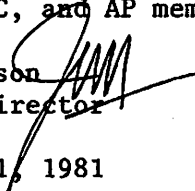


M E M O R A N D U M

TO: Council, SSC, and AP members
FROM: Jim H. Branson 
Executive Director
DATE: September 21, 1981
SUBJECT: Herring

ACTION REQUIRED

1. Review herring PMT report
Consider recalling FMP from Washington, D.C.
2. Review request for offshore joint-venture or domestic allocation.

BACKGROUND

E-2(a) The Plan Maintenance Team has reviewed the procedures outlined in the FMP and has discovered significant problems in applying this year's data. The PMT suggests that the FMP be withdrawn from Secretarial review so that it can be amended to more closely reflect the Council's intent.

The major considerations are:

Determination of OY
Allocation of Harvestable Surplus
Allowable Incidental Catch (AIC) Formula
Need for Flexibility
Nelson Island Stocks

E-2(b) The Council has received a request from Marine Resources Company to release the unharvested portion of OY for offshore allocation. Although we are still under the PMP the Council's views would aid NMFS in resolving this issue.

E-2(c) The Council has also received a letter from Ken Peterson stating his company's desire to harvest herring offshore. They have not decided whether to do this on their own or as a joint-venture with MRC.

HERRING PLAN MAINTENANCE TEAM REPORT

The herring plan maintenance team met with ADF&G herring personnel to discuss how the late 1981-1982 Bering Sea herring fishery would be managed if the FMP were in effect. The discussions focused on several critical aspects of the FMP, primarily the formulas for determining ABC and AIC. We also discussed the allocation schemes of the Council and the Board and how the strategies have diverged during the past year. After reviewing harvest data, spawning biomass estimates and incidental catch of herring in the foreign trawl fisheries, the PMT recommends that changes be made in the FMP to make it work more effectively upon implementation.

Specifically, the PMT recommends that:

1. the differences between state and federal management approaches be resolved (OY determination and offshore allocation);
2. the AIC formula be modified;
3. consideration of Nelson Island stocks be clarified; and
4. greater flexibility be built into the FMP to deal with inadequate data whenever necessary.

DETERMINATION OF OY

The management regimes of the Council and Board of Fisheries share numerous similarities but are also distinctly different in some important respects. Some of these differences are important only under certain biomass or harvest conditions which are likely to occur periodically. The primary strategy difference is in determination of OY, and secondary difference in allocation strategies also are present.

Both management regimes depend on the same data base, i.e., annual aerial biomass surveys conducted during inshore spawning. However, the FMP allows for a sliding exploitation rate based on the biomass estimate whereas the State policy relies on a more straight-line exploitation rate. Thus the FMP will often set a lower OY than the State guideline harvest up to a biomass of about 160,000 mt (Figure 1). Above MSY biomass the FMP will allow a larger harvest than allowed under Board guidelines. For example, under the FMP:

$$\text{Biomass} = 167,600 \text{ mt}$$

$$\text{ABC} = \text{biomass} \times .20 \times \frac{\text{current biomass estimate}}{\text{MSY biomass}}$$

$$\text{ABC} = 167,600 \times .20 \times \frac{167,600}{240,930}$$

$$\text{ABC} = 23,296$$

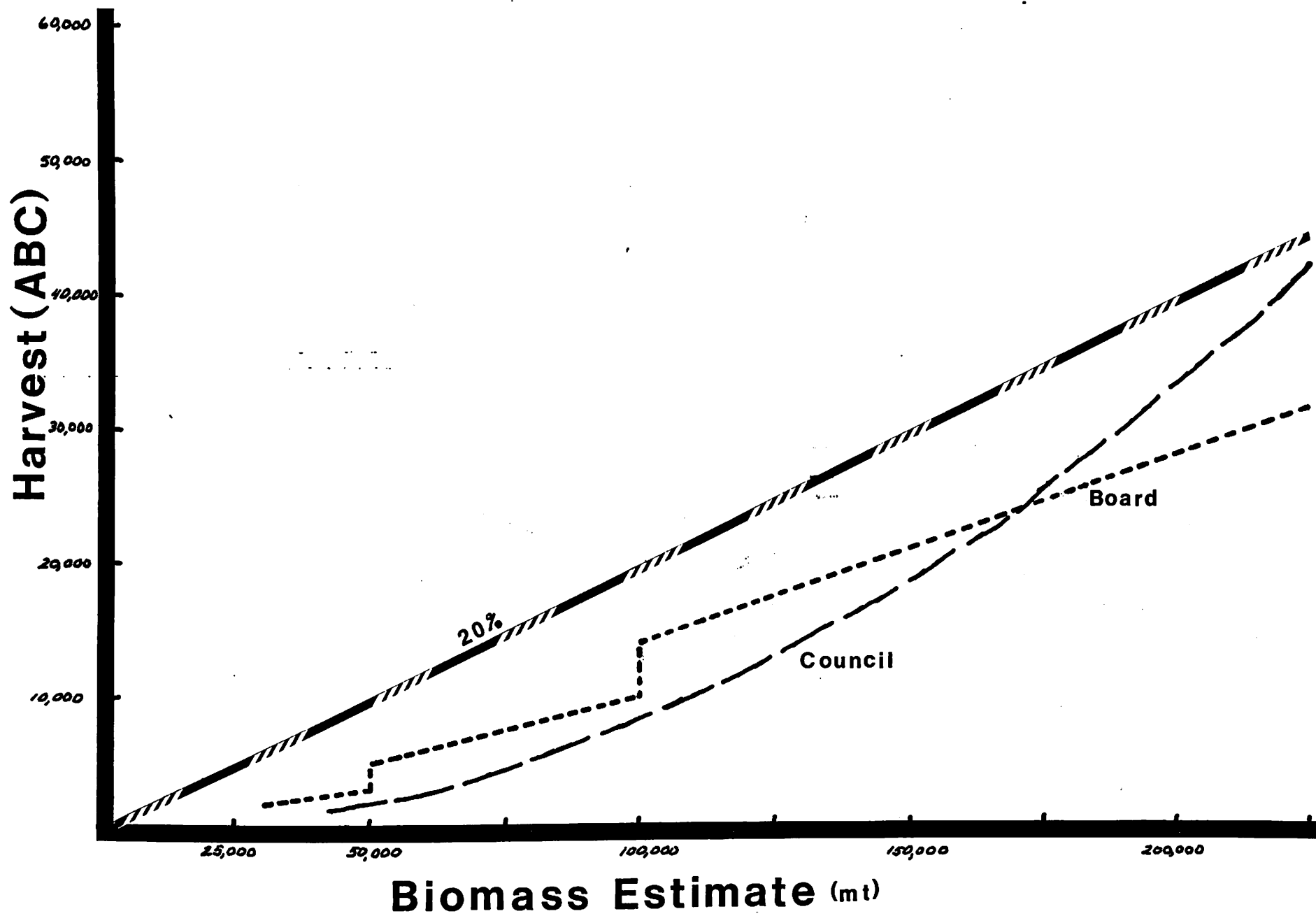


Figure 1. Board and Council Harvest Strategies.

On the other hand, the Board specifies that:

1. When the total observed biomass of early season older age class herring exceeds 20,000 mt, the season will open and the harvest rate will be 10% of the observer biomass; the harvest rate may be allowed to increase to 20% if the observed biomass exceeds 40,000 mt and sufficient spawning has occurred.
2. When the total observed biomass of later season younger age class herring exceeds 20,000 mt, a harvest of no more than 10% will be allowed.

The 1981 data have not been sufficiently analysed to determine age distribution, but in the given example with an approximate run ratio the State policy would set a harvest guideline as follows:

Early run estimate 66,000 mt

Second run estimate 100,600 mt

Board Harvest Guideline

Council OY

$$\begin{array}{r} 66,800 \times .2 = 13,360 \\ 100,200 \times .1 = \underline{10,020} \\ 23,380 \end{array}$$

23,296

Thus, although the methods differ the results are very similar. This is shown graphically in Figure 1, which uses a young:old ratio of 1.5:1. The Board's harvest guideline is consistently higher than OY up to a herring biomass of about 160,000 mt. After this point, the exploitation rate established by the FMP increases OY above the Board's guidelines.

ALLOCATION OF HARVESTABLE SURPLUS

Both the Council's and Board's management regimes specify that subsistence users have the highest priority for herring determined to be surplus to reproductive needs. Following that the Board allocates the remainder of the surplus to the nearshore fisheries where stocks are presumed to be more manageable when they segregate prior to spawning. Current State regulations prohibit landing herring which have been harvested or processed offshore. On the other hand, the Council's allocation scheme established a priority for the nearshore sac roe fishery followed by a priority for the high seas domestic trawl fishery and high seas foreign trawl fishery, respectively. These differing allocation schemes lay the ground work for major regulatory conflicts in the event that the sac roe fishery does not harvest the OY. This situation may arise as the result of differing formulas being employed (as described above) or as the result of in-season management of the sac roe fishery.

Nearshore Sac Roe Herring Fishery

The nearshore sac roe fishery is so dynamic that in-season management has had little success in achieving specific harvest goals. This is particularly true for the largest component of the Bering Sea herring fishery, the Bristol Bay segment. For the past three fishing years, post season evaluation of the roe fishery indicates that the commercial fishery exceeded the OY (as specified in the draft FMP) one year and failed to achieve OY in the other two years. There are numerous logistical and practical reasons which account for this. Some of the more apparent problems include:

1. Aerial stock assessment techniques are in the developmental stage. New data is collected each year to quantify aerial estimates; generally this new data is collected after the major fishery has occurred and may result in revised biomass estimates.
2. Information on age-composition and incidental species collected in-season are carefully evaluated after the fishery and may result in changes to the biomass estimates.
3. Management's ability to forecast older age fish is barely adequate. No information is available to forecast recruitment.
4. Adverse weather conditions limit aerial stock assessment. Further, the commercial harvesters are unable to operate efficiently (if at all) during severe weather, resulting in diminished harvests.
5. Roe herring are of prime quality for only a brief period. An identified surplus may go underutilized if there is insufficient harvest or processing in the area during the period which the herring are of marketable quality.
6. Occurrence of incidental species such as capelin or smelt, as determined in gill net sampling, may require that preliminary biomass estimates be significantly modified during a post-season reassessment.

ALLOWABLE INCIDENTAL CATCH (AIC) FORMULA

The AIC formula has undergone a long review and revision period. The PMT has reviewed the biomass estimates for 1980 and 1981 along with the 1980 incidental catch rate and is concerned with the response of the AIC formula to this set of circumstances. The AIC formula currently stated in the FMP is as follows:

$$AIC = OY_g \times IR \times \frac{ABC_i}{ABC_{i-1}}$$

where AIC = allowable incidental catch of herring in the trawl fisheries

OY_g = groundfish OY, excluding herring

IR = incidence rate of herring in foreign trawl fisheries

ABC_{i+1} = current year's allowable biological catch of herring

ABC_i = previous year's ABC

The PMT went through the following steps to determine ABC and AIC:

Step 1. Determine 1980 Exploitation Rate

$$E_t = \frac{B_t}{B_{msy}} \times E_{msy}$$

$$E_t = \frac{80,200}{240,930} \times .2 = .067$$

Step 2. Determine 1980 ABC

$$ABC = B_t \times E_t$$

$$ABC = 80,200 \times .067 = 5,373 \text{ mt}$$

Step 3. Determine 1981 Exploitation Rate

$$E_t = \frac{B_t}{B_{msy}} \times E_{msy}$$

$$E_t = \frac{167,600}{240,930} \times .2 = .139$$

Step 4. Determine 1981 ABC

$$ABC = B_t \times E_t$$

$$ABC = 167,600 \times .139 = 23,296 \text{ mt}$$

Step 5. Determine 1982 AIC

$$AIC = OY_g \times IR \times \frac{1981 \text{ ABC}}{1980 \text{ ABC}}$$

$$AIC = 1,470,226 \times .00125 \times \frac{23,296}{5,373} = 7,968 \text{ mt}$$

When the Council considered this formula they expected AIC to be in the neighborhood of 1,500 - 3,000 mt, and using figures in the FMP from 1980 we expected about 2,000 mt. This 7,000 mt AIC would exceed the remaining 1981 herring OY by 2,000 - 3,000 mt.

To further illustrate how the current formula over-reacts, we compared it to a "no biomass change" situation:

Step 6. Determine 1982 AIC if the 1981 spawning biomass had been the same as the 1980 estimate.

$$\begin{aligned} \text{AIC} &= \text{OY}_g \times \text{IR} \times \frac{1981 \text{ ABC}}{1980 \text{ ABC}} \\ \text{AIC} &= 1,470,226 \times .00125 \times \frac{5,373}{5,373} = 1,837 \text{ mt} \end{aligned}$$

What is needed is a more effective method of compensating for changes in herring abundance.

There are several alternatives to this particular formula that the Council could consider. These are listed and discussed below, along with some of the assumptions upon which they are based.

Option 1. Replace ABC in the formula with a ratio of the spawning biomass estimate for the previous year to that of the current year. This option would eliminate the effect of the sliding exploitation rate and would result in a proportionate increase in AIC as biomass estimate increases. Using the same figures as the previous example, the 1982 AIC would be 3,841 mt.

$$\begin{aligned} \text{AIC} &= \text{OY}_g \times \text{IR} \times \frac{\text{current year's spawning biomass}}{\text{previous year's spawning biomass}} \\ \text{AIC} &= 1,470,226 \times .00125 \times \frac{167,600}{80,200} = 3,841 \text{ mt} \end{aligned}$$

This option would be subject to inadequacies that may exist in the methods used to estimate spawning biomass. Also, since pre-spawning year classes are not included in the estimates of spawning biomass, and since these year classes may, in some years, represent a significant percentage of the offshore biomass, this option may not always reflect the true changes in offshore abundance. We would suggest that alternative methods of determining biomass be identified in the FMP. Thus, if inadequate or no aerial survey data is available the PMT should be directed to use whatever data is available. As a last resort we could fall back on the previous year's estimate or some other pre-determined number.

A drawback to this formula is the use of every biomass estimate in two consecutive years. The problem arises when an adequate estimate is not available, but that estimate must be used for two years. It might be better to use a formula that avoids this pitfall.

Option 2. Replace the ABC portion of the formula with a ratio of the spawning biomass estimate for the current year to the biomass that will support MSY. (This is the same ratio that is in the formula used to calculate the exploitation rate). Using the same figures as in previous formula, the 1982 AIC would be 1,278 mt.

$$AIC = OY_g \times IR \times \frac{B_t}{B_{msy}} = 1,263 \text{ mt}$$

$$AIC = 1,470,226 \times .00125 \times \frac{167,600}{240,730} = 1,278 \text{ mt}$$

The advantage of this alternative is that it relates current herring abundance to abundance levels that will support MSY, rather than to the previous year's abundance. Thus, whenever the biomass estimate is 167,600, for example, AIC will equal 1,278 mt unless IR or OY_g change. A disadvantage of this formula is that the biomass level that will support MSY (240,930 mt) is derived from the long-term catches in the directed foreign fisheries and therefore includes year classes which are not a component of the inshore estimates. As a result, this option will produce a rather conservative AIC. An adjustment factor could be used to make the calculation less-conservative.

Option 3. Replace ABC in the formula with the actual sac roe harvests. Using the same OY_g and IR as the previous examples, the 1982 AIC would be 1,211 mt.

$$AIC = OY_g \times IR \times \frac{1981 \text{ sac roe harvest}}{1980 \text{ sac roe harvest}}$$

$$AIC = 1,470,226 \times .00125 \times \frac{17,600}{26,700} = 1,211 \text{ mt}$$

This option would be subject to management decisions made by ADF&G during the sac-roe fishery as well as the effect of weather on fishery success. As is the case with Option 1, this option may not adequately represent offshore abundance. It should be noted that, while herring appeared to be more abundant inshore during 1981, the 1982 AIC would be one-third less than what it would have been if the abundance indicator had remained the same.

Option 4. Eliminate the third variable in the formula and depend upon the Incidental Catch Rate (IR) to compensate for changes in the herring abundance.

This option assumes that the incidental catch rate accurately reflects offshore abundance. If this were true, IR would effectively control AIC by itself and there would be no need to rely on inshore biomass estimates. However, there is concern that the accuracy of the IR estimate is not a sufficient measure of herring abundance offshore. Using an IR of .00125, the 1982 AIC would be 1,838 mt.

$$AIC = OY_g \times IR$$

$$AIC = 1,470,226 \times .00125 = 1,838 \text{ mt}$$

Incidental Catch Rate (IR)

An assumption of all four options, as well as the original formula, is that IR will respond to changes in herring abundance. At least at current levels of observer coverage, this relationship remains to be proven. If such a relationship could be developed by increased observer coverage and/or by selective use of data, IR would have the advantage of representing offshore abundance. However, the current value of annually determining IR can be questioned.

IR can also be manipulated by fishing nations to their own advantage since the higher the IR the larger the next year's AIC will be. The degree to which this will be attractive will be limited by the penalty for exceeding the current year's AIC (i.e., further trawling prohibited in all or part of the Herring Savings Area). However, it will be in a nation's interest to catch, or at least report, its full AIC.

Because of these disadvantages, the Council may wish to consider establishing IR as a constant, based on previous catch rates, and depend entirely on the third variable in the formula to adjust for herring abundance. However, as mentioned previously, if IR could be refined to adequately reflect offshore abundance, it would be a meaningful component of the formula.

NEED FOR FLEXIBILITY

While the concept of determining AIC from a formula is valid, it can be anticipated that, in some years, the formula may produce an unacceptable AIC. This could be the result of inadequate data (i.e., incomplete biomass data due to adverse weather conditions) or unpredictable economic or biological factors (i.e., very poor recruitment). Should this occur, the PMT should have the flexibility to utilize alternate methods for determining AIC and OY. Since the PMT will only recommend an AIC for subsequent approval by the Council, sufficient public input will be afforded. A list of data which would be utilized by the PMT would include aerial surveys, spawn deposition surveys, acoustic surveys, gillnet surveys, offshore harvest data, test fishing and any other pertinent data. This would make the FMP a framework that could deal with a wider variety of conditions without requiring amendment.

NELSON ISLAND SUBSISTENCE STOCKS

The FMP takes the Nelson Island subsistence stocks into account in the determination of OY by subtracting the ABC of these stocks from the total Bering Sea ABC. This would seem to require annually estimating the spawning biomass in the Nelson Island area, adding it to the rest of the Bering Sea spawning biomass estimate, and establishing an exploitation rate for the Nelson Island stock in order to determine the Nelson Island ABC. A simpler method would be to disregard Nelson Island stocks when totaling spawning biomass estimates. The result would be a slightly smaller OY and less potential impact on Nelson Island stocks.

As an example, if the Nelson Island stock spawning biomass estimate was 3700 mt and we used the same exploitation rate for it as for the rest of the Bering Sea, the ABC would be 23,800 mt using the procedures in the FMP and 23,296 mt using this simpler method.

Procedures in the FMP:

167,600

+ 3,700

171,300

$$E_t = \frac{171,300}{240,930} \times .2 = .142$$

$$ABC = 171,300 \times .142 = 24,325$$

$$ABC_{\text{(Nelson Island)}} = 3,700 \times .142 = 525$$

24,325

+ 525

23,800 mt

Simpler Procedure:

171,300

- 3,700

167,600

$$E_t = \frac{167,600}{240,930} \times .2 = .139$$

$$ABC = 167,600 \times .139 = 23,296$$



Marine Resources Company

SEP 14 1981

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September 8, 1981

Mr. Clement V. Tillion
Chairman
North Pacific Fisheries Management Council
P. O. Box 3136 DT
Anchorage, AK 99510

Dear Clem:

We have begun preparations for our 1982 fisheries in Bering Sea and Gulf of Alaska with the expectation of beginning our midwater trawl operations in January. Last year the Council did not approve our proposal to conduct an experimental, research oriented trawl fishery for food grade herring on Bering Sea during 1981 (January-March). Consequently our operations were scaled down and we conducted only a marginal fishery for pollock in the Southeastern Bering Sea during that time period.

This year, ourselves and the U.S. fishermen who will work with us, have a strong interest in once again trying to mount a high seas domestic herring fishery in the central Bering Sea during the January-March period. To do so, though, will first require that the Council endorse such an operation and that NMFS promulgate the implementing regulations.

Currently the herring resource is managed under a PMP which will remain in effect until the FMP, which has been approved by the Council, is implemented by the Department of Commerce. Considerable effort was put forward by the Plan Development Team, the Advisory Panel, the Scientific and Statistical Committee, as well as the Council in finalizing this Plan. Moreover, extensive input was received from all public and private entities having a direct or indirect interest in Bering Sea herring; thus the Plan reflects these concerns.

Until the FMP is in place, we rightfully expect that management agencies will incorporate the approaches and techniques worked

Clement V. Tillion
September 8, 1981
Page 2.

out in the FMP for the interim management of this resource. To do otherwise is de facto rejection of the Plan and the plan process.

Taking into consideration the management approach established in the approved herring FMP, the status of the resource and available surplus is as follows:

- | | |
|--|--------------|
| A) State survey of 1981 spawning biomass
(from ADF&G reports) | 167,700 tons |
| B) 1981 Sac roe fishery
(from ADF&G reports) | 17,650 tons |

Section 9.6.2.2 of the FMP produces a formula to compute the appropriate exploitation rate on the stocks based on the current ratio of biomass to MSY. The biomass level felt necessary to produce MSY at a 20% exploitation rate (E_t) has been given as 240,930 tons. Thus:

$$E_t \text{ for 1981} = \frac{167,700}{240,930} \times 0.2 = 0.14$$

An exploitation rate of 14% thus allows for a 1981 acceptable biological catch of 23,478 tons ($0.14 \times 167,700$ tons). The sac roe fishery harvested a total of 17,650 tons so that leaves 5828 tons herring yet available for fishery harvest up to March 31, 1982. This amount does not include herring which may be taken from the Aleutian Island/Alaska Peninsula stocks or those from the Port Clarence/Kotzebue Sound groups.

Marine Resources Company has had discussions with U.S. fishermen and pursued markets for frozen food grade herring. Based on the interest shown we feel a viable joint venture commercial fishery for herring can be conducted January-April 1982 in Central and Southeastern Bering Sea. We ask the Council to endorse this fishery.


Legally, we understand that at the present time under the existing PMP herring cannot be retained onboard our joint venture, foreign-flag processing vessels. This is because for some unknown reason the National Marine Fisheries Service has not yet proceeded with the required administrative measures to remove herring as a temporary "prohibited species".

Clement V. Tillion
September 8, 1981
Page 3.

In consideration of ourselves and the U.S. fishermen who will fish for us in the Bering Sea this winter, we request the Council to urge the National Marine Fisheries Service to immediately take whatever actions are necessary to amend the existing PMP to make the biologically available 5,828 tons of herring legally available to the U.S. fishermen. We can find no legitimate basis for denying U.S. offshore fishermen the opportunity to harvest and market this quantity of herring.

It disturbs me considerably that after all the debate and compromise that went into the final approved draft herring FMP, we still find it necessary to make a formal request for herring that should have been automatically allocated to a U.S. high seas fishery; or in the absence of a U.S. fishery to TALFF. As a user of the resource, I do not think it is unreasonable for ourselves and the fishermen who fish for us to expect access to resources which are biologically and legally available. When bureaucratic burdens or delays prevent such access, is it any wonder that we become frustrated and disenchanted with the present management system? We trust that the Council will act in a manner to insure that this surplus herring will be available in time for the start of our Bering Sea operations in January, and thereby restore our faith in the management process.

Yours truly,



Walter T. Pereyra
Vice President and General Manager

WTP:kb
cc: William Gordon
Robert McVey
Congressman Young
Congressman Pritchard
Senator Gorton
Senator Stevens



AMERICAN FISHERIES PRODUCTS

"HARVESTERS OF THE NORTH PACIFIC"

SEP 18 1981 AGENDA E-2(c)
September 1981

4315 11TH N.W.
Seattle, Washington 98107
(206) 789-3800

Ken Petersen
Carl Perovich

FROM	ROUTE TO	INITIAL
		S

F/V AMERICA NO. 1

September 16, 1981

Mr. Clement V. Tillian, Chairman
North Pacific Fisheries Management Council
P.O. Box 3136 DT
Anchorage, Ak 99510

Dear Clem:

In lining up projects for our vessels in 1982 we have been advised that there is an excess quota of herring in the Bering Sea of approximately 5,800 tons. Under what we believe has been forwarded as a PMP, we are in a position to request this excess herring and are now doing so. We are still sitting on the nets and equipment we purchased in 1979 for that years quota request and would sure like to get the stuff wet --- other then rain water. Perhaps with the council's kind interdedence, we may do so in 1982.

Presently, our vessels may fish for themselves or for MRC processors. We probably won't be making that decision until a later date, but would like to be sure that MRC has the ability to land this product without hinderance or the hassel we exper- ienced in 1980. We feel that this fish is there in sufficient quantities and that, as users of this resource, we should not have restrictions other then biological stopping our harvesting of the resources.

We respectfully make this request and hopefully this surplus herring can be harvested without the "red tape" once again digging our foot ropes in the mud.

Our respects,

AMERICAN FISHERIES PRODUCTS
Kenneth R. Petersen

OCEAN SPRAY FISHERIES
Dennis Petersen, President

CC: Congressman Young
Congressman Pritchard
Senator Jackson

Senator Stevens
Senator Gorton
William Gorton - NMFS

Table 5. In-season biomass estimates (m.t.) of Pacific herring within Foglak fishing district, Alaska, 1981.

District ^{2/}	Survey 1/			
	Date	Rating	Kulukak	Nunavachak Foglak Hagemeister Total
	4/20	G-F	0	0
	4/22	E-G	116	0
	4/23	E-G	0	0
	4/24	G-P	316	0
	4/25	G	340	0
	4/26	E-G	238	1,556
	4/27	G-F	259	483
	4/28	P	1,516	680
	4/30	U	--	--
	5/1	U	425	1,444
	5/2	P-U	184	262
	5/3	G-P	605	3,721
	5/4	G	408	880
	5/5	P	--	122
	5/6	P	51	--
	5/7	G	833	1,149
	5/8	E-G	2,139	1,189
	5/9	E-G	6,469	1,002
	5/10	P-U	--	987
	5/12	G-F	3,580	3,484
	5/13	E-G	29,971	1,745
	5/14	E	51,439	2,110
	5/15	E-G	65,304	2,972
	5/16	P-U	9,963	305
	5/17	U	--	--
	5/20	U	--	--
	5/22	P-U	--	--
	5/23	F-P	469	1,234
	5/26	G	469	703
	6/3	G-F	1,285	87

* Commercial fishing periods occurred on these dates: 5/2-3 (10 hr), 5/3-4 (24 hr), 5/5 (24 hr), 5/6 (24 hr), 5/12-13 (10 hr), 5/15-16 (9 hr)

1/ E=excellent, G=good, F=fair, P=poor, U=unsatisfactory

2/ Conversion factor = sliding scale based upon water depth (shallow water, 3 m or less = 1.2 m.t. per RAI unit; medium depths, 5-6 m = 2.4 m.t. per RAI unit; deep water, 7 m or greater = 3.4 m.t. per RAI unit)

3/ Two surveys flown on these days: highest biomass estimate used