AGENDA D-3
SEPTEMBER 1983

M E M O R A N D U M

TO: Council, SSC and AP Members

FROM: Jim H. Branson
Executive Director

DATE: September 16, 1983

SUBJECT: Bering Sea/Aleutian Islands King Crab Fishery Management Plan

ACTION REQUIRED

Re-adopt the BS/AI King Crab FMP package for fast-track Secretarial review.

BACKGROUND

The BS/AI King Crab FMP, the Environmental Impact Statement, the Regulatory Impact Review, and implementing regulations were submitted for Secretarial review on May 25, 1982. The FMP was the product of a five-year effort by the Council to address the concerns of various user-groups in this fishery while at the same time acknowledging over twenty years of management of king crab by the State of Alaska. Secretarial review began on June 10, 1982 and was suspended last December pending receipt of a revised Notice of Availability, Preamble, implementing regulations and a legal memo discussing the legality of federal delegation of king crab management authority to the state. On March 30, 1983, the Council unanimously approved several technical changes to the ABC/OY section based on the recommendations of the PDT. The updated FMP and remaining supporting documents were submitted to Washington D.C. to reinitiate Secretarial review on August 18, 1983. The Alaska Region of NMFS has advised us that in light of the recent MFCMA amendments, it would be advantageous to formally re-submit the king crab package on the fast-track review schedule. To do that, the Council must formally withdraw the King Crab Plan from Secretarial review (the old, slower schedule) and re-adopt the package for Secretarial review. This administrative exercise would guarantee a fast-track review by the Secretary and should lead to a decision with possible implementation of the FMP by March of next year.

The following motions may be helpful to the Council in accomplishing this action:

1. "I move to withdraw the Bering Sea/Aleutian Islands King Crab FMP and its supporting documents from Secretarial review, which began on June 10, 1982."

2. "Having considered the updated FMP, the FEIS, RIR, legal memo, Preamble and implementing regulations, I move to adopt the Bering Sea/Aleutian Islands King Crab FMP for fast-track Secretarial review."

The Northwest and Alaska Fisheries Center Summer Trawl Survey is now complete and currently undergoing analysis. A preliminary report on the status of the Bering Sea king crab stocks will be available.

A report on ongoing king crab fisheries and future management actions by ADF&G will be available.

SEPT83/H

§676.6 Permits.

(a) No vessel may fish for king crab in the FCZ unless it has on board a current Federal king crab fishing permit issued under this section.

(b) The Regional Director shall, subject to the other provisions of this section, issue a Federal king crab fishing permit on an annual basis to the owner or operator of any vessel, whether or not that vessel is registered under the laws of the State of Alaska, who submits to the Regional Director an application containing the following information: (1) the applicant's name, mailing address, and telephone number; (2) the name of the vessel; (3) the vessel's U.S. Coast Guard documentation number or State identification number; (4) the home port of the vessel; (5) the signature of the applicant. If during the term of the permit a change occurs in any of the information that was submitted in the application, the permit holder shall inform the Regional Director of that change within thirty days.

(c) The authority to fish in the FCZ under a Federal king crab fishing permit issued under this section may be modified, suspended, or revoked, and the future grant of such authority to the same vessel owner or operator may be prohibited or limited, in accordance with 50 CFR Part 621, Subpart D, if the vessel for which that Federal king crab fishing permit was issued or any other vessel owned or operated by the same person was used in the commission of a violation of the Act or of this Part.

AGENDA D-3
SUPPLEMENTAL

SEP 26 1983

North Pacific Fishing Vessel Owners' Association

ACTION	ROUTE TO	INITIAL

September 22, 1983

Jim H. Branson
Executive Director
North Pacific Fishery Management Council
P.O. Box 3136 DT
Anchorage, AK 99510

Dear Mr. Branson:

Because the North Pacific Fishery Management Council intends to take action on the "Bering Sea/Aleutian Islands King Crab Fishery Management Plan, May 1982 (updated August 1983)" (King Crab Plan or FMP) at its September meeting, the North Pacific Fishing Vessel Owners' Association (NPFVOA) feels compelled to comment lest its silence be construed as acceding to the adoption of this fishery management scheme. Please let me assure you that NPFVOA remains steadfastly opposed to the King Crab Plan as presently written.

Since 1980, the Association has painstakingly detailed its concerns about the Council's proposed actions with respect to each draft of the FMP that has been sent out for public review. In general, the Council has chosen to ignore these very thorough analyses and comments, and has continued to embrace the management concepts it initially proposed. With the Council apparently determined to continue on the course it set almost three years ago and its failure to establish a period of public comment on the August 1983 draft of the King Crab Plan, it would serve no purpose for NPFVOA to again do a line-by-line critque of the FMP. The Association reserves that right when (and if) the National Marine Fisheries Service (NMFS) solicits public comment on the Council's actions in the Federal Register. NPFVOA, however, does want to highlight (especially for the new members of the Council) its reasons for

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opposing the management scheme proposed for the king crab fisheries. In so doing, the Association will also bring to the Council's attention the State of Alaska's failure to adhere to the "Joint Statement of Principles" and "Framework" in establishing management measures for the 1983 Bering Sea and Aleutian Islands king crab fisheries. (To ensure that the Association does not waive its right to raise its previous detailed comments at a later time, the following NPFVOA letters to the Council should be considered as part of these remarks: December 6, 1980; March 23, 1981; May 18, 1981; September 21, 1981; March 4, 1982; and May 17, 1982.)

1. The Proposed Delegation of Management Responsibilities to the State of Alaska Is Illegal.

The Association wishes to emphasize that management of the king crab fisheries in the Fishery Conservation Zone (FCZ) should be a cooperative effort between the Council, the federal government and the State of Alaska; this view is in keeping with the provisions of the Magnuson Fishery Conservation and Management Act (MFCMA). Such cooperation, however, does not encompass the kinds of delegations proposed in the King Crab Plan. The MFCMA, does not sanction a delegation of either the Council's authority to establish management measures or the federal government's responsiblity to implement these measures through procedures mandated by statue. The Association remains unconvinced by the extremely strained arguments in support of these delegations contained in the National Oceanic and Atmospheric Administration's General Counsel memorandum of July 29, 1983 which was prepared by Michael Rubinstein and revised by Pat Travers. From a thorough reading of the MFCMA and an appreciation of the pains to which the Congress went to creating an elaborate regional management system that theoretically has the interest of the nation at heart, it is clear that Congress did not intend for this system to be bypassed with delegations of Council and federal responsibilities to the State of Alaska. Despite the protestations of the Council in the Final Environmentaal Impact Statement accom-

panying the FMP, the proposed delegations, if approved by NMFS, would undermine the regional council system throughout the country.

2. The Proposed Delegation Establishes A Conflict of Interest Situation.

One is supposed to be comforted by the King Crab Plan's assurances that its procedural processes will result in management measures that are consistent with the MFCMA and applicable law. Yet, delegation of the Council's management responsibilities to the Alaska Board of Fisheries establishes a classic conflict to interest situation and militates against management measures being in the best interests of the United States.

As we pointed out in our remarks on earlier versions of the FMP, the Board of Fisheries is composed solely of Alaskans; they are required by law to promote and protect the interests of Alaskans. Should the Board be faced with a proposed measure favorable to Alaskan fishermen but detrimental to non-Alaskan interests, the Board is naturally going to side with its fellow Alaskans. Unless the measure is totally without a basis in fact, the Board will be able to construct an explanation that will appear to comply with the FMP framework criteria and the MFCMA's national standards. While the FMP's procedures may eliminate the more blatant discriminatory measures, there still remains the very real threat of subtle discrimination. (Also see item #3 below.)

Delegation of the Council's management responsibilities also places the Council in a subordinate role; Congress, in the MFCMA, intended the regional councils play the central role in fisheries management. Although the Council, through the FMP, may dictate the type of the management measure, the Board will be able to determine its substance. In addition, one must not be lulled into a false sense of security by the FMP's promise that the Board's management measures will be consistent with the MFCMA, and hence, discrimination against non-

Alaskan fishermen will cease to exist. One cannot forget that the Board's power not only lies in its ability to adopt management measures, but also in its ability to reject proposals that may be inimical to Alaskan interests. This, too, is discrimination. (There is, of course, no procedures for reviewing the Board's failure to adopt a proposal.)

3. The FMP's Framework Criteria Favors Alaskan Interests.

The socio-economic criteria to be considered in the promulgation of measures such as seasons and registration areas are written so as to favor Alaskan over non-Alaskan interests. Given the all-Alaskan composition of the Board, one can be certain that these "pro-Alaskan" factors are going to weigh heavily in any decision the Board makes.

4. The FMP Should Encompass All The Westward Fisheries.

We are not convinced by the FMP's rationale for limiting the King Crab Plan to only the Bering Sea and Aleutian Islands areas. In spite of the FMP's elaborate justification, the decisions to exclude the other westward king crab fisheries was political: the Kodiak fishermen did not want federal management and the State of Alaska wanted to retain control over as many of the king crab fisheries as it could.

As the Association has repeatedly pointed out, there are strong economic ties between all the westward king crab fisheries; there is also much vessel movement between the fisheries. In addition, the FMP's framework criteria for establishing seasons and exclusive registration areas include consideration of fishing and processing activities which occur east of the Bering Sea and Aleutian Islands areas.

5. Other Comments on the FMP.

The most recent version of the King Crab Plan sent out for public comment was the November 1981 draft. Subsequent drafts have greatly expanded the section on exclusive registration areas so that this measure would appear to comply with the national standards of the MFCMA; it does not. In addition, we were surprised to discover that districts may now be designated as "exclusive." An exclusive registration district is a measure that was never discussed by the Council nor was it ever presented to the public for comment. (These additions to the FMP emphasize our concern that considerations in establishing some management measures are weighted heavily in favor of the Alaskan small vessel fleet.)

Table 2 (page 16) was never contained in earlier drafts of the FMP sent out for public review. An explanation of the methodology used to establish the table's exploitation rates is necessary.

6. Shortcomings in the Implementation of the Joint Statement of Principles and the Framework in 1983.

In earlier Association letters, the Council was informed of significant violations by the Board in 1981 and 1982 of the "Joint Statement of Principles" and the "Framework," documents which are the foundation of the King Crab FMP. NPFVOA also advised the Council at its May 1983 meeting that comments would be forthcoming on procedural deficiencies in establishing regulations for the 1983 fisheries. Before the Council takes final action on the FMP, it seems appropriate to bring these problems to its attention.

At least 30 days before its shellfish meeting, the Board is required to make readily available in written form the data and reports received by the Board in support of proposed regulations. While this

requirement is theoretically reasonable and appropriate, it has proved to be of little practical value due to the way that the Board conducts its activities. The Board does not require proposal makers to submit data or reports in support of their requests; therefore, the inclusion of data with a proposal becomes the exception, rather than the rule. In fact, the Board subtly discourages such substantiation by placing a word limit on proposals. Unlike federal procedures which require the maker of a regulatory proposal to justify his actions, the Board process, in effect, shifts this burden to the opponent of a proposal. The opponent first has to research the proposal to ascertain if there is substantiating data; only then can he begin to build a case in opposition.

The Alaska Board of Fish and Game (the Board's scientific staff) failed to make available at least thirty days prior to the meeting its "Westward Shellfish Report" and the data to support its proposed quotas for the fisheries.

While deliberated on the 1983 regulatory proposals, the Board failed to refer to the criteria set out in the Framework for considering proposals. In addition, the Board never discussed whether its actions conformed to the national standards of the MFCMA. (We even question whether all the members of the Board know and understand these standards.)

Although the Board did provide written explanations for the regulations it adopted, these justifications were of a very general nature and did not contain supporting data. Given the failure of the Board to discuss the Framework criteria and the national standards during its deliberations, we fail to see how its actions could have conformed to the Joint Statement of Principles and the Framework.

In previous letters, the Association expressed disappointment with Council oversight of the Board's actions on the king crab proposals. In 1983, Council oversight of the Board process was again inadequate.

Although the entire Council did listen to public testimony on this year's regulatory proposals, we recall only one Council member actually sitting in on the Board discussions. In addition, review by the Council of the Board's actions a month and a half after the shellfish meeting served little purpose; if the Council disagreed with the Board, what substantive steps could the Council have taken at that time? We were also disappointed that the Council seemed unprepared to adequately analyze and discuss the regulations adopted by the Board.

We do not recollect any representatives from the Alaska Region, NMFS, being present during the Board's 1983 deliberations. NMFS, as the "arbiter" of whether management measures conform to the MFCMA's national standards and other applicable law, should have had Alaska Region personnel observing the Board proceedings to ensure that these criteria were discussed and considered. In addition, monitoring of the Board's shellfish meeting would enable NMFS to determine if the Board's written explanations were true reflections of the Board's deliberations and not ex post facto justifications designed to conform to the standards required of the Board.

We thank you for this opportunity to reiterate our concerns to the Council before it takes final action on the King Crab FMP.

Sincerely,

Dennis Petersen
President
NPFVOA

Barry D. Collier
Executive Director
NPFVOA

Enclosures

AGENDA D-3(b)
SEPTEMBER 1983

PRELIMINARY RESULTS OF THE 1983 EASTERN BERING SEA CRAB SURVEY

Report To: North Pacific Fishery Management Council and U.S. Section of the International North Pacific Fisheries Commission

Anchorage, Alaska
September 26 - 30, 1983

Robert S. Otto
National Marine Fisheries Service
Resource Assessment and Conservation
Engineering Division
P.O. Box 1638
Kodiak, Alaska 99615

INTRODUCTION

The 1983 survey was conducted between June 7 and August 6 by the NOAA R/V Chapman and the chartered R/V Alaska. The survey covered the habitats of all commercial crab stocks in the Bering Sea except for Norton Sound red king crab. Abundance estimates are given in Tables 1 - 3. Size-frequency distributions of males from each stock are given in Figures 1 - 5 to provide an assessment of future stock trends.

Methodology was similar to that of previous surveys in that stations were made at the centers of squares defined by a 20 x 20 nautical mile grid. A larger trawl was used in the 1982 and 1983 surveys than had been used in previous years. Population estimates have been adjusted for this fact. Bottom tending characteristics of the larger trawl appear to be similar to those of trawls used in previous years so the necessary adjustment was simply to allow for a greater area-swept. Procedures for estimating abundance were identical to those of previous years.

STATUS OF STOCKS

Red King Crab. The abundance of legal crab is the lowest on record (Table 1). The contribution of Pribilof Islands red king crab is insignificant and the figures given reflect trends in Bristol Bay. The downward trend in legal crab abundance began in 1980 and has been severe from 1981 onward. There were no noteworthy changes in the distribution of red king crab from 1982 to 1983. The 1982 size-frequency distributions showed a large mode in the 60-80 mm carapace length (CL) range (Fig. 1, top). In fact, the 1982 population estimate for males less than 110 mm CL (107 million) was the highest on record. These two facts led me to believe that this stock was recovering. The 1983 size-frequency data, however, show that there has been a tremendous loss of small crab (Fig. 1, bottom) and the 1983 estimate of males less than 110 mm CL was only 43 million. Since red king crab become legal at a size corresponding to about 135 mm CL, size-frequency and abundance data indicate a rapidly deteriorating situation with little hope of recovery in the near future. There has also been a severe loss of mature females (greater than the 90 mm CL point of 50% maturity) from 54 million in 1982 to 9.6 million in 1983. The mature female stock is now dominated by small, less fecund crab. Following a record catch of 130 million pounds in 1980, catches fell to 33 million in 1981 and 3 million pounds in 1982. There will be no fishery in 1983.

Pribilof Island Blue King Crab. Abundance of legal crab in 1983 is 1.3 million or about 60% of 1982 abundance (Table 1). There was little or no change in distribution. Trends in abundance of pre-recruits and size-frequency data (Fig. 2A) indicate continued declines in abundance. Catches have declined from 11 million pounds in 1980 to 9 million in 1981 and about 5 million pounds in 1982. These declines have occurred despite record levels of effort. The fishery will open on October 1 and record effort is again expected, but landings will probably be in the 2 to 4 million pound range.

St. Matthew Island Blue King Crab. The abundance of legal crab declined from 6.8 million in 1982 to 3.4 million in 1983 but was still the second highest on record (Table 1). Part of this decline may reflect differences in the offshore-inshore distribution of the population since grounds near the islands are rocky and untrawlable. Size-frequency data were similar from 1982 to 1983

although fewer crab were taken this year (Fig. 2B). We had difficulty locating sub-legal crab during a tagging study conducted in late June and early July. This, coupled with a 40% decline in pre-recruit abundance indicates that the abundance of legal crab will continue to decline going into 1984. Catches have increased from 5 million pounds in 1981 to 9 million in 1982 and about 10 million pounds in 1983. Increasing catches have been accompanied by record levels of effort. The 1983 catch will probably be one of the top two king crab fisheries in the state.

Tanner Crab (C. bairdi). The abundance of legal crab declined from 10.1 million in 1982 to 6.7 million in 1983 or by about 33% (Table 2). Record low abundances of legal crab have been established in each year from 1977 onward. The distribution of legal crab showed areas of relatively high abundance in Bristol Bay east of Amak Island and near the Pribilof Islands. The Bristol Bay area was more important and the Pribilof area less so as compared to last year. The abundance of pre-recruits declined substantially (32%) from 1982 to 1983 and size-frequency data indicate an extremely unstable future (Fig. 3). Anticipated recruitment for 1983 did not materialize and low numbers of crab in the 60-80 mm size group indicate a near failure of at least one year class. There were record numbers of extremely small (20-40 mm) crab taken in 1983 but this size group is not well assessed by the survey and little can be said of its actual abundance. Catches have declined from 30 million pounds in 1981 to 11 million in 1982 and 5 million pounds in 1983. Even lower catches can be anticipated in 1984.

Tanner Crab (C. opilio). The abundance of "large" crab was stable from 1981 to 1982 (Table 2) in the Northern and both southern districts. The abundance of "pre-recruit" crab increased by about 44% in the southern districts and declined by 40% in the Northern District. Changes in abundance reflect a southward shift in distribution. Southward shifts were particularly prevalent near the Pribilof Islands. In the case of C. opilio, the "large" and "pre-recruit" size categories reflect historical trends in the fishery. A legal size of 3.1 inches was set in 1982 but most crab landed in 1983 were above 3.7 inches. There have been differential prices paid for C. opilio over the past year and the two size groups given roughly correspond to the higher and lower prices paid. Size-frequency data indicate that stocks of marketable (95 mm +) C. opilio will be stable or increasing over the next year (Fig. 4). A paucity of crab in the 35-45 mm size group may indicate a poor year class but it is too early to evaluate this possibility. Catches declined from 53 million pounds in 1981 to 29 million in 1982 and 23 million by June 1983. Abundance and size-frequency data indicate stable abundance but landings may fluctuate with effort and market conditions.

Korean Hair Crab. Abundance of large crab (no legal size established) declined by more than 50% from 1982 to 1983 (Table 3). The distribution of hair crab is similar to that of previous years and the vast majority of the stock is located near the Pribilof Islands. Size-frequecies are similar in 1982 and 1983, except that far fewer crab were taken this year (Fig. 5). This is a developing fishery and catches were inconsequential prior to 1981 when 2.5 million pounds were taken. The 1982 catch was 1.2 million pounds, and the 1983 catch is currently 0.7 million pounds. The fishery is still in progress, but landings are sporatic. Catches have probably reflected market conditions rather than abundance, although the latter may soon become limiting.

Table 1. -- Population estimates for eastern Bering Sea king crabs from NMFS surveys (millions of crabs).

Bristol Bay and Pribilof Red King Crabs

Year	Pre-recruits 1/	Legals 1/
1969	19.5	9.8
1970 2/	8.4	5.3
1972	8.3	5.4
1973	25.9	10.9
1974	31.2	20.8
1975	29.6	21.2
1976	49.3	32.7
1977	63.9	37.6
1978	52.5	46.6
1979	38.8	45.5
1980	23.9	36.1
1981	18.9	11.3
1982	17.1	4.4
1983 3/	10.5	1.5

Table 1. -- (CONTINUED)

Pribilof Blue King Crabs

Year	Pre-recruits 1/	Legals 1/
1974	3.1	1.9
1975	8.0	7.5
1976	2.1	3.9
1977	2.2	9.4
1978	5.6	4.3
1979	1.5	4.6
1980	1.4	4.2
1981	1.4	4.1
1982	0.7	2.2
1983 3/	0.8	1.3

Saint Matthew Blue King Crabs

Year	Pre-recruits 4/	Legals 4/
1978	3.3	1.9
1979	3.0	2.1
1980	3.0	2.5
1981	2.2	3.1
1982	3.3	6.8
1983 3/	1.9	3.4

1/ The size groups 5.2" - 6.4" and $\geq$ 6.5" have been used for pre-recruits and legals, respectively.
2/ Limited survey in 1971, not used for population estimates.
3/ Preliminary estimate subject to change upon further analysis.
4/ The size groups 4.3" - 5.4" and $\geq$ 5.5" have been used for pre-recruits and legals respectively.

Table 2. -- Population estimates for eastern Bering Sea tanner crabs from NMFS surveys (millions of crabs).

Bristol Bay and Pribilof *C. bairdi*		
Year	Pre-recruits 1/	Legals 1/
1973	140.5	66.9
1974	255.0	130.5
1975	207.0	209.6
1976	136.6	109.5
1977	116.3	92.1
1978	81.2	45.6
1979	47.7	31.5
1980	65.0	31.0
1981	24.0	14.0
1982	46.9	10.1
1983 2/	32.0	6.7

Bristol Bay and Pribilof *C. opilio*		
Year	Pre-recruits 3/	Large 3/
1973	38.7	84.7
1974	169.2	246.7
1975	247.4	274.8
1976	190.4	181.6
1977	196.6	137.3
1978	171.6	78.4
1979	146.3	106.3
1980	99.1	53.6
1981	62.7	15.7
1982	63.8	10.8
1983 2/	91.6	12.9

Table 2. -- (CONTINUED)

Bristol Bay and Pribilof Hybrid Tanner Crab

Year	Pre-recruits 3/	Large 3/
1975	13.2	33.8
1976	4.0	16.5
1977	9.6	15.4
1978	2.0	5.6
1979	3.0	5.1
1980	0.8	1.7
1981	0.5	0.8
1982	0.6	0.5
1983 2/	0.4	<0.1

Northern District C. opilio

Year	Pre-recruits 3/	Large 3/
1978	8.2	10.5
1979	20.8	6.6
1980	30.4	4.2
1981	17.1	6.5
1982	70.4	10.0
1983 2/	50.0	9.2

1/ A legal size limit of 5.5" carapace width was imposed in 1976, but prior to this > 5.0" was used in the "Legal" column. In parallel, pre-recruit was 3.3" - 5.0" prior to 1976 and 4.3" to 5.5" since.

2/ Preliminary estimate subject to change upon further analysis.

3/ "Large" is > 4.3" as this has been the size of most interest to U.S. industry; pre-recruit is 3.7 to 4.3". Crab in both size groups have been landed in the past two years, however, and the minimum acceptable size is fluctuating with market conditions.

Table 3. -- Population estimates for eastern Bering Sea Korean hair crabs from NOAA/NMFS surveys (millions of crabs).

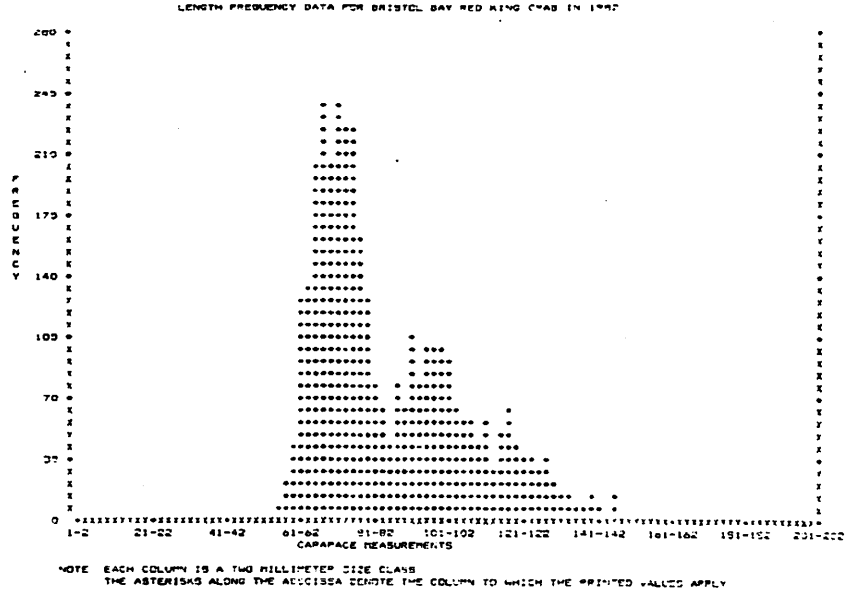
Pribilof District		
Year	Pre-recruits 1/	Large
1979	2.9	8.4
1980	3.6	10.4
1981	4.3	13.0
1982	0.8	5.3
1983 2/	0.3	2.5

Bristol Bay		
Year	Pre-recruits	Large
1979	1.2	6.3
1980	0.7	2.5
1981	0.4	2.7
1982	0.3	1.9
1983 2/	0.3	1.6

Northern District		
Year	Pre-recruits	Large
1979	0.4	1.4
1980	0.8	0.8
1981	<0.1	0.2
1982	<0.1	0.5
1983 2/	0.1	0.4

1/ "Large" is > 3.5" in width which is approximately the size at entry into the U.S. fishery; pre-recruit is 3.0" - 3.4".

2/ Preliminary estimate subject to change upon further analysis.



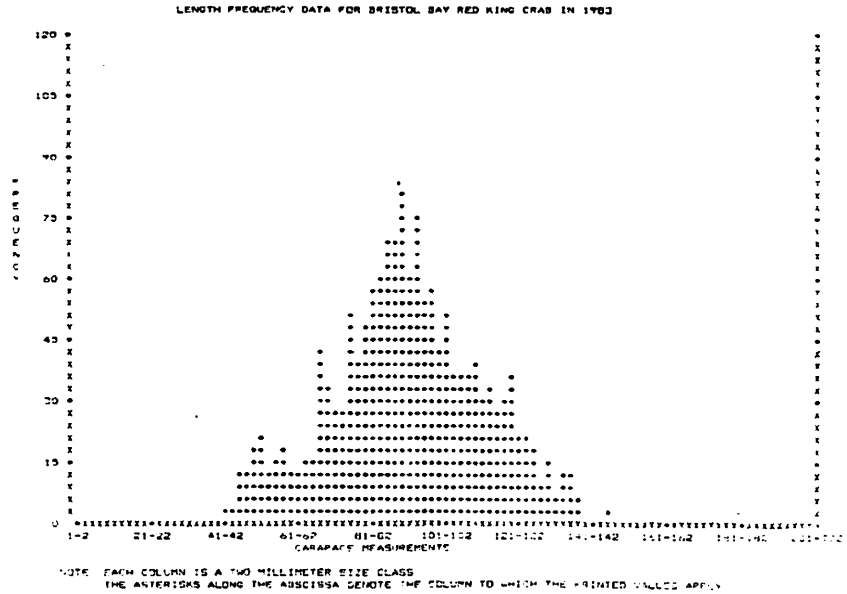
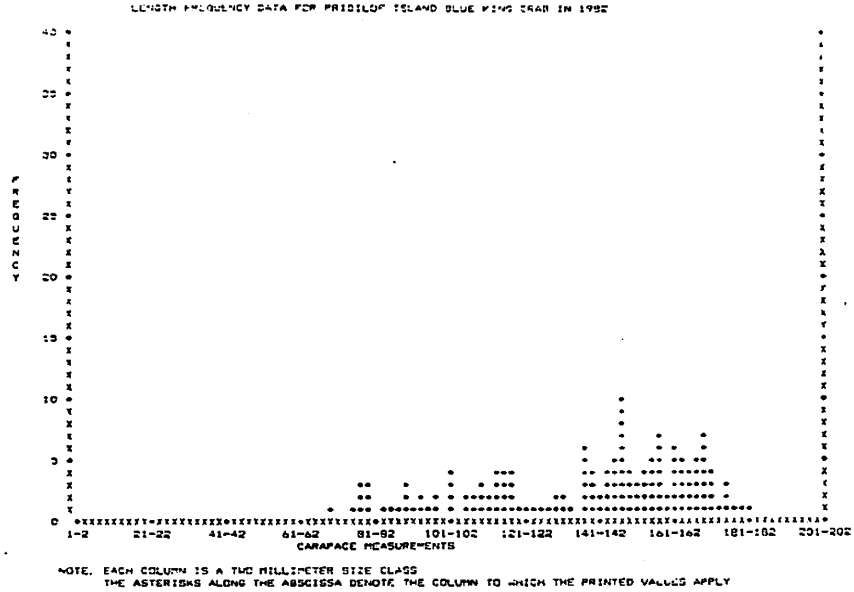


Figure 1. Length-frequency data for Bristol Bay red king crab in 1982 (top) and 1983 (bottom). Note differing vertical scales.



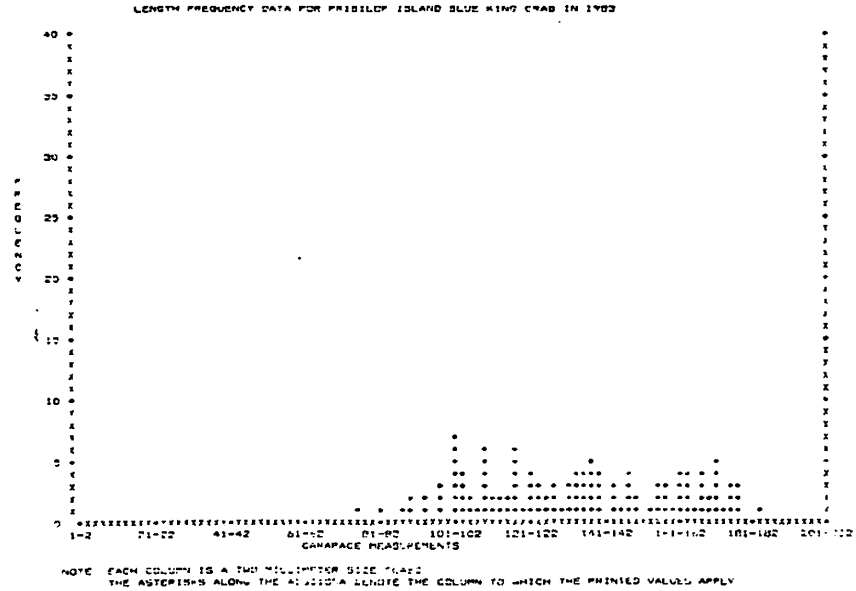


Figure 2A. Length-frequency data for Pribilof Island blue king crab in 1982 (top) and 1983 (bottom).

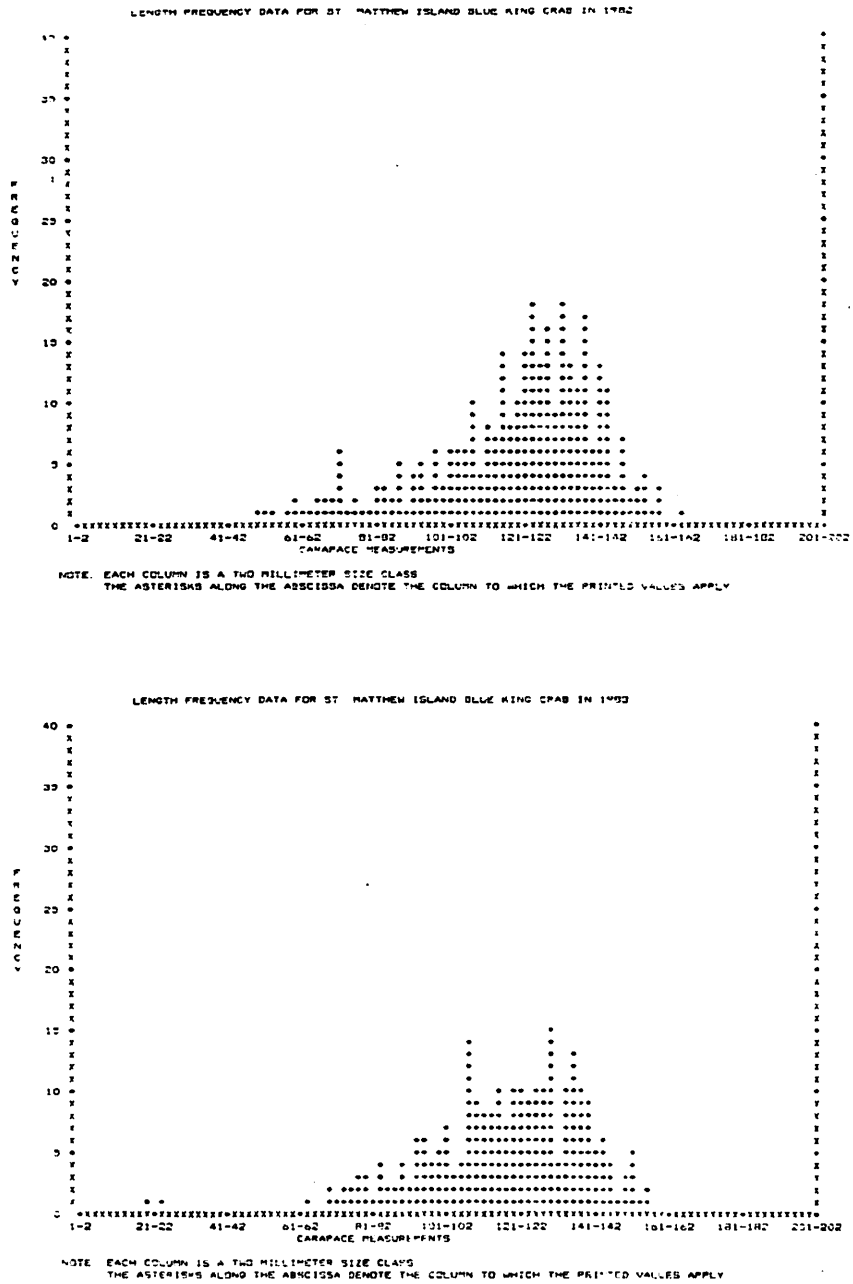


Figure 2B. Length-frequency data for St. Matthew Island blue king crab in 1982 (top) and 1983 (bottom).

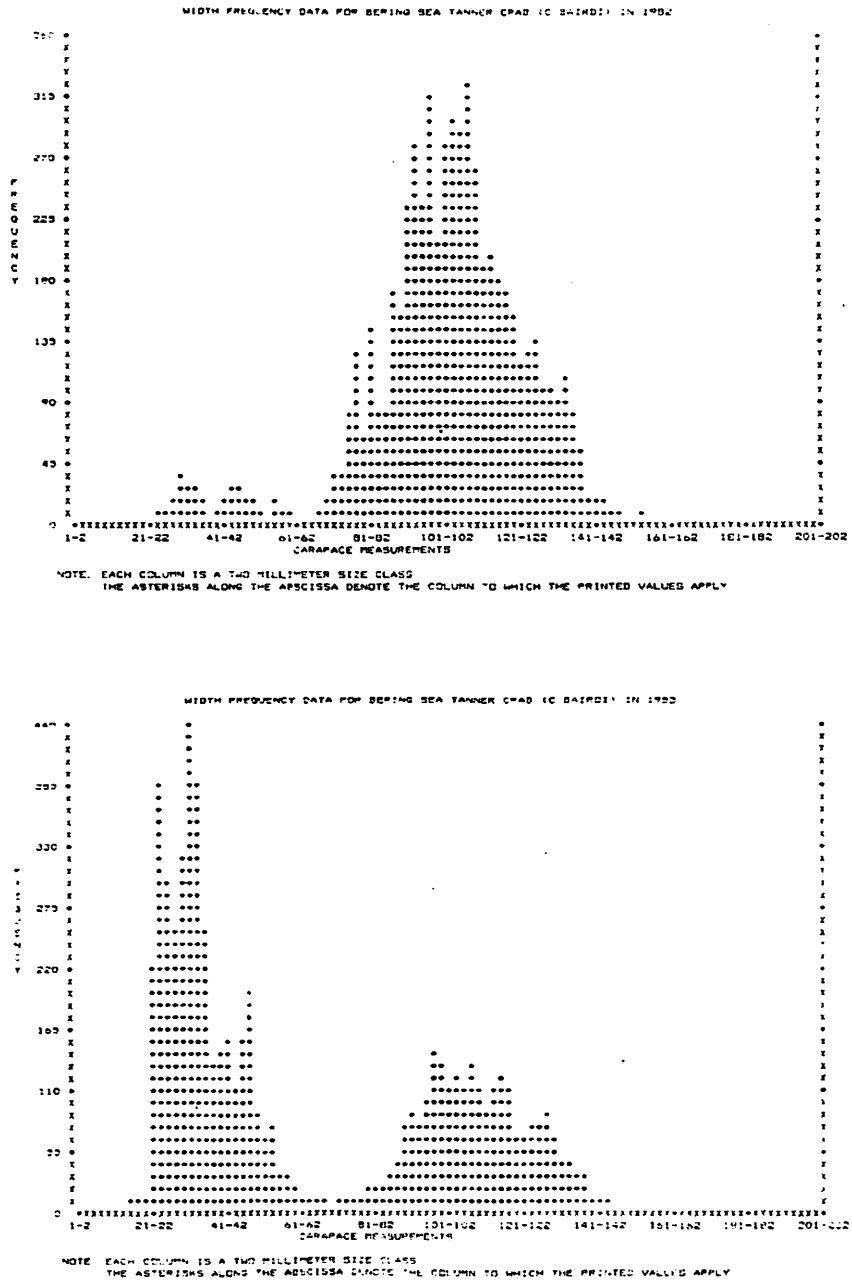


Figure 3. Width-frequency data for Bering Sea C. bairdi in 1982 (top) and 1983 (bottom). Note differing vertical scales.

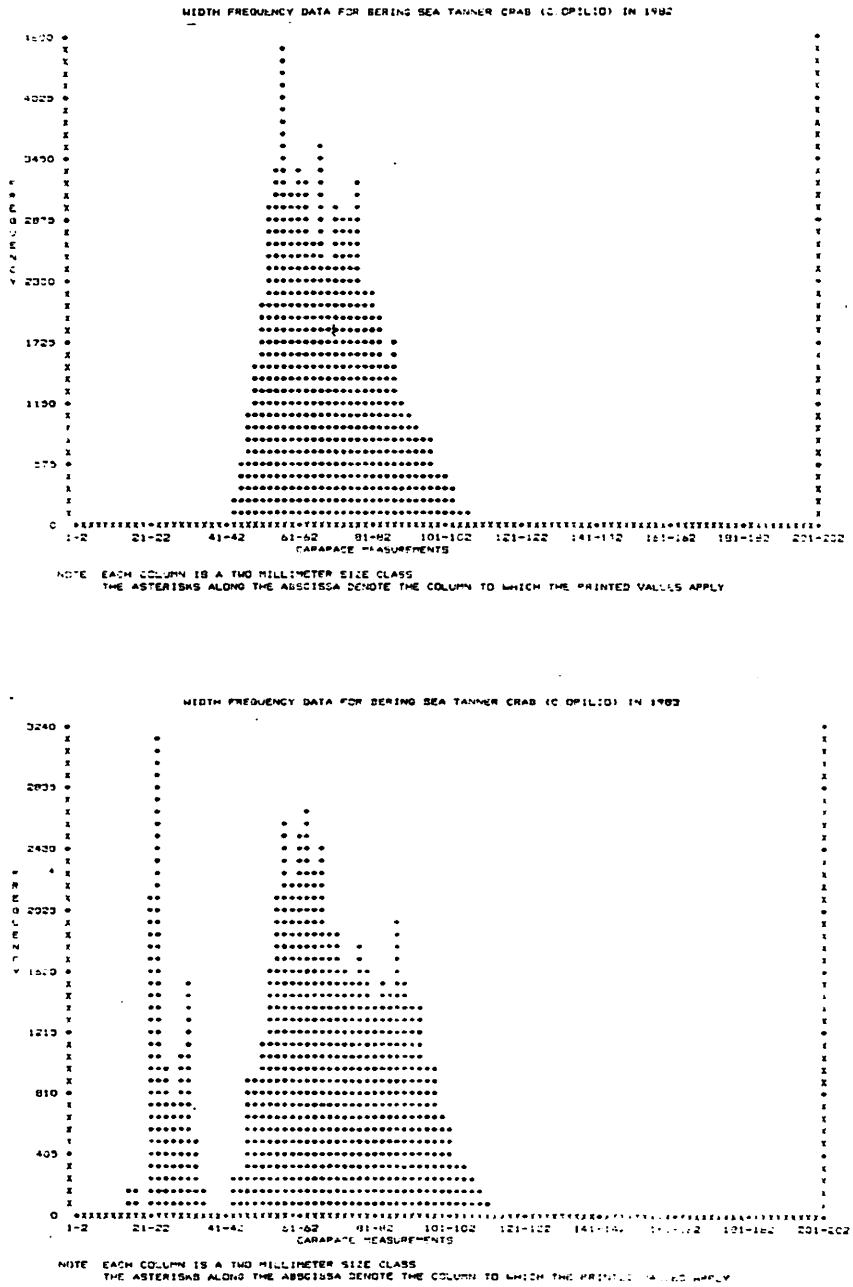


Figure 4. Width-frequency data for Bering Sea C. opilio in 1982 (top) and 1983 (bottom). Note differing vertical scales.

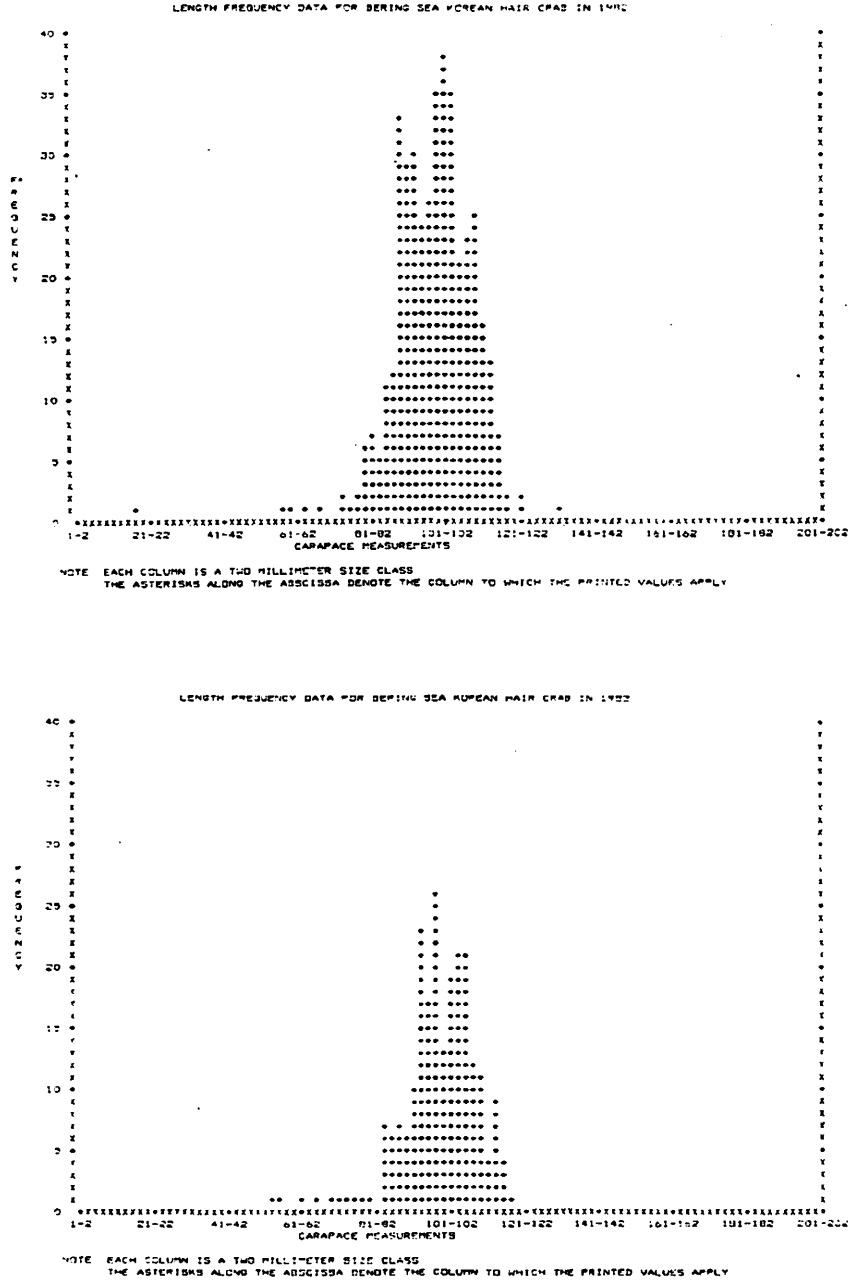


Figure 5. Length-frequency data for Bering Sea Korean hair crab in 1982 (top) and 1983 (bottom).

SEP 21 1983

COPY FOR YOUR INFORMATION

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest and Alaska Fisheries Center
Kodiak Investigation-Research
P.O. Box 1638
Kodiak, Alaska 99615

September 14, 1983 RSO:F/NWC11

TO: Mr. Martin Eaton
Alaska Department of Fish and Game
Kodiak, Alaska 99615

FROM: Robert S. Otto
National Marine Fisheries Service
Kodiak, Alaska 99615

SUBJECT: Current status of Bristol Bay and Pribilof Island king crab stocks.

Preliminary results of the 1983 eastern Bering Sea trawl survey indicate a continued deterioration of the Bristol Bay red king crab stock. Comparing the abundances of various size and sex groupings to those of last year yields the following:

Size (mm)/sex	1982	1983 (Preliminary)
	(millions of crabs)	
Males:		
<110	106.9	43.4
110-134	17.1	10.4
120-134	8.3	4.9
>134 (legal)	4.2	1.5
Females:		
<90	77.2	24.3
>89	53.8	9.6

(ie. 50% maturity)

Table 1 gives similar estimates extending over the history of the survey. Table 1 differs from the above in that data from the Pribilof Islands are included, but the number of red king crab in the Pribilof Islands is minor and hardly effects the following conclusions.

Abundance data indicate the following:

1. Abundance of all size/sex categories declined substantially over the past year.

2. Abundances of legal males (>134), prerecruit males (120-134) and mature females (>89) are the lowest on record.

3. Abundances of other size/sex groupings are the lowest since 1972.

4. There has been a particularly severe decline of males less than 110 mm.

Under normal conditions I would expect about 10% natural mortality of males between 110 and 134 mm and about 10% skip-molting. Normal recruitment would hence be about four million males in each of the next two years. In each of the past three years natural mortaility has approached 50% and if high mortalities persist then only about two million recruits in each year can be anticipated. In either case the abundance of legal males will remain low for at least two years and possibly longer.

The size composition of females has changed radically from 1981-1983 and the population is now dominated by small individuals (Figures 1-3). While almost all mature females were carrying normal clutches, the number of eggs produced this year will be low due to the lesser fecundity of small individuals. There are more than sufficient males to ensure that all females are mated although I cannot explain the apparent super-abundance of males relative to females in 1983.

Rapid and continued declines in abundance of red king crab in Bristol Bay have raised questions as to the advisability of opening the fishery. Several factors have been associated with declining abundance and need to be considered:

1. Declining recruitment was expected starting in 1981 but declines have been far more severe than anticipated. The immediate cause of declining recruitment was low abundance of one to two year classes. Causes weak year classes are poorly understood but probably beyond management control.

2. High abundances of predators (particularly cod and halibut) are doubtlessly one cause of high mortalities and reduced recruitment in recent years. The abundances of predators are not presently under management control in Bristol Bay.

3. Several diseases (one protozoan and one or several viruses) have recently been discovered. These types of diseases have caused drastic declines in crustacean or other arthropod populations. Whatever their influence, diseases are probably not controlable through management.

4. Fishery effects (directed and undirected catch, legal and illegal) have probably had some influence but total catches from all sources are small relative to declines in abundance. While fishing mortality is potentially controlable, there is little evidence that makes me believe that cecession of fishing will lead to substantial recovery of legal stocks in the near future. Further, I do not believe that catches of legal males will effect the reproductive potential of the stock under current conditions.

5. Handling mortality of sublegal males was suspected as a cause of declining abundance in 1980 and 1981. High rates of natural mortality have, however, persisted despite a drastic reduction in fishing effort in 1982.

6. What few legal males that remain are extremely scattered and low catch rates can be expected. Delaying the season may allow crab to congregate in the course of the inshore spawning migration but this is an economic rather than biological concern.

7. Simultaneous openings in Bristol Bay and the Pribilof District would provide vessel operators an alternative to fishing in the Pribilofs. Any benefits deriving from reduced effort in the Pribilofs are probably small and unlikely to influence management tactics. There would, however, be potential benefits for individuals.

The bottom line is that a closure is justified on biological grounds to protect a stock that is in the worst condition yet recorded. Beneficial effects on stock abundance and future recruitment are, however, uncertain and probably small. Using Board and Council guidelines the exploitation rate should be 0-20%.

Turning to the Pribilofs, changes in estimated abundance over the past year are given below.

Size (mm)/sex	1982	1983
	(millions of crabs)	
Males:		
<110	1.2	0.6
110-134	0.7	0.8
120-134	0.3	0.5
>134 (legal)	2.2	1.3
Females:		
<90	0.7	0.2
>89	8.6	9.2

Combined with historical data (Table 2) I note the following:

1. The abundances of all categories of males are at or near the lowest on record.

2. The abundances of females are more stable but not particularly reliable.

3. The abundance of prerecruits has declined steadily and prospects for future recruitment are poor.

Further, the reporductive condition of blue king crab stocks is inherently unstable because of a two year reproductive cycle for most individual females. By consequence the reproductive condition of blue king crabs provides little guidance for management.

Using the guidelines accepted by the Board and the Council the exploitation rate should be 0 - 20%.

cc: Baglin (NMFS Kodiak, c/o ADF&G)
Branson/Davis (NPFMC)
McVey (F/AKR)
Arron (F/NWC)
Hayes (F/NWC1)
Pennoyer (ADF&G, Juneau)
Griffin (ADF&G, Dutch Harbor)
Larkins (F/NWR)
Reeves (F/NWC2)

Table 1.--Annual abundance estimate (millions of crabs) for P. camtschatica in the Pribilof and Bristol Bay Districts from NMFS surveys.

	Males					Females			Grand
Size: 1/	<110	110-134	>134	120-134	Total	<90	>89	Total	Total
1969	41.0	20.3	9.8	9.6	71.1	18.3	28.5	46.8	117.9
1970	9.5	8.4	5.3	5.2	23.2	4.9	13.0	17.9	41.1
1972 2/	14.1	8.0	5.4	4.7	27.5	7.0	12.1	19.1	46.6
1973	50.0	25.9	10.8	14.2	86.7	24.8	76.8	101.6	188.3
1974	59.0	31.2	20.9	20.0	111.1	37.7	72.0	109.7	220.8
1975	84.9	31.7	21.0	18.6	137.6	70.8	58.9	129.7	267.3
1976	70.2	49.3	32.7	30.7	152.2	35.9	71.8	107.7	259.9
1977	80.2	63.9	37.6	35.3	181.7	33.5	150.1	183.6	365.3
1978	62.9	47.9	46.6	30.9	157.4	38.2	128.4	166.6	324.0
1979	48.1	37.2	43.9	27.4	129.2	45.1	110.9	156.0	285.2
1980	56.8	23.9	36.1	15.3	116.8	44.8	67.6	112.5	229.3
1981	56.6	18.4	11.3	8.9	86.3	36.3	67.3	103.6	189.9
1982 3/	107.2	17.4	4.7	8.5	129.3	77.2	54.8	132.0	261.3
Limits 4/									
Lower	74.2	13.2	3.7	6.2	96.0	46.2	44.4	99.3	214.6
Upper	140.2	21.5	5.6	10.8	162.6	108.3	65.2	164.8	308.0
±%	31	24	21	27	26	40	19	25	18

1/ Carapace length (mm).

2/ Limited survey in 1971, not used for population estimate.

3/ 1982 data includes small numbers of crab from the Northern District.

4/ With 95% confidence.

Table 2 - Annual abundance estimate (millions of crabs) for P. platypus in the Pribilof District.

Pribilof District										
	Males						Females			Grand
Size: 1/	<120	>119	<110	110-134	>134	Total	<90	>89	Total	Total
1974	5.9	3.5	4.4	3.1	1.9	9.4	0.6	10.9	11.5	20.9
1975	6.9	12.7	4.1	8.0	7.5	19.6	0.0	8.8	8.8	28.4
1976	11.3	5.0	10.3	2.1	3.9	16.3	0.4	17.7	18.1	34.4
1977	4.3	10.5	3.2	2.2	9.4	14.8	2.2	17.5	19.7	34.5
1978	3.7	7.6	1.2	5.8	4.3	11.3	0.3	35.5	35.8	47.1
1979	6.6	5.9	6.4	1.5	4.6	12.5	5.2	2.9	8.1	20.6
1980	2.2	5.2	1.9	1.4	4.2	7.5	0.8	101.9	102.7 3/	110.2
1981	5.4	5.0	4.8	1.4	4.2	10.4	3.4	11.6	15.0	25.4
1982	1.6	2.5	1.2	0.7	2.2	4.1	0.7	8.6	9.3	13.4
Limits 2/										
Lower	1.1	2.0	0.7	0.5	1.8	3.4	0.3	4.4	5.1	9.1
Upper	2.1	2.9	1.6	1.0	2.6	4.8	1.1	12.9	13.6	17.8
+%	32	18	40	34	19	17	62	49	46	32

1/ Carapace length (mm).

2/ With 95% confidence.

3/ Estimates for females and grand total considered unreliable in 1980.

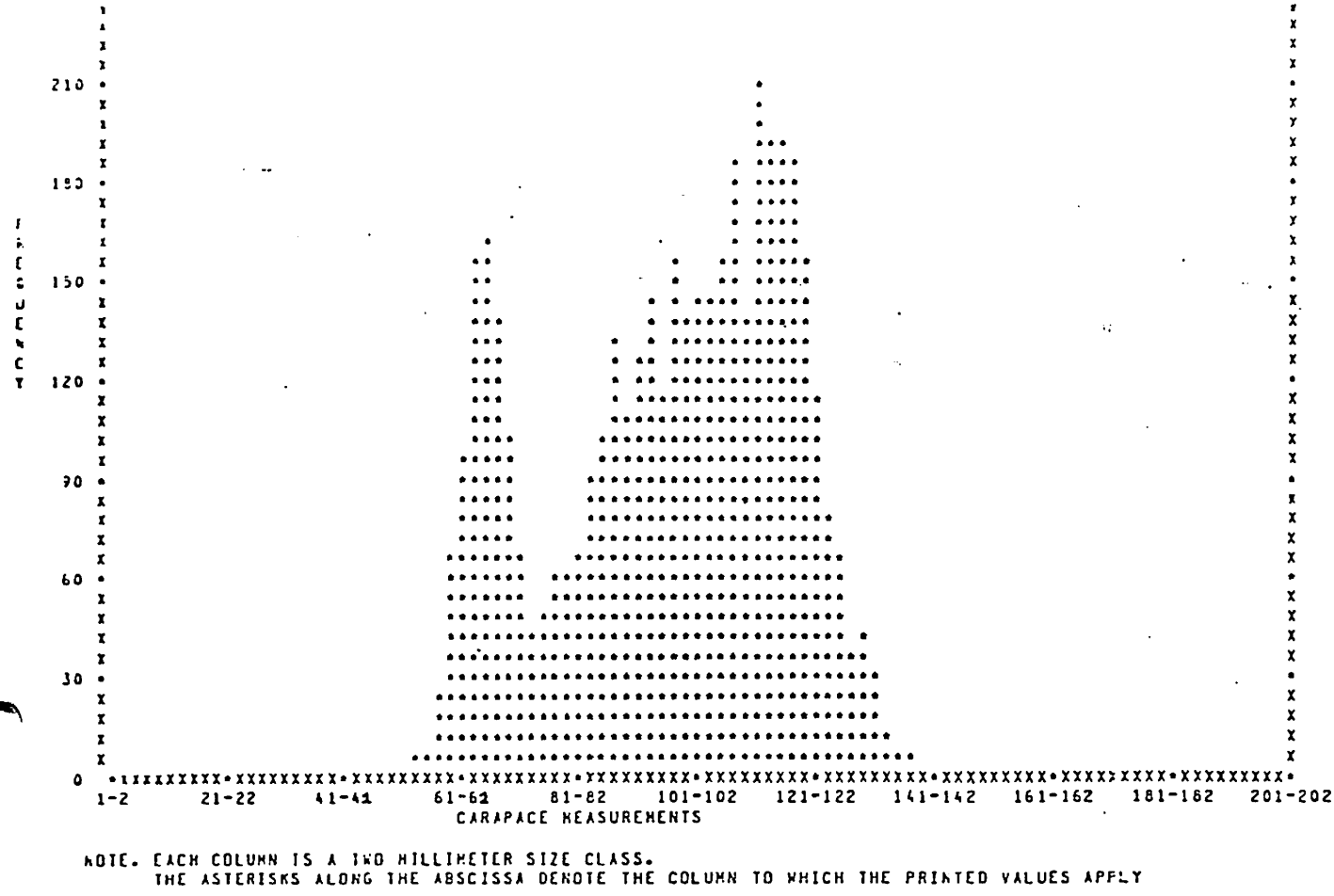
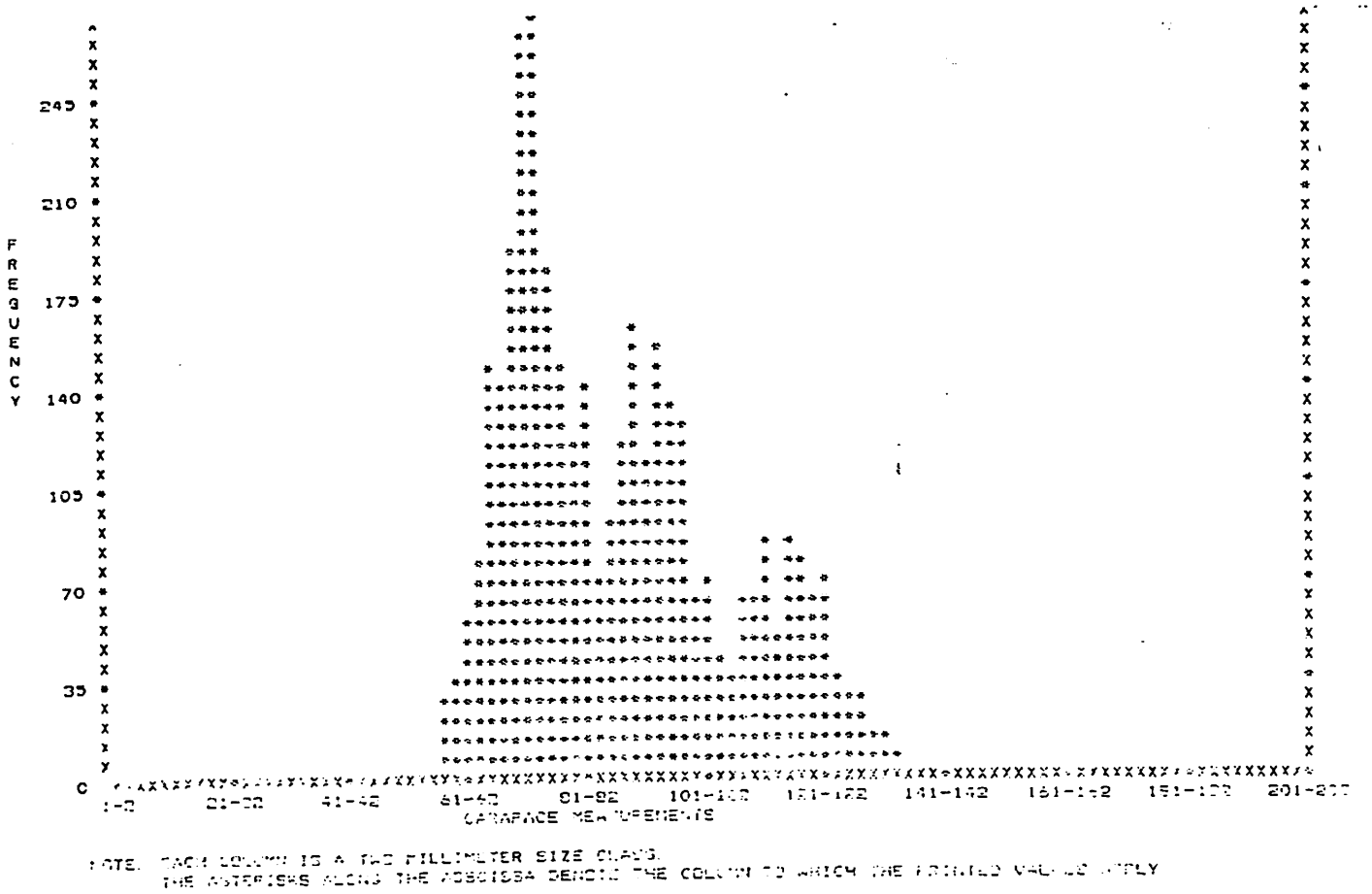


Figure 1.--Length frequency of female red king crab in 1981.



NOTE. EACH COLUMN IS A TWO MILLIMETER SIZE CLASS.
THE ASTERISKS ALONG THE ABSCISSA DENOTE THE COLUMN TO WHICH THE PRINTED VALUE APPLY

Figure 2.--Length frequency of female red king crab in 1982.

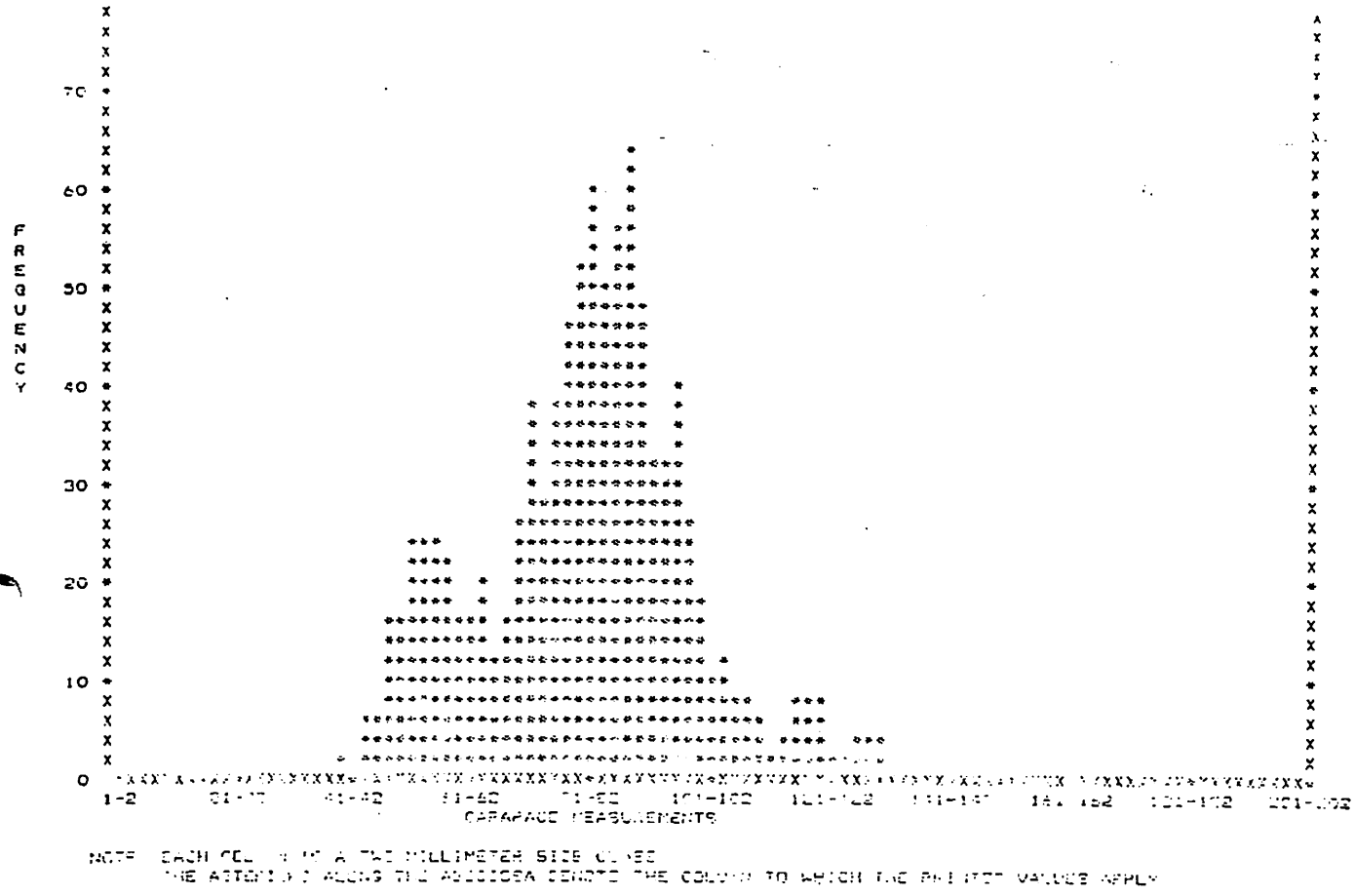


Figure 3.--Length frequency of female red king crab in 1983.