

M E M O R A N D U M

TO: Council, SSC and AP members
FROM: Jim H. Branson
Executive Director
DATE: November 18, 1983
SUBJECT: Herring FMP

ACTION REQUIRED

Review SSC/PMT subgroup report on research and experimental fisheries.

BACKGROUND

At the September 1983 meeting the Council approved the final Bering Sea Herring FMP, implementing regulations, and supportive documents. The complete FMP package has not yet been submitted, pending final review of the completed package. We expect it to be mailed within the next few days.

Also at the September meeting, the Council received a proposal from the North Pacific Fishing Vessel Owner's Association (NPFVOA) for an experimental/research herring fishery. General Counsel has told us that any directed catch taken by a commercial vessel must be considered part of OY and must not cause the total catch to exceed OY. However, the use of commercial vessels for research purposes could take place prior to FMP implementation regardless of OY considerations.

The Council appointed a workgroup of SSC and PMT members to review herring research needs and determine if this type of experimental/research fishery could generate the desired data. This research workgroup met November 1 and December 5 and has prepared a report for Council review [agenda D-1(a)]. An oral summary will be presented at this meeting also.

What is it?

DRAFT

12/5/83

REPORT TO THE NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
ON
BERING SEA HERRING RESEARCH

In September, the Council appointed a working group of SSC and Herring Plan Development Team members to address Bering Sea herring issues. The working group was instructed to:

- (a) Identify knowledge gaps, particularly in offshore stocks.
- (b) Look at experimental designs to fill these gaps.
- (c) Consider the utility of the North Pacific Fishing Vessel Owner's Association proposal in light of the above exercise, including costs of obtaining data.
- (d) Make recommendations concerning the proposal or a modification thereof, considering necessary phasing of research and the need for a multi-year project.

The working group met on November 1 and on December 5. A list of participants is attached (Appendix 1). This report presents the findings of the group.

The group concluded that the lack of knowledge of Bering Sea herring stocks fell into four general categories: abundance, identification of stocks, distribution of stocks and stock-recruitment relationships. Some of these topics were previously addressed in a document prepared by Council staff and the Herring Plan Development Team (PDT) entitled "Bering Sea Herring Research Needs" which was submitted at the September Council meeting (Appendix 2).

The group agreed that the goal of the research program is generation of information on the structural makeup of the herring population, its distribution and size to allow evaluation of alternative harvesting strategies.

Research to obtain basic information can be separated into inshore and offshore components because of differences in the objectives of the research and because of the logistics of research. Inshore waters, although remote, are more accessible than offshore areas. Further, individual stocks separate on the spawning grounds and can be sampled and quantified to some degree. Offshore aggregations are difficult to locate and assess and may be a mixture of many spawning stocks. Severe winter weather and sea ice also hampers the operation of research vessels.

Inshore Research

Recent research has been primarily focused on inshore waters because of a need to obtain basic resource data for management of the inshore fishery. The Draft Bering/Chukchi Sea Herring Fishery Management Plan gives priority to subsistence and domestic fisheries in inshore areas. Foreign and domestic offshore fisheries for herring are prohibited or severely restricted.

The Alaska Department of Fish and Game (ADF&G) has been using aerial surveys since 1978 to estimate the abundance of spawning stocks of herring. The resultant biomass estimates are used for in-season management and to set annual harvest guidelines. The surveys provide the best estimates of abundance possible under current budget and regulatory constraints and technological limitations. Further research is needed to determine the accuracy of the estimates.

Data are routinely collected by ADF&G to determine basic biological parameters including length, age, growth, mortality and stock identity. The Council has contracted the Fisheries Research Institute, University of Washington to conduct scale pattern analyses on individual spawning stocks of herring. Preliminary results of the two-year study suggest that some individual spawning stocks can be identified in a mixed stock fishery. If the final report supports this conclusion, scale analysis will be an essential part of offshore stock assessment.

The ADF&G has prepared research proposals designed to improve inshore stock assessment by tagging, through the use of hydroacoustic surveys and by utilizing ultrasonic transmitters. The objectives of these proposals are

outlined in Appendix 2. The complete proposals have been provided by ADF&G to the Council and SSC.

In general, the knowledge of spawning stocks in inshore areas has improved significantly in the last 5 years. Knowledge of abundance and location of spawning stocks, age distribution, etc., of herring during the inshore spawning season is much greater than information available on the total abundance and distribution of stocks in offshore areas.

Offshore Research

Most research in inshore waters relate to spawning stocks adjacent to spawning grounds and does not address information on total abundance, migration and stock distribution in offshore areas. Research in offshore waters is difficult because the herring aggregate in offshore waters only during the winter, costs for large research vessels needed during the winter months is high, adverse weather and ice conditions limit operating time, and the vast area involved imposes difficulties in the location and assessment of herring aggregations.

In the past it has been considered difficult if not impossible to identify individual stocks in a mixed-stock aggregation.

The working group concluded that the primary objectives of the offshore research program should be:

- (1) Determine the location and range of winter grounds.
- (2) Determine the distribution of herring within the grounds.
- (3) Obtain age, length, weight, maturity, abundance indices and scales for stock distribution studies.
- (4) Estimate the general size and age-length composition of herring schools.

- (5) Investigate the diurnal distribution and behavior of herring schools within the water column.
- (6) Assess the degree of mixing with other species.
- (7) Evaluate the results obtained to determine if they can be applied to herring management.

There are several means of collecting information required to accomplish the above objectives. The committee considered four methods. They are:

1. Research program using government or chartered research vessels.

The National Marine Fisheries Service has undertaken herring research in the Bering Sea during the winter with the R/V Miller Freeman. It was difficult to locate herring aggregations in the time allotted and weather conditions restricted operations. It may be possible to successfully achieve the above objectives if 3-4 months ship time is available. Minimum costs are estimated to be \$500,000-\$750,000 per year.

2. Research program using commercial fishing vessels.

If an offshore herring allocation is granted, commercial vessels may be willing to support the research program as a condition for obtaining fishing privileges. Costs of this approach might be limited to personnel, supplies, and data processing analysis.

3. Observer program on commercial vessels.

Observers can be placed aboard commercial vessels for a relatively small cost. However, data collected are limited to samples of the catch, effort, and area of catch. There could be no directed research and there could be no control over fishing activities.

4. Combination of commercial vessels and a research vessel.

A commercial fishery may be permitted with conditions as provided in 2 or 3 above. A government or chartered research vessel would be available for structured research when herring aggregations were located by the commercial fleet, but would conduct alternative research on other species until herring were located.

The working group concluded that a combination of commercial and research vessels has the greatest potential for success. However, if funding and scheduling problems preclude the use of a research vessel, a project using only commercial fishing vessels is a viable option. Valuable information on relative abundance, distribution, and behavior could be obtained as well as fish samples for scale pattern analyses and other biological data.

The proposal by the North Pacific Fishing Vessel Owners Association (Appendix 3) is an innovative and responsible approach to the problem of conduct of research in the eastern Bering Sea. It is an example of the fishing industry's interest in the status and future development of fisheries in the eastern Bering Sea. However, the proposal would require modification in order to provide maximum information.

Prior to implementing offshore fishing the Council must allocate tonnage and approve a conditional offshore fishery. At the present time the proposed herring FMP gives priority to inshore fisheries. An apportionment to a winter offshore fishery will occur only in the event a surplus exists after all other harvests are taken into account.

Given the uncertainties of funding, research vessel availability and costs of using commercial fishing vessels, we believe the Council should proceed with a request for proposal for herring research by commercial vessels. It is unlikely, however, that such a project could be executed in 1984 because fishing vessels need more time to program fishing schedules.

The group reviewed a draft request for proposal which included an experimental design for offshore research with commercial vessels. Further work is necessary before it is ready for Council consideration. A request for proposal will be submitted to the Council at the next meeting.

LIST OF PARTICIPANTS

Donald Bevan, SSC Member
Robert Burgner, SSC Member
John Burns, SSC Member
Barry Collier, NPFVOA
Al Didier, PMT Member
Steve Fried, PMT Member
Jim Glock, PMT Member
Steve Langdon, SSC Member
Richard Marasco, SSC Member
Richard Marshall, PMT Member
Alan Millikan, SSC Member
Dennis Petersen, NPFVOA
Donald Rosenberg, SSC Member
Jeff Stephan, Council Member
Vidar Wespestad, PMT Member
John Winther, Council Member

AGENDA D-2(d)
SEPTEMBER 1983BERING SEA HERRING RESEARCH NEEDS

Harold Lokken requested that a package of research proposals be prepared which would address the major gaps in our knowledge of Bering Sea herring. We have included a brief history of research, mostly taken from the FMP. In general, the data gaps fall into three main categories: stock abundance, migration routes and rates, and offshore distribution and mixing.

HISTORY OF RESEARCH

Herring stocks have been extensively investigated in areas where they are commercially important (Cushing 1975). Research on Pacific herring has occurred primarily in Southeastern Alaska and British Columbia (Reid 1972, Taylor 1964). Much of the life history and population dynamics of Pacific herring have been developed for these areas. In contrast, research on herring in the Bering Sea has been limited, and most has occurred within the last three years.

United States Research

In the 1880's, exploratory surveys of the Bering Sea and western Alaska were begun by various departments of the Federal Government. These surveys, which continued into the early 20th Century, generally included a naturalist or fishery biologist who noted the occurrence of herring in the Bering Sea (Bean 1887, Cobb 1907, Gilbert 1895, Jordan and Gilbert 1899, Nelson 1887, Tanner 1890).

The first specific investigation of herring in the Bering Sea occurred in the late 1920's (Rounsefell 1930). Rounsefell collected samples from the catches from Unalaska and Golovin Bay in 1928, the year that commercial herring fisheries developed at Unalaska. The Bering Sea samples were included with samples from the Gulf of Alaska for investigation of the stock relationships of Alaska herring.

After 1928, there were no US herring investigations in the Bering Sea until the advent of the OCSEAP in 1975. There had been some sporadic sampling for biological statistics by the ADF&G in the 1960's and 1970's.

Intensive investigations of the distribution, relative abundance and biology of spawning stocks in addition to the determination of subsistence use levels were begun by ADF&G in 1975 under OCSEAP in an area from the Alaska Peninsula to Kotzebue Sound. Much of this research in addition to stock identification and biomass estimates of spawning fish is being continued by ADF&G through State and NPFMC funding. The NMFS, under OCSEAP, investigated herring in Norton Sound and the Chukchi Sea and also reported on the occurrence of herring in southeastern Bering Sea demersal fish surveys (Wolotira et al. 1977, Pereyra et al. 1976). A winter hydro-acoustic survey was conducted in 1978 and 1979, northwest of the Pribilof Islands by NMFS to estimate the distribution and abundance of herring on the winter grounds.

In recent years, NMFS, first through the International North Pacific Fisheries Commission (INPFC), and later under the Magnuson Act, has placed observers on foreign vessels to monitor catch rates and to collect biological samples. ADF&G also had observers on domestic processors in the Togiak region since 1977 to collect biological data from the fishery.

Foreign Research

When the Soviet Union began fishing for herring in the eastern Bering Sea in the early 1960's, they initiated investigations to determine the extent and distribution of the herring resource. Most of the present knowledge of the offshore distribution and behavior of eastern Bering Sea herring is based on the Soviet research. Specific investigations dealt with winter abundance and distribution (Shaboneev 1965), summer abundance, distribution and migration (Rumyantsev and Darda 1970) and with eastern-western Bering Sea stock relationships (Prokhorov 1968). The main purpose of these surveys was the determination of the extent and potential uses of resources prior to commercial exploitation by the Soviet fleet.

Japanese research in the eastern Bering Sea began in the mid-1950's with limited exploratory trawl fishing. Extensive and systematic surveys of eastern Bering Sea groundfish by the Japanese were begun in 1963 by the Japan Fishery Agency (JFA), and have continued annually with the exception of 1972 (Japan Fishery Agency 1977). These surveys have covered broad areas of the continental shelf, and in some years included the shelf edge and upper continental slope. Japanese research efforts have focused on pollock and other demersal species; herring have only been noted incidentally.

The Japanese have been collecting catch and effort statistics and occasionally length frequency data from their herring fisheries since 1964. These data have been provided to the US through the INPFC.

QUALITY OF RESEARCH

The overall quality of domestic research data is fair to poor. In coastal areas, recent intensive surveys have helped to define features of spawning behavior, relative abundance, and coastwise distribution. The data on early life history, which may be a period when year-class strength could be assessed, are very weak. Individual spawning stocks have been identified along the coast, but the relationship of these stocks to the offshore fisheries is unclear due to an absence of direct data on offshore distribution and migration patterns.

RESEARCH NEEDS (summarized from Section 12.7, FMP)

Research will be required to (1) develop means of reducing the incidental catch of herring in other fisheries, (2) refine estimates of abundance and biological characteristics of stocks through resource surveys, (3) improve the capability for predicting changes in resource abundance, composition, and availability, and (4) identify the origin and distribution of stocks in offshore waters.

For purposes of conservation and harvesting efficiency, fishing methods or gear should be modified or developed which will reduce the incidental catch of herring in groundfish trawl fisheries.

Estimates of biomass of specific groundfish resources have been obtained through resource surveys using bottom trawls. However, herring are not generally available to bottom trawls and other gear and methods must be used for assessing biomass. Hydroacoustic surveys, spawn deposition surveys and aerial surveys of schooled fish are some of the methods under consideration.

Hydroacoustic surveys in the nearshore areas just prior to or during spawning are difficult due to the many widely scattered schools that are constantly moving through shallow waters. Hydroacoustic surveys are probably best conducted when herring are relatively concentrated on the winter grounds. Results of surveys conducted during late winter - early spring could be applied in time for management of the inshore fisheries. Some increased ability to identify discrete spawning stocks in the offshore survey area would also be desirable.

Aerial surveys are one of the more cost effective tools for measuring the abundance of spawning herring. However, this method is limited due to weather conditions and narrow time-area coverage. Intensive testing should be made of school distribution within a limited area to determine if surveys are more effective at particular times and to investigate the variability of schools along sighting tracks. Also, aerial biomass estimation procedures and species identification procedures should be improved.

Long-term fisheries management requires reliable forecasting of stock conditions. Until now, forecasts have been based mainly on past events, such as trends in abundance indices (catch per unit effort) and size and age composition of specific resources without any consideration of the interactions of these resources with each other and the environment. Studies need to be continued to determine for predictive purposes those factors that have major influences on the abundance, composition, and distribution of resources. Monitoring certain oceanographic and climatological conditions (temperature, currents, etc.) in both the nearshore spawning-rearing grounds and the offshore wintering grounds may be very important in understanding fluctuations in herring abundance.

There is a critical need for annual pre-recruit surveys (i.e. of young fish before they enter the fisheries) so that a measure of their abundance can be used to forecast later contribution to the exploitable stock. Assessment of pre-recruit abundance could be made of juveniles in nearshore nursery areas or at a later age in more offshore waters. The major limitation for use of this method is the virtual absence of information relating to distribution of eastern Bering Sea herring during the first two or three years of their life cycle.

Current studies in inshore waters are emphasizing the assessment of stock condition through aerial survey observation of schooled fish and age composition data collected from commercial and test fishing catches. Age composition data when collected over a number of years are indicative of the relative

strength of various year classes including newly recruited fish, and may be used to a limited degree in adjusting quotas and formulating other management measures.

Basic biological research is needed to systematically investigate population parameters, such as age-specific mortality rates, growth rates, and recruitment rates. Investigations are also needed to establish the degree of utilization of herring in the diet of marine mammals, salmon, and other predators so ecological effects of harvesting can be better evaluated.

Lastly, stock identification needs to be refined so that the distribution of stocks within the eastern Bering Sea and their frequency of occurrence in each fishery can be established.

* * * * *

WHERE DO WE GO FROM HERE?

It is apparent that in many respects we are at square one in regards to herring data. Since no offshore fisheries have been allowed since 1980 we have very little current information about offshore herring distribution. This general information must be collected before any intensive herring research can be started. The cheapest way (in terms of federal and state research dollars) would be to allow some type of commercial fishery. The Council recently received a proposal of this type from Marine Resources Company and their request for a 10,000 mt joint venture allocation.

Once basic distribution information is obtained, any number of specific sampling programs could be initiated to collect stock assessment, tag recovery, scale sample or other data.

To determine the distribution of discrete inshore stocks and the degree of mixing offshore, some form of stock identification-mark is needed. Scales provide a general identifier and may prove adequate for our immediate needs. Tags, either coded wires or external, would yield more precise data but at a far greater cost. The cost is related to the recovery or sampling program as well as the physical marking. If tags could be recovered from a commercial fishery the cost would be much less than from a directed research-type sampling survey.

The coded wire tag proposal by ADF&G does not include an offshore sampling program. That would have to be added to the \$600,000 tagging and inshore recovery cost.

Currently FRI is analyzing herring scales taken from the summer fishery near Dutch Harbor and comparing these to samples of scales from discrete inshore spawning populations. We are waiting for the results of this study and would recommend that additional studies be postponed until we review these results and determine what questions remain.

In response to Mr. Lokken's request we have prepared the following summary of studies proposed by ADF&G and NMFS. The SSC has received the complete proposals which are also available to Council members on request.

POTENTIAL PROGRAM TO FULFILL HERRING RESEARCH NEEDS

1. Allow a commercial fishery to occur offshore in such a way as to gain the maximum amount of distribution and abundance data possible. A maximum total catch could be established. This could be a 1-, 2- or 3-year program.
2. During that period attempts should be made to improve stock assessments and identification inshore.
3. A scale pattern study, using scales collected from offshore commercial catches or from fish recovered in research surveys, should be conducted to improve the precision of scale analysis techniques and to identify the contribution of discrete stocks to the offshore fishing grounds.
4. If scale analysis does not provide detailed enough information, an intensive inshore tagging program should be initiated. Tagging would probably have to occur over a period of at least two years due to the short period of availability of spawning stocks and their geographic separation.
5. Tag recovery programs, either through monitoring commercial catches, research cruises, or a combination of the two, should be initiated immediately after tagging and continue for at least two years after tagging was completed.

Research Proposals - Inshore

I. Stock Assessment

A. Coded Wire Tags

1. Objectives

- (a) determine size of Togiak stock
- (b) determine fishing mortality
- (c) determine homing and stock integrity

2. Cost \$607,500

B. Hydroacoustic and aerial surveys (inshore)

1. Objectives

- (a) estimate density of herring schools for use with aerial estimates
- (b) determine relationship between density and several environmental factors
- (c) harvest and estimate volume and tonnage of several schools and compare to hydroacoustical and aerial estimates

2. Cost \$100,000

C. Ultrasonic transmitters

1. Objectives

- (a) determine migration routes of herring entering and exiting spawning grounds
- (b) estimate residence time in the fishing district
- (c) determine environmental effects on movement

II. Migration

A. External Tags

1. Objectives

- (a) determine feasibility of large scale tagging program
- (b) determine short-term movements within spawning areas
- (c) determine distribution of tagged herring within other spawning/fishing areas
- (d) provide information on migration routes and rates

2. Cost \$86,300

Research Proposals - Offshore

To: Jim Glock
From: Vidar Hestepstad
Subject: Resource assessment of herring in the Bering Sea.

In response to the Council's request for information on what research activities could be conducted to quantitatively assess herring in off-shore waters and identify the stock composition of these herring I am submitting the following potential projects and cost projections. Prior to preparing this memo I reviewed the section on research requirements (12.7) in the herring FMP and found that most of the information contained therein is still relevant. In the 5 years since this section was prepared some of the research suggested has been done or is being conducted. However, research directed toward quantifying the abundance of herring has not progressed to any great degree primarily due to the high costs and logistics involved.

The problem of stock identification is currently being addressed although not as rapidly as desired. The original proposals for stock separation called for a stepwise progression from the least cost option, electrophoretic biochemical studies, to more costly scale pattern studies and then to yet more expensive tagging studies if necessary. To date electrophoretic studies have been carried out on major stocks with the results that stocks within the Bering Sea are indistinguishable. Scale pattern analyses are now in progress and preliminary results indicate that the method may prove adequate for stock separation. If the scale pattern analysis does not prove to be feasible then tagging studies are the only remaining option for stock identification. It should be noted that a tagging study to determine off-shore stock composition will require some form of directed off-shore commercial or research fishing effort.

Quantification of the herring resource in off-shore waters may be rather simple and straight forward given the right conditions but based on our general lack of knowledge of off-shore distribution and previous attempts to assess herring in the central Bering Sea this is presently not the case. Japanese and Soviet fishery data indicate that herring concentrate in a relatively small area northwest of the Fribilof Islands during the winter months. It is during this time period that the best estimates of herring abundance can be made. However, the poor weather conditions, remoteness from ports and the large area that must be surveyed requires the use of large vessels for periods of 2-3 months to insure that enough survey days are obtained to adequately cover the entire winter range of herring. Current cost estimates for a winter hydroacoustic survey are between \$600,000-700,000. The largest part of this cost is vessel charter.

The costs of a winter hydroacoustic survey can be reduced through the use of less vessel time. This could occur through fortuitous good weather coupled with the rapid discovery of major herring concentrations. Unfortunately, the likelihood of this occurring is remote as past attempts at winter herring assessment were unsuccessful due to many survey days being lost to weather.

Vessel days and costs can also be reduced by conducting preliminary studies into the distribution and behavior of herring on the winter grounds. Such studies are needed to ascertain whether or not a hydroacoustic survey is even feasible. Questions that need answering are what is the diurnal behavior of schools, what is the variation in school sizes, what is the distribution of schools and/or concentrations within the winter grounds, are concentrations purely herring or are schools associated with other species such as pollock. Acquisition of this information could lead to survey designs which would utilize less vessel time.

Preliminary biological and distribution studies could be conducted in two ways, either using a research vessel or utilizing time on a commercial fishing vessel in conjunction with a fishery. Employing a research vessel would require a minimum of 30 survey days with an associated minimum cost of \$150,000-200,000. Additional to the monetary costs of the survey would be the diversion of funds or vessel time from other projects such as Bering Sea pollock unless supplemental funding is granted. Costs involved in preliminary studies conducted on a fishing vessel would be limited to personnel and equipment costs and possibly some charter or fuel costs for major diversions of the fishing vessel from fishing.

SEP 26 1983



North Pacific
Fishing Vessel
Owners' Association

September 21, 1983

Jim Branson
Executive Director
North Pacific Fisheries Mgmt. Council
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NPFVOA HERRING PROPOSAL

Recent evidence from the annual NMFS Bering Sea bottom trawl survey demonstrates that the abundance of herring has increased to higher than recent levels of abundance. Analysis of the trawl survey data produced a biomass estimate of that portion of the herring resource available to this bottom trawl gear of 33,000 metric tons to 110,000 metric tons. Considering that herring is an off-bottom species and therefore is not completely available to bottom trawls, the actual biomass of herring in the eastern Bering Sea must be substantially greater than the above estimate generated by the trawl survey.

Based upon the information cited above, it seems reasonably clear that the Bering Sea herring resource is presently underutilized. The North Pacific Fishing Vessel Owners' Association feels strongly that an offshore food herring fishery is justified. Therefore we request that the North Pacific Fishery Management Council and the National Marine Fisheries Service authorize an offshore winter Herring Research/Experimental Production Project at the level of 10,000 metric tons for the period January to April 1984 in the eastern Bering Sea.

We would propose that the project be organized along the following lines:

A) A project committee should be established comprised of NPFVOA executives, owners of U.S. harvesting vessels, Pribilof Islands interests representatives of domestic processors who will process and market the herring, and fishery research and management specialists from State and Federal agencies. This committee would be responsible for establishing the experimental design, delineating the logistical responsibilities and cooperatively developing a research format so that the objectives of the project can be accomplished.

B) This will undoubtedly be a totally domestic operation, U.S. harvesters, U.S. catcher-processors, and U.S. shore-based processing facilities will be engaged. The primary objectives of the project will be to:

1. More equitably allocate and more fully utilize for food purposes the herring resource of the eastern Bering Sea and the U.S.A. Fishery Conservation and Management Zone;
2. Expand market opportunities to U.S. fishermen for underutilized species such as Pacific herring and allow the domestic industry to itself test the economic viability of an offshore fishery for food herring;
3. Begin to provide the management agencies with additional and critically needed information on the abundance, distribution, age composition, and behavior of Pacific herring.

Biologists of State and Federal agencies as well as biologists from the private sector have suggested the types of useful information to be generated from such a research/experimental production project and how that information could be used. They include:

1. Age composition and population structure of the eastern Bering Sea herring stocks;
2. Relative abundance indices of the various year classes presently comprising the population;
3. Relative abundance and maturity data on younger age groups which are only partially recruited to the roe fishery;
4. Distribution data on the herring resource and stockmixing or segregation, including possible mixing with western Bering Sea stocks;
5. Spatial relationship between herring and the other pelagic resources in this area;
6. Oceanographic factors influencing the offshore distribution of herring during winter;
7. Schooling behavior of herring;
8. Acoustic signatures of herring relative to other midwater species in this area at this time;
9. Food habits of wintering herring concentration for use in Bering Sea biomass modeling efforts.

We would expect that an agreement would be signed within the project committee whereby the boats in our Association would obligate themselves to provide the specified services and vessel time as agreed upon with the research personnel. A primary vessel offered within the context of this project will be the AMERICAN NO. 1. As a catcher/processor this

ship will be able to maximize its time on the fishing grounds. The AMERICAN NO.1 together with the other vessels participating in this project would accept for use the various sampling and testing equipment such as XBT, CDT and hydroacoustic assessment equipment as requested by the biologists.

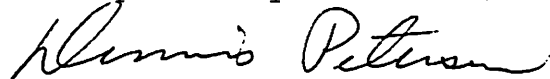
It is expected that 90 days of vessel time would be available in this fishery, unless the target of 10,000 metric tons was reached beforehand. We have had preliminary discussions with some of the companies which operate shore processing facilities in the Bering Sea region. They have expressed an interest in developing a winter food herring fishery. We would expect them to join this project with enthusiasm.

No funding of any sort is being requested for this project. The various survey and sampling efforts would be pursued as an integral part of our experimental production fishery. The various research agencies themselves would be responsible for supporting their own personnel, including their specific catch sampling and data analysis requirements.

The design of this research/experimental production project incorporates many of the thoughts and requirements expressed by agency biologists who participate in the management of the Bering Sea herring resource. Our Association is confident that we and the fishermen who join the operation could cooperatively and successfully work with the biologists responsible for the details of design and implementation of the research program.

We are ready to begin work on this project immediately. We seek Council endorsement. If it is granted, we firmly believe that the additional steps necessary to implement this cooperative venture can be and will be accomplished to the benefit of all concerned with the rational management and utilization of the Bering Sea herring resource.

Respectfully submitted,



Dennis Petersen
President
NPFVOA

cc: Lucy Sloan, National Federation of Fishermen
Bob McVey, National Marine Fisheries Service
William Gordon, National Marine Fisheries Service