Bay fisheries policy matters for some time. The Board is pleased to have Mr. Tilden aboard.

II. Salmon Bycatch Enumeration and Estimation.

A. Background. At the January Council meeting, the Foundation, representatives of CDQ communities and members of the Council expressed concern regarding the discrepancies among the 1994 "B" season salmon bycatch amounts reflected in vessel operators' records, those assigned to specific vessels on the NMFS electronic bulletin board (the "PSCRATES" file) and the NMFS overall seasonal salmon bycatch mortality estimate. At the suggestion of the Council, representatives of the Observer Program, the NMFS Alaska Regional Office, the Bering Sea groundfish industry and the Foundation met to review 1994 "B" season and 1995 "A" season salmon bycatch data, and to discuss current NMFS methods for collecting and compiling the same. Presentations were made by Dr. Bill Karp, who manages Observer Program operations, and Mr. Galen Tromble, who prepares seasonal PSC mortality estimates for the Regional Office, and a discussion session followed.

Key issues identified at the meeting are as follows:

1. Policy. Observer Program personnel are overtasked, and the Program has received multiple, conflicting priorities as Council and industry policy goals have changed. Under the present program design, developing haul-specific bycatch information taxes Observer Program resources at the vessel, processor and central office levels. Therefore, the Program does not consider this activity to be an appropriate objective at this time. The Program believes it is more appropriate to focus its efforts on developing an accurate seasonal salmon mortality estimate.

2. Retention and Counting Implementation. As a general matter, it is not possible to apportion shoreside deliveries into hauls, and an observer's ability to sample an entire haul on a given factory trawler or mothership may be impaired by other work priorities, vessel layout, quantity of the haul, or diversity of species in the haul. These factors will make implementation of the

retention and counting regime difficult until fundamental operational changes are made.

Because the retention regulation became effective shortly before the 1994 "B" season opened, observers and processors were not well briefed concerning its requirements. Consequently, observers did not apply count reliability codes consistently, and processors assigned to assist with sorting and counting duties were frequently unfamiliar with the regulation's requirements and underlying objectives. One major processor either misunderstood or wilfully failed to comply with the retention and counting regulation during that season. Because chinook bycatch has not been as controversial as chum bycatch, retention and counting of salmon may have been considered a relatively low observer priority during the 1995 "A" season.

Dr. Karp's preliminary analysis shows 1994 "B" season salmon bycatch rates associated with counts conducted when an observer was present to be higher than those conducted when an observer was not present. The industry believes undercounting in the absence of observers to be aberrational and minor. However, NMFS staff believe that logistical problems and the production slowdowns associated with retaining and counting salmon undermine the incentive to comply with retention and counting regulations, and that the consequences for non-compliance are currently inadequate.

3. Current Estimation Methodologies. Dr. Karp has concluded that 1994 "B" season sample-based bycatch rates and observed retention-based bycatch rates correlate fairly well at the fleet-wide, season-total level. However, he concedes that rate correlation does not in itself establish that either method is producing accurate data. Conducting the replications and statistical analyses necessary to determine whether they are doing so is beyond the current resource level of the Program.

The Region continues to estimate salmon bycatch mortality using the same general model it adopted in 1990. Bycatch mortality is estimated on a processor-by-processor basis. The Region constructs a per-haul bycatch amount by expanding the number of salmon in a sample according to the proportion of the size of the sample to the size of the haul.

The weekly salmon total is divided by the total amount of catch from which it was constructed, and the resulting rate is applied to the processor's total catch for the week (observed and unobserved), producing the processor's weekly salmon mortality estimate. The processor amounts are then summed by sector. Because weekly rates are highly variable, a three week rolling average is constructed, which is used to derive the posted seasonal mortality estimate.

Most samples are small relative to the haul they are taken from,

and even at high bycatch rates salmon are present in very low relative numbers. Therefore, samples typically contain either no salmon or one salmon, and per-haul expansions of salmon data are typically either zero or a very large number. While the Region believes sampling and extrapolation produces a reliable seasonal salmon mortality estimate, the numbers it generates are controversial at the processor, sector and season levels, and are likely to remain so until their accuracy is tested. In addition, Dr. Karp's preliminary analysis indicates that the degree of agreement between the sample and retention-based estimates for any given haul is directly proportional to the amount of the haul sampled. This suggests that the small sample estimates typical under the current regime are unlikely to produce accurate haul-specific or even vessel-specific bycatch estimates.

B. Foundation Recommendations. The Foundation Board believes that accurate haul-specific salmon bycatch data is essential to achieving the Foundation's primary functions, i.e., developing an understanding of bycatch patterns and avoidance methods and promoting vessel-level accountability for bycatch. Until an independent, third-party assessment of the current data collection and aggregation methods is conducted, the accuracy of NMFS salmon bycatch data will remain unknown. Until the accuracy of this data is established, its adequacy to support any salmon bycatch management action will remain questionable.

The Foundation Board also believes that the Observer Program has been provided with conflicting signals concerning the Council and the industry's expectations of it, and that it is currently staffed and funded at a level inadequate to meet the first order demands placed on it by the Council and industry, much less those related to self-evaluation and long term planning and development.

Finally, the Board believes that vessels and processors must be given additional incentives to comply with the retention regulation and support the Observer Program's efforts in connection with the same.

In light of these considerations, the Foundation Board proposes to sponsor an independent review of current NMFS salmon bycatch estimation procedures by a well-qualified fishery biometrician. The goal of this review will be to identify the steps that need to be taken by the Observer Program and the groundfish industry to develop a level of demonstrably accurate haul-specific bycatch data adequate to support salmon avoidance research and vessel-level bycatch accountability, and the costs associated with the same. The Foundation Board proposes to assemble a steering committee for this review to include among its members representatives of the NMFS Fisheries Science Center, ADF&G, the Observer Oversight Committee, the groundfish industry, and western Alaska salmon users. The Foundation plans to have the funds

necessary for this review estimated and the sources identified by the June Council meeting.

It is the hope and intention of the Foundation that the review it proposes be conducted without prejudice, and with the express objective of resolving to the extent possible the controversy that currently attends salmon bycatch data.

III. Stock Identification. The Foundation Board has approved a 1995 "B" season chum stock identification project developed by Dr. Mundy and its Scientific Advisory Panel which will employ the funds contributed by the catcher boats that deliver to the Unisea plant in Dutch Harbor.

As an initial step, the Foundation contacted researchers and administrators involved in Alaska chum salmon stock identification to determine what they needed to improve existing programs and/or initiate new ones that would improve our understanding of the origins of chum taken as bycatch in the pollock "B" season trawl fishery. Based on their response, the Foundation is developing a cooperative effort involving federal, state and university expertise and efforts. With Foundation support, genetic work now under way at the NMFS Auke Bay Laboratory will receive additional chum samples, the University of Washington will analyze scale samples for age and growth information, and the Auke Bay and ADF&G Genetics Labs will explore statistical methods for combining the genetic and scale data to improve geographic resolution of chum stock identification.

The results of the genetic analysis conducted at the Auke Bay Lab should be available in early 1996. However, the scale and statistical analyses are developmental projects, and are expected to take at least a year to produce results. The Foundation is deeply appreciative of the cooperation and enthusiasm of the scientists and administrators at NMFS, ADF&G and the University of Washington. The Foundation looks forward to an active role in promoting cooperative development of salmon stock identification information beyond the 1995 "B" season.



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submitted by Dan Albrecht, executive director

March 1995; Report

from Canada DFO: Whitehorse office

A summary is presented of releases and recoveries of chinook salmon coded-wire tagged at the Whitehorse Rapids Hatchery.

The Whitehorse hatchery began releasing coded-wire tagged chinook in 1985 (Appendix ___). In the first and second year of the programme, all coded-wire tagged fry were released into Michie Creek, approximately 150km above the Whitehorse dam. In 1988, the first release of coded-wire tagged fry into Wolf Creek (just upstream of the dam) was conducted. Coded-wire tagged chinook salmon fry were released into the Whitehorse Fishway (just downstream of the dam) for the first time in 1989. Since 1991, releases have included all three locations, with approximately 50,000 coded-wire tagged fry per site. The anticipated coded-wire tagged release from the Whitehorse Hatchery in 1995 is approximately 70,000 chinook fry.

Recoveries:

There were no Alaskan recoveries reported prior to 1992; this may have been due to the lack of a directed recovery effort.

Two tags have been recovered on the high seas from the Pollock "A" fishery; in 1992, at lat./long. 5644N/17315W (southwest of the Provilof Islands) and in 1994, at lat./long. 6006N/17858W (west of Saint Matthew Island).

Apart from these two coded-wire chinook tags, all reported recoveries have been in-river. In Alaska all in-river recoveries have been through the test fishery in District One, or commercial sampling in Districts 1, 2 or 4. Of the twenty fish recovered in 1992 (three without tags), 17 were caught in District One and three in District Two. Twelve fish caught in 1993 (three without tags) - 10 in District One and two in District Two. In 1994, 18 adipose-clipped chinook were obtained - six in District One, seven in District Two and five in District Four. The number of fish examined for marks in District One from 1992 to 1994 is presented in Table ___ along with recoveries.

Table __. Adipose-Clipped chinook salmon recovered in the Alaskan test fishery or commercial sampling in District One.

Year	Adipose-clips	Tags Recovered	Examined
1992	17	14	3853
1993	13	10	2451
1994	6	3	3350*

* close approximation