

BOARD ACTION - KING CRAB

I. Areas and Boundaries

- A. The western boundary of the Dutch Harbor Area was shifted from 172°W. longitude to 171°W.
- B. The northern boundary of the Adak Area was shifted northward to include Bowers Ridge.
- C. The Bering Sea Area definition was modified to reflect the Adak Area change.
- D. A new subsection called St. Lawrence was established west of Norton Sound.

II. Season

- A. Sex, size, season (3-S) management was rejected. Staff was directed to increase the exploitation rate in the St. Matthew section if the 1984 preseason king crab survey indicates a high abundance of post-recruit crabs.
- B. The following seasons were established (* denotes change)

Norton Sound	Aug 1 - Sept 3
*St. Matthew	Sept 1 - Sept 22
*St. Lawrence	Aug 1 - Sept 3
Pribilofs	Oct 1 - Apr 15
Bristol Bay	Oct 1 - E.O.
Dutch Harbor	Nov 10 - E.O.
Adak	Nov 10 - Feb 15

III. Size Limits

- A. The brown king crab size limit was changed to 6" in Dutch Harbor and 5½" in Bristol Bay.

IV. Harvest Strategies

No change.

V. Closed Waters

- B. The closed area around St. Lawrence, King and Diomed Islands was increased from 3 miles to 10 miles.

VII. Landing, Inspection and Reporting Requirements

- A. The 116-hour bait up period was eliminated in Bristol Bay, Dutch Harbor, and Pribilofs, and replaced with tank inspections beginning 24 hours before season opening.
- B. No action on bait up in the general section of the Bering Sea area.
- C. The 36-hour contact period for the Pribilof District was reduced to 24 hours.

VIII. Pot Storage

The Board re-established the old Federal Pot Storage area and eliminated the other Bristol Bay storage area.

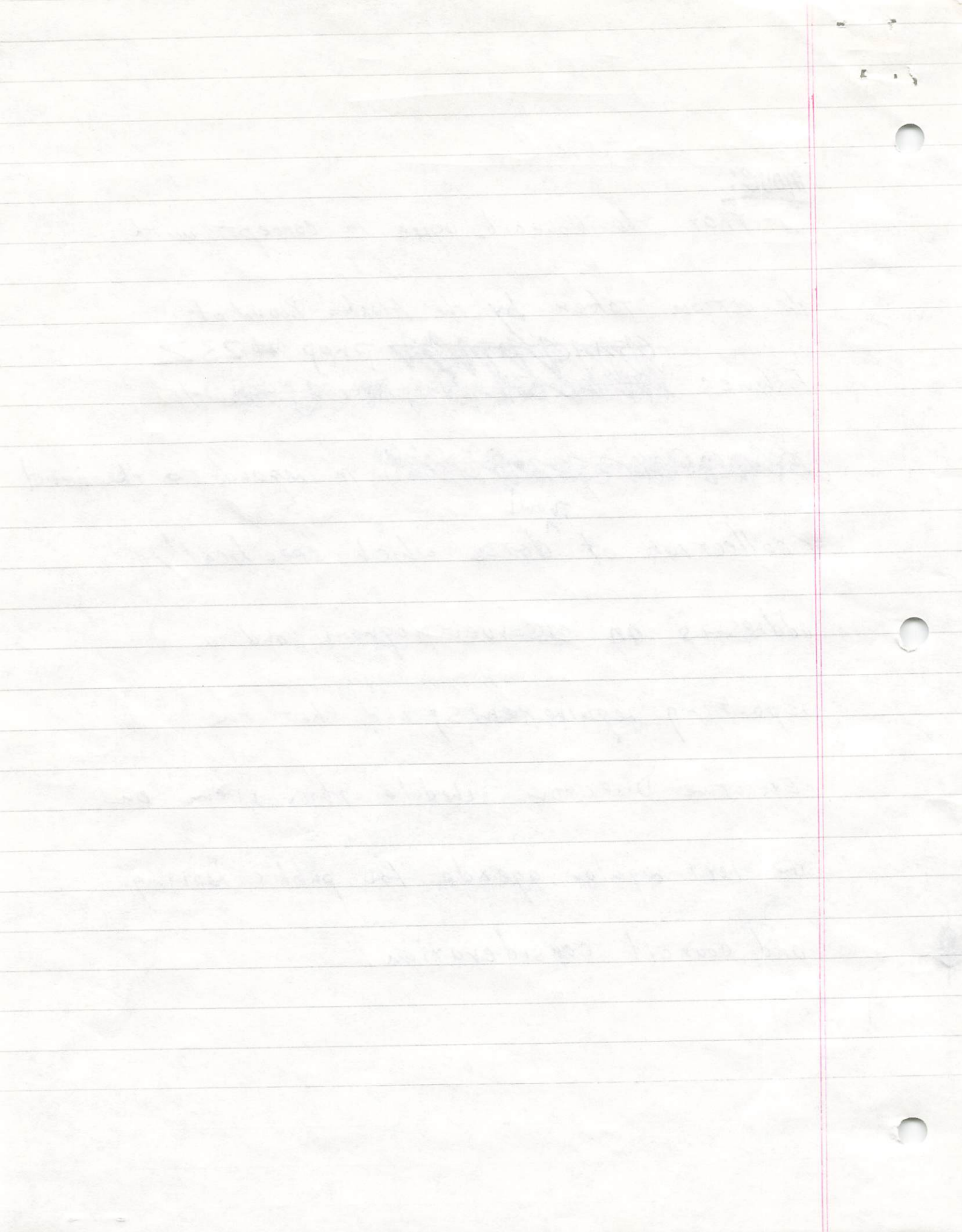
IX. Miscellaneous

- A. Vessels aiding distressed vessels will not be allowed to make up lost fishing time.

- B. Bottom trawl. The Board approved a data collection/observer/registration program to identify sensitive areas and monitor the impacts of trawling in those areas. The Council concurred in principle with the action and included this as an item on the May agenda (Rudy Petersen objected).

MOVE:

That the Council agree in concept with
the action taken by the Alaska Board of
Fisheries ~~STATE BOARD OF FISHERIES~~ Prop. #232
~~STATE BOARD OF FISHERIES~~
~~STATE BOARD OF FISHERIES~~ in regard to the need
for collection of ^{trawl} data which specifically
addresses an observer program, and a
reporting requirements; and that the
Executive Director schedule this item on
the next regular agenda for public hearing
and council consideration.



DRAFT

5AAC 39.xxx, BOTTOM TRAWL FISHERIES MANAGEMENT PLAN.

(a) The Board of Fisheries and the Department of Fish and Game are concerned about the by-catch of fish, particularly crab and halibut, by bottom trawl gear used to harvest bottomfish. King and Tanner crab populations in most areas of the state are either depressed or declining and are in need of protection from man induced mortality if they are to be allowed to rebuild to levels that will allow future harvests. Halibut populations, while high, are fully utilized in directed fisheries and any additional harvest by nondirected fisheries may increase exploitation rates above those used to maintain a sustained harvest level. There is an indication that bottom trawl gear may, at certain times and in certain locations, inflict unacceptable mortalities on these nondirected species. Since there is not at this time enough data available to quantify the affects of bottom trawl fisheries on nondirected species, the board adopts this plan as a means of ensuring that the data can be obtained.

(b) The department may require that owners or operators of bottom trawl fishing vessels being operated in waters west of the longitude of Cape Fairfield:

- (1) report locations of their operations to the department;

- (2) complete and submit to the department written information on their fishing operations;
- (3) allow representatives of the department to be placed on board their vessels to observe and collect information on the fishing operations; and
- (4) abide by any other requirements the department determines are needed for the conservation and development of fishery resources.



**North Pacific
Fishing Vessel
Owners' Association**

February 27, 1984

The North Pacific Fishing Vessel Owners' Association
Position Paper on
1984 Shellfish Proposal

SOUTHEASTERN/YAKUTAT - TANNER CRAB

III. Gear

- A. Repeal the pot limit.

NPFVOA WILL SUPPORT (co-writer of proposal)

V. Registration

- A. Repeal the super exclusive registration for the area.

NPFVOA WILL SUPPORT (co-writer of proposal)

WESTWARD - KING CRAB

I. Areas and Boundaries

- A. Shift the Western boundary of the Dutch Harbor Area from 172° W. longitude to 171° W. longitude.

NPFVOA WILL AMEND: Granted this change would allow brown king crab fishermen in the Sequam and Amukta Pass areas to fish one registration region, but it also splits the Amukta Bank in separate areas. This is an area which is regularly fished during the brown crab fishery. Amending the proposal to put the line at 171°30' would solve both problems.

- B. Change the Western boundary of the Adak Area to be a line from 52° North latitude, 168°35' East longitude, to 55°30' North latitude, 173°30' East longitude.

NPFVOA WILL SUPPORT this Adak boundary change.

- C. Redefine the Bering Sea Area as follows:

Statistical Area "Q" has as its southern boundary a line from Cape Sarichef (54°36' North latitude) to 54°36' North latitude, 171° West longitude, to 55°30' North latitude, 173°30' East longitude; its northern boundary the latitude of Point Hope (68°21' North latitude), its eastern boundary, a line from 54°36' North latitude, 168° West longitude, to 58°39' North latitude, 168° West longitude, to Cape Newenhan (58° 39' North latitude); its western boundary a line from

55°30' North latitude, 173°30' East longitude to 65°32' North latitude, 168°55' West longitude, to 68°21' North latitude, 168°55' West longitude (The U.S.-Russian Covention Line of 1867).

NPFVOA WILL SUPPORT this Bering Sea alteration.

- D. Extend the western boundary of the Norton Sound Section out to the U.S.-Russian Covention Line of 1867.

NPFVOA WILL SUPPORT (co-maker of proposal).

II. Seasons

- A. Manage the king crab fishery by sex, size, and season regulations. Retain the current males only provision and change some size limits (see III.A.) The following are the recommended seasons:

AREA	BROWN CRAB	RED CRAB
Norton Sound	Aug 1 to Sept 10	Aug 1 to Sept 10
St. Matthew	Oct 1 to July 15	Oct 1 to Dec 15
Pribilof	Oct 1 to July 15	Oct 1 to Dec 15
Bristol Bay	Oct 1 to July 15	Oct 1 to April 1
Dutch Harbor	<u>Nov 10</u> to July 15	<u>Nov 10</u> to April 15
Adak	<u>Nov 10</u> to July 15	<u>Nov 10</u> to April 15
Alaska Peninsula	Oct 1 to July 15	Oct 1 to Dec 15
Kodiak	Oct 1 to July 15	Sept 25 to Dec 15

NPFVOA WILL SUPPORT (co-maker of proposal). The Dutch Harbor/Adak season in the original proposal will be amended to start November 10. With this concept the fisheries will be regulated by a set season/set size of crab/and specific sex (i.e. male crab). Thus, the procedure of setting quotas would no longer take place. The size limits and season would be bilogically set, to allow for proper recruitment. NPFVOA is suggesting a 5-1/2 inch size limit for brown king crab and 6-1/2 inch size limit for red king crab (see IIIa). We will stress to the North Pacific Fishery Management Council and the Alaskan Board of Fisheries that each season should be considered separately if they have difficulty recommending all of the above.

- B. Open the General Section (St. Matthews) of the Northern District from 12:00 noon September 10 to 12:00 noon October 1.

NPFVOA WILL OPPOSE.

- C. Open the General Section north of the latitude of Cape Romanzof from 12:00 noon July 15 to 12:00 noon July 31.

NPFVOA WILL OPPOSE.

- D. Open the brown king crab fishery for the Pribilof Section and the Bristol Bay and Dutch Harbor areas from January 1 through December 31 under the conditions of a permit issued by the Commissioner.

NPFVOA WILL SUPPORT and Amend: We will encourage the amendment of this proposal to include the Kodiak and Alaskan Peninsula areas.

III. Size limits

- A. Change the size limits as a companion to proposal II.A. The size limits would be 5-1/2 inches for brown king crab and 6-1/2 inches for red king crab in all areas.

NPFVOA WILL SUPPORT (co-maker of proposal).

IV. Harvest strategies

- A. Manage the harvest of king crab in that part of the General Section north of the latitude of Cape Romanzof for one-half of the exploitation rate determine under 5 AAC 34.080.

NPFVOA WILL OPPOSE. The commercial fishery is already very short (a few days), compared to a year round subsistence fishery.

V. Closed Waters

- A. Close all waters of the General Section north of Cape Romanzof.

NPFVOA WILL OPPOSE.

- B. Increase the closed area around St. Lawrence, King, and Diomed Islands to 30 miles.

NPFVOA WILL OPPOSE.

VI. Registration

- A. Allow fishermen to fish for brown king crab in both the Kodiak and Alaska Peninsula areas.

NPFVOA WILL AMEND AND SUPPORT: Brown king crab registration should include all areas/year round. (See IID).

VII. Landing, Inspection, and Reporting Requirements.

- A. Eliminate the 116 hour bait up period for the Alaska Peninsula, Bristol Bay, and Dutch Harbor areas and the Pribilof District. Inspections would start 24 hours before the season openings.

NPFVOA WILL OPPOSE. By eliminating the 116 hour bait up period there is a strong possibility of increased safety problems, for example a small vessel trying to get gear to the grounds could easily overload.

- B. Establish a bait up period with inspections starting 24 hours after the opening for the General Section of the Bering Sea Area.

NPFVOA WILL OPPOSE: Safety Problem.

- C. Eliminate the 36 hour contact period for the Pribilof District that is in 5 AAC 34.035(e)(3).

NPFVOA WILL OPPOSE: a vessel needs this time to safely travel to port to unload its catch.

VIII. Pot Storage

- A. Provide a pot storage area from 57° to 58° North latitude and 164° to 166° West longitude.

NPFVOA WILL SUPPORT (co-maker of proposal).

- B. Establish a pot storage area for the St. Matthews fishery as follows: King crab pots may be stored one month before the start of Northern District season and one month after the end of Northern District season in waters enclosed by a line from 60°24' North latitude, 169° West longitude, to 60°24' North latitude, 171° West longitude, to 61° North latitude, 171° West longitude, to 61° North latitude, 169° West longitude, to the starting point.

NPFVOA WILL SUPPORT

IX. Miscellaneous

- A. Allow a vessel that aids another vessel in distress to make up lost fishing time.

NPFVOA WILL SUPPORT (co-maker of proposal).

WESTWARD - TANNER CRAB

I. Seasons

- A. Manage the Tanner crab fishery by sex, size, and season regulations. Retain current size limits and males only with the following seasons:

*Bering Sea (Area J)	Jan. 15 to Aug 1
*Dutch Harbor (Area J)	<u>Nov. 10</u> to Aug 1
*Adak (Area J)	<u>Nov. 10</u> to April 15
*Chignik - South Peninsula (Area J)	Jan. 15 to April 15
*Kodiak (Area J)	Jan. 15 to April 15

*District

NPFVOA WILL SUPPORT (co-maker of proposal). Dutch Harbor/Adak season will be amended to start November 10th. Sex/Size/Season management as stated earlier would allow the season to be managed over a specific time, size of crab and sex (i.e. male) not a specific quota. Biological ramifications must be considered when developing a 3(S) system. We are suggesting the size limit stays the same: Bairdi 5-1/2 and Opelio 3.1. This proposal would work most efficiently as a management package, but could be considered season by season.

- B. Open all Area "J" Districts concurrently and close at 12:00 noon May 15.

NPFVOA WILL OPPOSE.

- C. Open the Kodiak District on January 15.

NPFVOA WILL SUPPORT (see IA.)

II. Pot Limits

- A. Repeal the pot limit for the Kodiak District.

NPFVOA WILL SUPPORT (co-maker of proposal). This would put Federal and State regulations in common by regulation.

III. Registration

- A. Repeal the super exclusive registration for the Chignik and South Peninsula districts.

NPFVOA WILL SUPPORT (co-maker of proposal).

IV. Miscellaneous

- A. Allow a vessel that aids another vessel in distress to make up lost fishing time.

NPFVOA WILL SUPPORT (co-maker of proposal).

WESTWARD - MISCELLANEOUS SHELLFISH

- II. B. Allow a vessel that aids a vessel in distress to make up for lost fishing time.

NPFVOA WILL SUPPORT (co-maker of proposal).

WESTWARD - FINFISH AND SHELLFISH TRAWL FISHERIES

Prohibit the use of hard-on-the-bottom trawl gear, including roller gear, from February 1 through June 1 in selected locations in the Westward Area. The Department is identifying locations that should be closed to protect soft shell and breeding crab, particularly king crab. The specific locations will be available for public review by the public through the Department's Kodiak office.

NPFVOA WILL OPPOSE: We will stress that industry is presently trying to reduce its incidental catch internally with both the industry and Council incidental catch working groups. This issue should be monitored closely.

STATEWIDE - KING CRAB

- I. Allow a five day "bait up period" in all areas with tank inspections starting 120 hours after the season opening.

NPFVOA WILL SUPPORT (co-writer of proposal). Needed because of safety reasons.

- II. Allow king crab fishing vessels to register for the species of crab they wish to fish for, i.e., red, blue or brown.

NPFVOA WILL OPPOSE.

- III. Separate the brown king crab fishery from the blue and red fisheries with a separate permit card and possibly separate seasons.

NPFVOA WILL OPPOSE.

- IV. Amend 5 AAC 34.050(c) to allow seven days for removal of gear from the grounds after any closure of part of or an entire registration area.

NPFVOA WILL SUPPORT (co-writer of proposal).

- V. Permit the Department to allow fishing pots on the grounds because of weather or a major breakdown.

NPFVOA WILL SUPPORT.

STATEWIDE - TANNER CRAB

- I. Allow a "bait up period" in all areas with tank inspections starting 120 hours after the season opening.

NPFVOA WILL SUPPORT (co-writer of proposal).

- II. Amend 5 AAC 35.050(c) (3) (B) to allow seven days for removal of gear from the grounds after any closure of part of or entire registration area.

NPFVOA WILL SUPPORT (co-writer of proposal).

- III. Prohibit a validly registered Tanner crab vessel from registering for more than one Tanner crab fishery at a time and for concurrently registering for a crab fishery in another area.

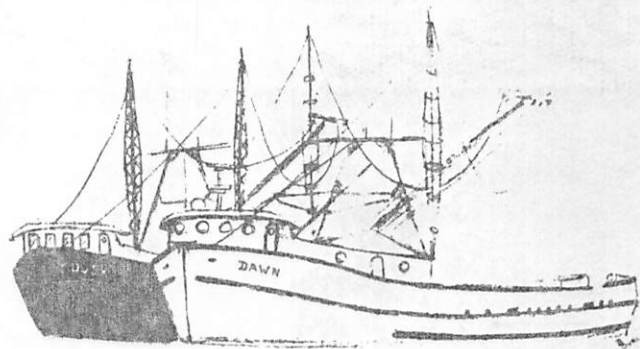
NPFVOA will ask for clarification from author (ADF&G).

STATEWIDE - MISCELLANEOUS

- II. Trawl Fisheries: Require trawl fishermen to report incidental harvest in writing to the Department at least once a week. Data would include area caught, numbers and pounds of crab, halibut, black cod, herring, and salmon, type of gear used, and method of delivery to processor.

NPFVOA will ask for clarification and discuss with the author the question of valid information and cumbersome paperwork.

Burch Brothers
Box 2203
Kodiak, Alaska 99615
486 - 5238 or 486 - 3653



March 28, 1984

Jim Campbell
Chairman
North Pacific Fishery Management
Council
P.O. Box 3136DT
Anchorage, Alaska 99510

Dear Jim:

The Alaska Department of Fish and Game "Kodiak" with no biological reason, or any proven facts has proposed a closure of all the trawl areas around Kodiak for four months out of the year.

We can furnish observer reports that prove that out of over a hundred tows, we caught no King Crab and very few Tanners.

If this proposal #23, page 34, were to be adopted, we can be sure that the shore-based operations will be in serious jeopardy, if not killed entirely in the State.

It seems very strange to me that one part of the State is promoting Whitefish Development, and a very few biased State Employees are doing their best to kill the development.

Just the writting of the proposal has cost the State, City, and the Trawlers a substantial amount.

If there were biological, proven facts in this proposal, we would be for it. In all my years of trawling this is the biggest bunch of garbage I have ever heard of.

Sincerely,

Oral L. Burch

DRAFT

5AAC 39.xxx, BOTTOM TRAWL FISHERIES MANAGEMENT PLAN.

(a) The Board of Fisheries and the Department of Fish and Game are concerned about the by-catch of fish, particularly crab and halibut, by bottom trawl gear used to harvest bottomfish. King and Tanner crab populations in most areas of the state are either depressed or declining and are in need of protection from man induced mortality if they are to be allowed to rebuild to levels that will allow future harvests. Halibut populations, while high, are fully utilized in directed fisheries and any additional harvest by nondirected fisheries may increase exploitation rates above those used to maintain a sustained harvest level. There is an indication that bottom trawl gear may, at certain times and in certain locations, inflict unacceptable mortalities on these nondirected species. Since there is not at this time enough data available to quantify the affects of bottom trawl fisheries on nondirected species, the board adopts this plan as a means of ensuring that the data can be obtained.

(b) The department may require that owners or operators of bottom trawl fishing vessels being operated in waters west of the longitude of Cape Fairfield:

- (1) report locations of their operations to the department;

- (2) complete and submit to the department written information on their fishing operations;
- (3) allow representatives of the department to be placed on board their vessels to observe and collect information on the fishing operations; and
- (4) abide by any other requirements the department determines are needed for the conservation and development of fishery resources.

M E M O R A N D U M

TO: Council, Board, SSC and AP Members

FROM: Jim H. Branson
Executive Director

DATE: March 19, 1984

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

ACTION REQUIRED

Review of BS/AI king crab fisheries including status of the stocks, regulatory proposals and status of the FMP. Discussion of 1984 king crab management with the Board.

BACKGROUND

On October 20, 1981, the North Pacific Fishery Management Council and the Alaska Board of Fisheries adopted the Joint Statement of Principles for managing the domestic king crab fisheries in the Bering Sea and Aleutian Islands [item D-2-III(a)]. This agreement requires that both bodies meet jointly at least once every year to review the management of the fishery, discuss any regulatory proposals, and determine if there is a need to amend the management framework. In preparation for this meeting the Council and Board held a joint public hearing on March 9, in Seattle, Washington to receive public testimony on the regulatory proposals. A summary of the BS/AI king crab proposals, a copy of the proposal package, and the hearing summary are provided as items D-2-III(b), (c) and (d), respectively.

The Bering Sea/Aleutian Islands King Crab FMP, the Regulatory Impact Review, the Final Environmental Impact Statement and implementing regulations were submitted for fast-track Secretarial review on October 25, 1983. However, due to problems concerning the federal permit provision, formal review has been delayed. The FMP requires that a federal fishing permit be required for all vessels fishing king crab in the Fishery Conservation Zone. The Council, upon recommendations of a Council workgroup, decided to reserve that requirement in the implementing regulations due to several legal questions about the applicability of using existing state permits under this plan. These legal questions are currently being investigated and a written review of these questions and a summary of the options available to the Council, will be presented at the May meeting.

Revised 9/8/81

JOINT STATEMENT OF PRINCIPLES
BETWEEN
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL (NPFMC)
ANCHORAGE, ALASKA
and
ALASKA BOARD OF FISHERIES (BOF)
JUNEAU, ALASKA
ON
MANAGEMENT OF DOMESTIC KING CRAB FISHERIES
IN THE BERING SEA AND ALEUTIANS

Recognizing that NPFMC has a legal responsibility for reviewing and recommending to the Secretary of Commerce measures for the conservation and management of the fisheries of the Arctic Ocean, Bering Sea, and Pacific Ocean seaward of Alaska, with particular emphasis on the consistency of those measures with the National Standards of the Magnuson Fishery Conservation and Management Act (Magnuson Act); and

Recognizing that State and Federal governmental agencies are limited in fiscal resources, and that the optimal use of these monies for North Pacific fisheries management, research, and enforcement occurs through a clear definition of agency roles and division of responsibilities, thus avoiding unnecessary duplication; and

Recognizing that the State of Alaska has for more than two decades exercised effective control over domestic king crab fisheries both within and without its territorial waters. The State system centers around BOF for policy and regulations. BOF's regulatory system provides for extensive public input; is sufficiently structured to insure annual revisions; is flexible enough to accommodate resource and resource utilization "emergencies;" and is understood and familiar to the users of North Pacific fisheries resources. Further, there exists a substantial investment by the State in facilities, communications and information systems, vessels and other equipment, coupled with a cadre of experienced personnel capable of carrying out extensive management, research, and enforcement programs to monitor the conduct of the fisheries and the status of the resources.

Therefore, NPFMC and BOF enter into this Joint Statement of Principles, defining the roles of both organizations, in order to achieve the most effective and efficient management of domestic king crab fisheries in the Bering Sea and Aleutians.

I. Applicable Fisheries

This Joint Statement of Principles applies only to the domestic fishery for king crab (all members of genera Paralithodes and Lithodes) in the Bering Sea, Bristol Bay, Adak, and Dutch Harbor areas, also known as State of Alaska king crab statistical areas Q, T, R, and O. This fishery is hereinafter referred to as "the fishery."

II. Duration of Agreement

Recognizing that NPFMC is currently preparing a Fishery Management Plan (FMP) for the fishery, this agreement shall remain in effect until that FMP is implemented by the Secretary of Commerce. At that time the agreement shall be reviewed by both NPFMC and the BOF and revised as necessary and as they may agree so that it will conform with the then existing situation.

III. NPFMC and BOF shall undertake the following activities:

1. NPFMC and BOF shall adopt the framework developed and approved by both organizations in April and May, 1981 to govern management of the fishery, prescribing objectives, standards, and measures found to be necessary for the fishery's effective management. These objectives, standards, and measures are consistent with the national standards of the Magnuson Act and with the laws of the State of Alaska; and do not discriminate between residents and non-residents of the State of Alaska.
2. The framework shall be implemented through regulations adopted by BOF in accordance with the laws of the State of Alaska, which shall be consistent with the objectives, standards, and measures prescribed in the framework. Before taking final action on any regulation governing the fishery, BOF shall make readily available in written form to all persons interested in the fishery for a period of at least thirty (30) days, the reports and data received by BOF upon which the proposed regulation is based; shall afford all such persons the opportunity to submit written and oral comments to BOF on the proposed regulation during that period; and shall, upon the request of NPFMC, meet with NPFMC or its representatives to discuss the proposed regulation. Before any BOF regulation governing the fishery goes into effect, BOF shall issue a written statement explaining the basis for the regulation. The preceding provisions of this paragraph shall not apply to emergency regulations.
3. NPFMC and BOF shall meet jointly at least once every calendar year to consider management of the fishery and discuss the need for amendment of the framework or any regulations governing the fishery. NPFMC and BOF or their designated representatives shall also meet jointly to consider management of the fishery at the request of either NPFMC or BOF. All persons and agencies interested in the fishery shall have the opportunity to submit written and oral comments and reports on management of the fishery to NPFMC and BOF at these meetings. In preparation for the mandatory annual joint meeting provided for in the first sentence of this paragraph, representatives of NPFMC and BOF shall hold a public hearing in the State of Washington at which all persons and agencies interested in the fishery shall be afforded the same opportunity to comment on management of the fishery that they would have at the meeting itself.
4. The Alaska Department of Fish and Game (ADF&G) shall have primary responsibility for developing the information upon which regulations governing the fishery are to be based, and for implementing these regulations through monitoring of the fishery and development of

in-season management measures. NPFMC and BOF shall encourage ADF&G, in carrying out this responsibility, to consult actively with the National Marine Fisheries Service and the fishery management agencies of other states, in order to prevent duplication of research and management effort and to make optimum use of the resources available for management of the fishery.

5. NPFMC and BOF shall resolve conflicts on the framework and implementing regulations through all appropriate means.

Approved:

For the North Pacific Fishery
Management Council


Clement V. Tillion, Chairman

10 - 20 - 81
Date

For the Alaska Board of Fisheries


Nick Szabo, Chairman

10/20/81
Date

WESTWARD
KING CRAB

I. Areas and Boundaries.

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B. Change the western boundary of the Adak Area to be a line from 52° North latitude, 168°35' East longitude, to 55°30' North latitude, 173°30' East longitude.

C. Redefine the Bering Sea Area as follows:

Statistical Area "Q" has as its southern boundary a line from Cape Sarichef (54°36' North latitude) to 54°36' North latitude, 171° West longitude, to 55°30' North latitude, 171° West longitude, to 55°30' North latitude, 173°30' East longitude; its northern boundary the latitude of Point Hope (68°21' North latitude), its eastern boundary, a line from 54°36' North latitude, 168° West longitude, to 58°39' North latitude, 168° West longitude, to Cape Newenham (58°39' North latitude); its western boundary a line from 55°30' North latitude, 173°30' East longitude to 65°32' North latitude, 168°55' West longitude, to 68°21' North latitude, 168°55' West longitude (The U.S.-Russian Convention Line of 1867).

D. Extend the western boundary of the Norton Sound Section out to the U.S.-Russian Convention Line of 1867.

II. Seasons.

A. Manage the king crab fishery by sex, size, and season regulations. Retain the current males only provision and change some size limits (see III.A.) The following are the recommended seasons:

AREA	BROWN CRAB	RED CRAB
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Adak	Jan 15 to July 15	Jan 15 to April 15
Alaska Peninsula	Jan 15 to July 15	Jan 15 to April 15
Kodiak	Oct 1 to July 15	Oct 1 to Dec 15
	Oct 1 to July 15	Sept 25 to Dec 15

B. Open the General Section (St. Matthews) of the Northern District from 12:00 noon September 10 to 12:00 noon October 1.

C. Open the General Section north of the latitude of Cape Romanzof from 12:00 noon July 15 to 12:00 noon July 31.

- D. Open the brown king crab fishery for the Pribilof Section and the Bristol Bay and Dutch Harbor areas from January 1 through December 31 under the conditions of a permit issued by the Commissioner.

III. Size limits.

- A. Change the size limits as a companion to proposal II.A. The size limits would be $5\frac{1}{2}$ inches for brown king crab and $6\frac{1}{2}$ inches for red king crab in all areas.

IV. Harvest strategies.

- A. Manage the harvest of king crab in that part of the General Section north of the latitude of Cape Romanzof for one-half of the exploitation rate determine under 5 AAC 34.080.

V. Closed Waters.

- A. Close all waters of the General Section north of Cape Romanzof.
- B. Increase the closed area around St. Lawrence, King, and Diomed Islands to 30 miles.

VI. Registration.

- A. Allow fishermen to fish for brown king crab in both the Kodiak and Alaska Peninsula areas.

VII. Landing, Inspection, and Reporting Requirements.

- A. Eliminate the 116 hour bait up period for the Alaska Peninsula, Bristol Bay, and Dutch Harbor areas and the Pribilof District. Inspections would start 24 hours before the season opening.
- B. Establish a bait up period with inspections starting 24 hours after the opening for the General Section of the Bering Sea Area.
- C. Eliminate the 36 hour contact period for the Pribilof District that is in 5 AAC 34.035(e)(3).

VIII. Pot Storage.

- A. Provide a pot storage area from 57° to 58° North latitude and 164° to 166° West longitude.
- B. Establish a pot storage area for the St. Matthews fishery as follows: King crab pots may be stored one month before the start of Northern District season and one month after the end of Northern District season in waters enclosed by a line from $60^{\circ}24'$ North latitude, 169° West longitude, to $60^{\circ}24'$ North latitude, 171° West longitude, to 61° North latitude, 171° West longitude, to 61° North latitude, 169° West longitude, to the starting point.

IX. Miscellaneous.

- A. Allow a vessel that aids another vessel in distress to make up lost fishing time.

JUSTIFICATIONS:

I.A. This would allow the brown king crab fishermen in the Sequam and Amukta Pass areas to fish one registration area.

Proposed by: Department of Fish and Game

I.B. This puts the northern Bowers Ridge area, that is presently in the Bering Sea Area, into the Adak Area. It is more adjacent to and part of the Adak Area and should be managed with it.

Proposed by: Department of Fish and Game

I.C. This will put the Bowers Ridge area that is currently in the Bering Sea into the Adak management area. This area is adjacent to and part of the Petrel Banks area in Adak and should be managed as part of their stocks.

Proposed by: Department of Fish and Game

I.D. To allow for an exploratory fishery for red and blue crab, while the boats are already in the area.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel Owners Association (252)

II.A. Managing the king crab resource with sex, size and season regulations would safely provide the fishermen with the best biologically sound quotas and season structures. When creating this sex, size and season management regime we suggest that the State of Alaska, as they have done in the past, adopt a posture of abiding by the sound biological information. The proposed opening would maintain a continuous supply of raw material, sustain a constant employment level, and avoid major shut-down and start-up costs for both harvester and processors. Coordinated statewide openings would spread the fishing fleet out, thus reducing high fishing pressure in specific areas and allow for simultaneous harvesting of both king and Tanner crab in a given area.

Not only does this disbursement of the fleet benefit the resource, this regime would allow vessels to individually coordinate openings so as to achieve a high level of safety, thus the small boat operator would benefit from this regulatory package. Small vessel operators with their relatively low overhead costs could keep working on a stock of fish, when in comparison these vessels with high overheads would not be economically able to harvest crab. The biological safe guard would be management by a specific size.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel Owners Association (252)

II.B. Many crabbers are in the salmon tendering business out of economic necessity. Many tendering contracts are still active until the end of August. A September 10 opening will allow greater economic opportunity.

Proposed by: Peter Liske (192)

II.C. Crab boats interferred with St. Lawrence Island subsistence seal hunt during September. Also, there are some reports that the crab taken in September were soft shell.

Proposed by: Dorcas Akeya (286)

II.D. This will allow a year round exploratory fishery on brown king crab in areas that do not have an established fishery and allows the area biologists to monitor gear and effort levels.

Proposed by: Department of Fish and Game

III.A. See number II.A. above.

IV.A. Because the commercial fishery hardly leaves any crab for subsistence crabbers on St. Lawrence Island.

Proposed by: Dorcas Akeya (285)

V.A. Because the commercial fishery hardly leaves any crab for subsistence crabbers on the Islands. Too, the crab boats trade alcohol, and both villages on St. Lawrence are "dry" villages.

Proposed by: Dorcas Akeya (287)

V.B. In the past subsistence crabbing areas in St. Lawrence were producing fairly enough. After commercial crabbing opens most of the areas resources are gone and those others are producing much smaller harvest and the number of the harvest are going very low.

Proposed by: St. Lawrence Island Advisory Committee (170-171)

VI.A. We feel that the intent of area registration for king crab was an attempt to limit vessels fishing for red king crab only. Taking into consideration the economic situation with no red king crab season this year and a bleak outlook for future openings in coming years; more interest is expected to be placed on harvesting brown king crab. Waiving the registration requirement between the Chignik and Kodiak areas for brown king crab would allow fishermen seeking to harvest this underutilized resource greater flexibility in developing a viable brown king crab fishery.

Proposed by: Kodiak Advisory Committee (269)

VII.A. All Westward Region king crab stocks which have the bait up period are at very low stock levels. Vessel effort remains very high in these areas. Having baited gear on the grounds for five days makes it very difficult to control the catch and could result in severe overharvest of already depressed stocks.

Proposed by: Department of Fish and Game

VII.B. This would help to eliminate some of the registration and tank inspection problems by having gear off the vessels. Last season some vessels had to wait up to 13 hours for a tank check. Too many dangerous situations have developed with ADF&G personnel and vessels taking to many chances.

Proposed by: Department of Fish and Game

VII.C. Most processing is done on the grounds by floater. The running time from the area is less than 24 hours and the 36 hour period allows for another day of fishing.

Proposed by: Department of Fish and Game

VIII.A. Provide an option for pot storage closer to the Pribilof Islands. Eliminate excess running time and fuel consumption, also an additional vessel/crew safety factor.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel Owners Association (257)

VIII.B. To allow for equality between large boats and small boats. The existing pot storage area is too far from St. Matthews. It takes approximately 30 hours to run to pot storage stack your gear and get back on grounds that's approximately 1/5 of the season. Lets get it closer.

Proposed by: Peter Liske (193)

IX.A. In the Bering Sea and Aleutan Islands areas, there is virtually no Coast Guard search and rescue capability. Consequently, a fishermen must rely on another fisherman should his vessel become disabled. If a fisherman hesitates to render assistance because of losing fishing time, then the safety of a crew and vessel could be in jeopardy. This procedure would reward the fishermen who gives help and should eliminate any reasons for indecision.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel Owners Association (255-256)

WESTWARD
FINFISH AND SHELLFISH TRAWL FISHERIES

Prohibit the use of hard-on-the-bottom trawl gear, including roller gear, from February 1 through June 1 in selected locations in the Westward Area. The Department is identifying locations that should be closed to protect soft shell and breeding crab, particularly king crab. The specific locations will be available for public review by the public through the Department's Kodiak office.

JUSTIFICATION:

Some crab stocks, particularly king crab in the Westward Region are in serious biological trouble. With increasing groundfish development, the proposed closures would protect crab during the soft shell and breeding period when they are most susceptible to damage.

Proposed by: Department of Fish and Game

STATEWIDE
KING CRAB

- I. Allow a five day "bait up period" in all areas with tank inspections starting 120 hours after the season opening.
- II. Allow king crab fishing vessels to register for the species of crab they wish to fish for, i.e., red, blue or brown.
- III. Separate the brown king crab fishery from the blue and red fisheries with a separate permit card and possibly separate seasons.
- IV. Amend 5 AAC 34.050(c) to allow seven days for removal of gear from the grounds after any closure of part of or an entire registration area.
- V. Permit the Department to allow fishing pots on the grounds because of weather or a major breakdown.

JUSTIFICATIONS:

I. For safety (vessel and crew) reasons this five day bait up period would allow smaller vessels to make more trips to and from the grounds, thus lowering the potential of overloading a vessel. The problem of vessel overloading is becoming apparent as the resource levels decline. This proposal would make the regulation uniform for all species of crab.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel Owners Association (249)

II. Alaskan king crab fisheries area becoming more species specific. Often times species specific fisheries are designed to allow development of underutilized species when seasons are closed for the traditionally harvested species. These developmental fisheries are often of long duration following a closure for the targeted species. In practice king crab registration can only be invalidated when the season is closed for all king crab species. The establishment of species specific king crab registration would permit vessels to register for specific species fisheries and not limit their ability to fish for other species in other areas.

Proposed by: Department of Fish and Game

III. Is that its possible that it could be a underutilized fishery because of boundry set by king crab areas which means foriegners could get involved and we could not. By opening up free exploration could take place and a proper protection of fishery. In areas where there could be conflict with small boat fisheries fishing could be keep a off shore fishery where small boat can not fish any way or during months where they could they fish salmon.

Proposed by: Gary Buholm (141-142)

IV. Vessels have had to remove gear in bad weather and too short a time period and has resulted in lost vessels and crew.

Proposed by: Alaska Marketing Association and North Pacific Fishing Vessel
Owner's Association (251)

V. This provision is in both the Tanner and Dungeness chapters and should be
consistent.

Proposed by: Department of Fish and Game

MARCH 1984

SUMMARY: COUNCIL/BOARD OF FISHERIES JOINT PUBLIC HEARING
ON THE PROPOSED KING CRAB REGULATIONS FOR THE 1984-85 FISHERY

Seattle, Washington

March 9, 1984

In accordance with the provisions of the Joint Statement of Principles between the North Pacific Fishery Management Council and The Alaska Board of Fisheries for management of domestic king crab fisheries in the Bering Sea and Aleutians, the Council and Board conducted their third joint public hearing outside Alaska on Friday, March 9, 1984 in Seattle. The hearing was chaired by Jim Campbell, with Council members Rudy Petersen, Bob McVey, Jeff Stephan, John Harville, Keith Specking, Gene Didonato, and Board members Bix Bonney, Jeri Museth, John Garner and Val Angason in attendance. Support staff present were Jim Branson, Steve Davis, Jim Glock and Judy Willoughby, NPFMC; Beth Stewart, Kris Wright and Robin Eldridge, ABOF; Marty Eaton, ADF&G; and Bill Robinson, NMFS. The hearing convened at 1:00 p.m. with a staff report presented by Marty Eaton. Approximately 34 members of the public attended the hearing and synopses of individual testimony are given below.

Barry Collier, Dennis Petersen, and Arnie Aadland, North Pacific Fishing Vessel Owner's Association, Seattle, presented their association's support and opposition to a variety of proposals before the Board and Council.

Mr. Collier began by expressing the intent of NPFVOA in initiating their recent litigation against the Board regarding Tanner crab pot limits. He stressed that the members of the NPFVOA debated the litigation at length prior to submitting their complaint and that their intent was not to allow depletion of the resource. Rather, they were attempting to protect their large financial investments in a manner that would not cause a major decline in the resource. They also are requesting the Board to extend the pot limit ban indefinitely and to end exclusive registration areas. Their position paper is attached as Appendix I.

After hearing the ADF&G explanation for boundary area changes, NPFVOA supported all the boundary proposals. The proposal to ban bottom trawling is not clear and was explained by Marty Eaton. He stated that this proposal would close only specific areas, mostly shallower than 50 fathoms. He will provide charts and coordinates for the industry to review prior to the Board/Council joint meeting.

Bart Eaton, vessel owner/fisherman, Seattle, discussed quota management and the 3-S (sex, size, and season) management approach, bait-up and pot storage. He opposed the 3-S and supported bait-up and local pot storage. He felt that the fleet is now too well capitalized for 3-S management, although if it had been instituted earlier it may have prevented the over capitalization. Mr. Eaton felt that management measures which reduce fishermen's perceived needs to race against each other would reduce the likelihood of them making dangerous decisions. For example, he stated that in the St. Matthew/Bering Sea areas there were no nearby pot storage areas and no bait up period, and vessels were lost in both areas. In the Pribilof area where pots could be stored in areas of less than 25 fathoms and a bait up period was allowed, no vessels were lost. Another method of reducing this competition would be to open all areas simultaneously.

Mr. Eaton also related an experience of miscommunication within ADF&G regarding the Bering Sea opening which lead him to sit and wait three days. He hoped that in the future there would be better communication within the Department on such matters.

He also expressed his feelings about by-catch, and stated that all catch, whether incidental or directed, should be included in the harvest, and that allocation to the various fisheries is a socioeconomic question.

Terry Buholm, fisherman, Seattle, discussed the need for a bait up period and convenient pot storage, primarily for safety reasons but also to reduce fuel costs. He also supported the proposal to provide extra fishing time to individuals who provide emergency help to other vessels, stressing the economic disincentive that exists in the absence of some type of compensation.

CLOSED WATERS PROPOSAL

- 5 AAC xx.xxx. CLOSED WATERS. The following area are closed to all hard-on-the-bottom trawl (including roller) gear from February 1 through June 1.
- a. All waters inside of a box from Cape Uyak at 57°38'20" N. lat., 154°20'50" W. long. to 58°52' N. lat., 152°40' W. long. to 58° N. lat. 151° W. long. to 57°15' N. lat., 152°15' W. long. to 57°20' N. lat., 152°30' W. long. to 57° N. lat., 153° W. long. to 56°50' N. lat., 152°35' W. long. to 56°10' N. lat., 153°30' W. long. to 56°10' N. lat., 154° W. long. to 55°30' N. lat., 155°30' W. long. to 56° N. lat., 156°30' W. long. to Cape Ikolik at 57°17'15" N. lat., 154°47'00" W. long.
 - b. All waters inside of a box from 58°30' N. lat., 151°10' W. long. to 58°30' N. lat., 150°30' W. long. to 58°10' N. lat., 150°30' W. long. to 58°10' N. lat., 151°10' W. long. to 58°30' N. lat., 151°10' W. long.
 - c. All waters inside a line from Cape Lutke on Unimak Island at 54°29'25" N. lat., 164°19'30" W. long. to the southern most tip of Deer Island at 54°49'45" N. lat., 162°18'50" W. long. to Kupreanof Point on the Alaska Peninsula at 55°33'55" N. lat., 159°35'55" W. long. to Seal Cape on the Alaska Peninsula 55°59'20" N. lat., 158°25'30" W. long. to Cape Kumlik at 56°38' N. lat., 157°27' W. long.
 - d. All waters in the southeastern Bering Sea encompassed by straight lines connecting the following points. Beginning at Cape Sarichef light at 54°36' N. lat., 164°55'42" W. long. to 55°16' N. lat., 166°10' W. long. to 56°20' N. lat., 163°00' W. long. to 57°10' N. lat., 163°00' W. long. to 58°10' N. lat., 160°00' W. long.
 - e. All waters in the Aleutian Islands south within a line drawn to connect the following coordinates at 53°14' N. lat., 172°00' W. long. to 52°13' N. lat., 176°00' W. long. to 52°00' N. lat., 178°30' W. long.
 - f. All waters in the Petrel Bank area on the north side of the Aleutian Islands between the following coordinates. Beginning at 52°51' N. lat., 178°30' W. long. to 51° N. lat., 178°30' W. long., 51°15' N. lat., 179°00' E. long., 52°51' N. lat., 179°00' E. long., 52° N. lat., 178°30' W. long.

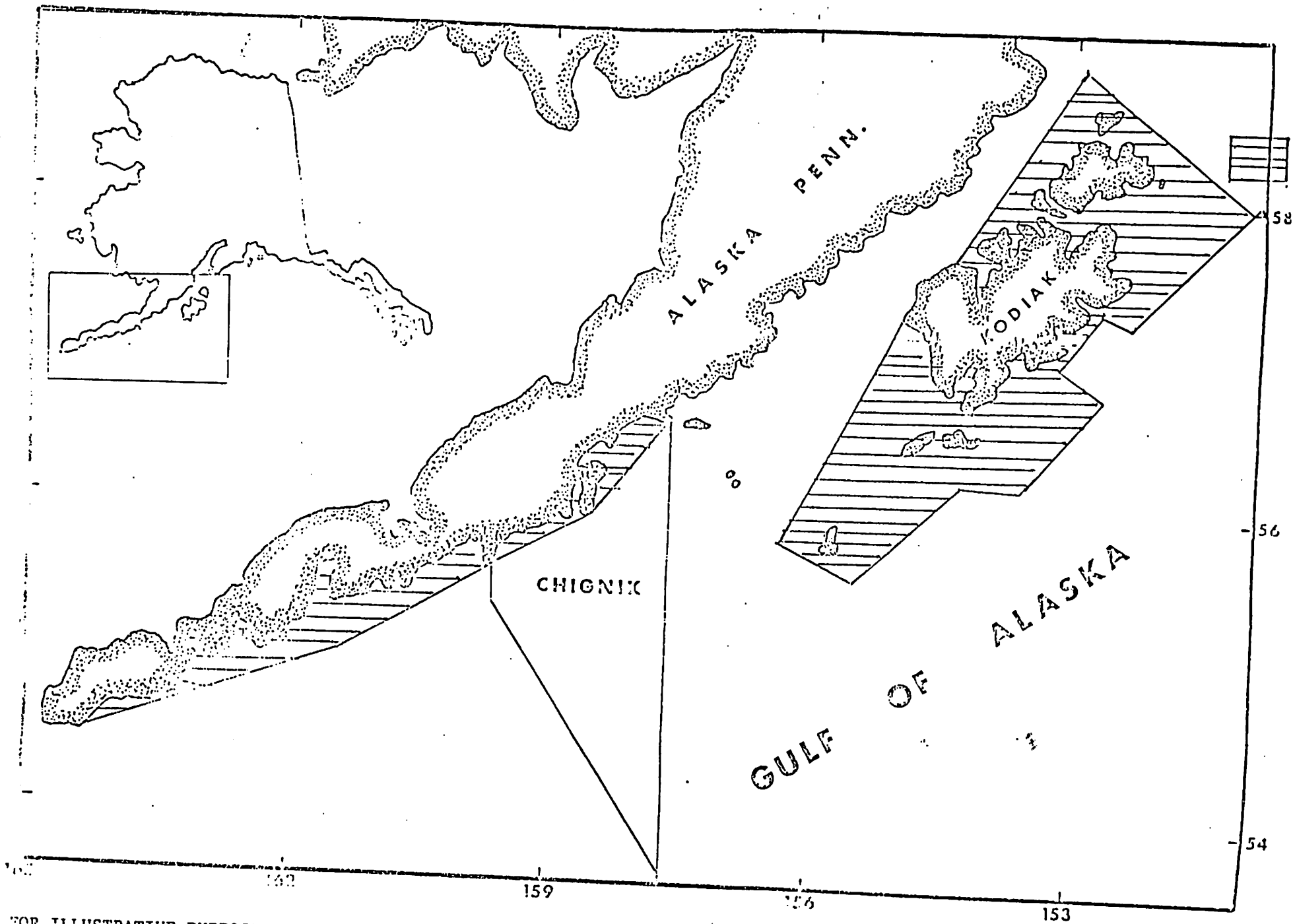
9. Akutan Bay: All waters inside Akun Head at $54^{\circ}18'30''$ N. lat., $165^{\circ}08'$ W. long. to North Head at $54^{\circ}14'$ N. lat., $165^{\circ}56'$ W. long.

Unalaska Bay: All waters inside Cape Cheerful at $54^{\circ}01'$ N. lat., $166^{\circ}41'00''$ W. long. to Cape Kalekta at $54^{\circ}00'30''$ N. lat., $166^{\circ}21'30''$ W. long.

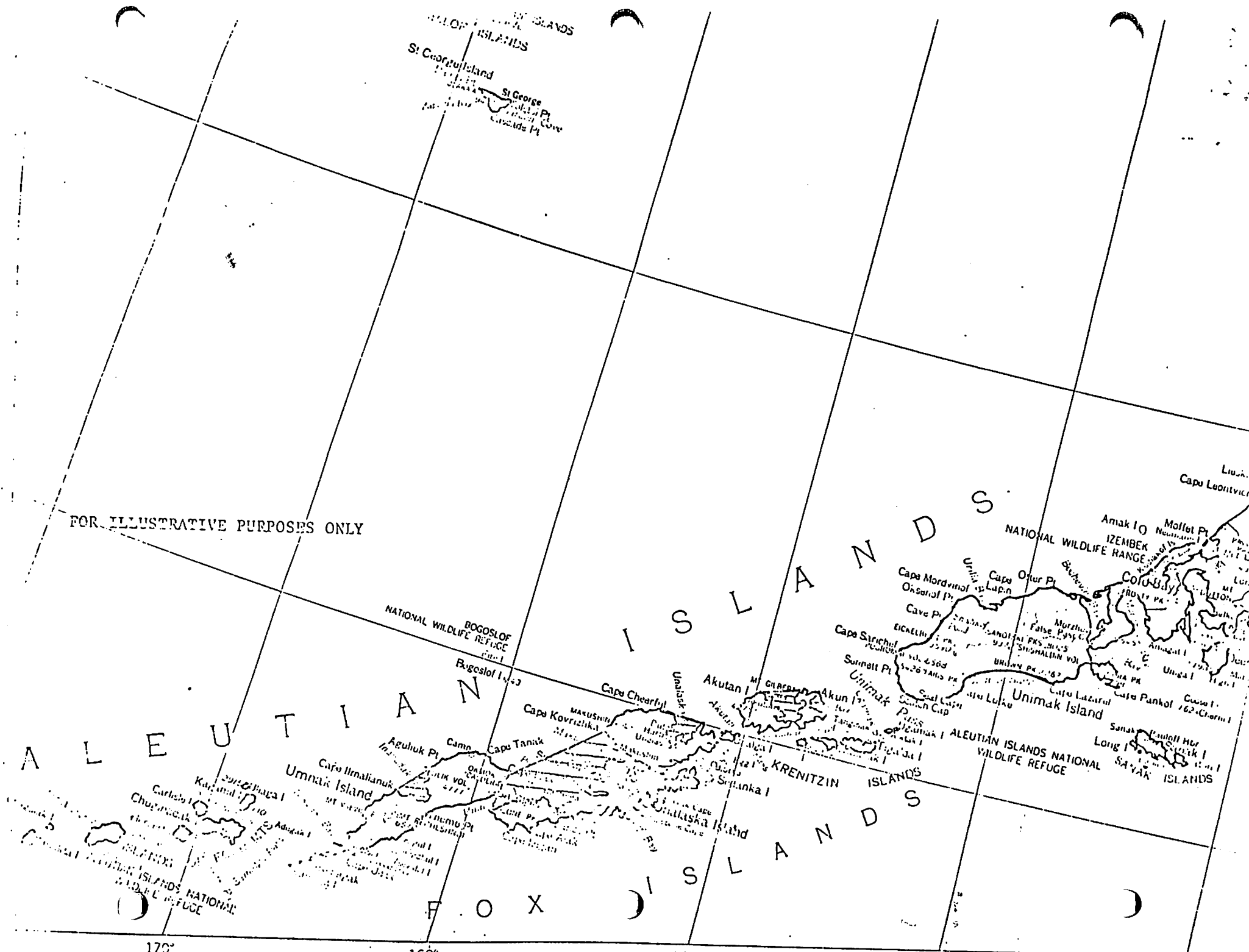
Makushin Bay: All waters inside Cape Kovrizhka at $53^{\circ}50'$ N. lat., $167^{\circ}09'30''$ W. long. to Cape Idak at $53^{\circ}31'30''$ N. lat., $167^{\circ}47'30''$ W. long. thence to Konets Head at $53^{\circ}19'30''$ N. lat., $167^{\circ}50'30''$ W. long.

Inanudak Bay: All waters inside Cape Aslik at $53^{\circ}25'$ N. lat., $168^{\circ}24'30''$ W. long. then to Cape Iimalianuk at $53^{\circ}17'$ N. lat., $168^{\circ}38'30''$ W. long.

Akun Bay: All waters inside Billings Head at $54^{\circ}17'30''$ N. lat., $165^{\circ}28'30''$ W. long. to a point on the opposite shore at $54^{\circ}13'$ N. lat., $165^{\circ}24'30''$ W. long.



FOR ILLUSTRATIVE PURPOSES ONLY



FOR ILLUSTRATIVE PURPOSES ONLY

BOGOSLOF ISLANDS

St. George Island
St. George Pt
Cape Adams Pt

ISLANDS

ALEUTIAN

BOGOSLOF NATIONAL WILDLIFE REFUGE
Bogoslof I.

IZEMBEK NATIONAL WILDLIFE RANGE
Amak I. Moffet Pt

Unimak Island
Cape Mordvinof
Cape Strichof
Sunnat Pt
Unimak I.

Unimak Island
Cape Lazareff
Cape Pankof
Cape Guro I.

Umnak Island
Cape Immanuk
Cape Tanuk
Cape Kovzevskii

AKUTAN I.
KRENITZIN ISLANDS
SITANKA I.
KALAKASKA Island

ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE
Long I.
SAVAK ISLANDS

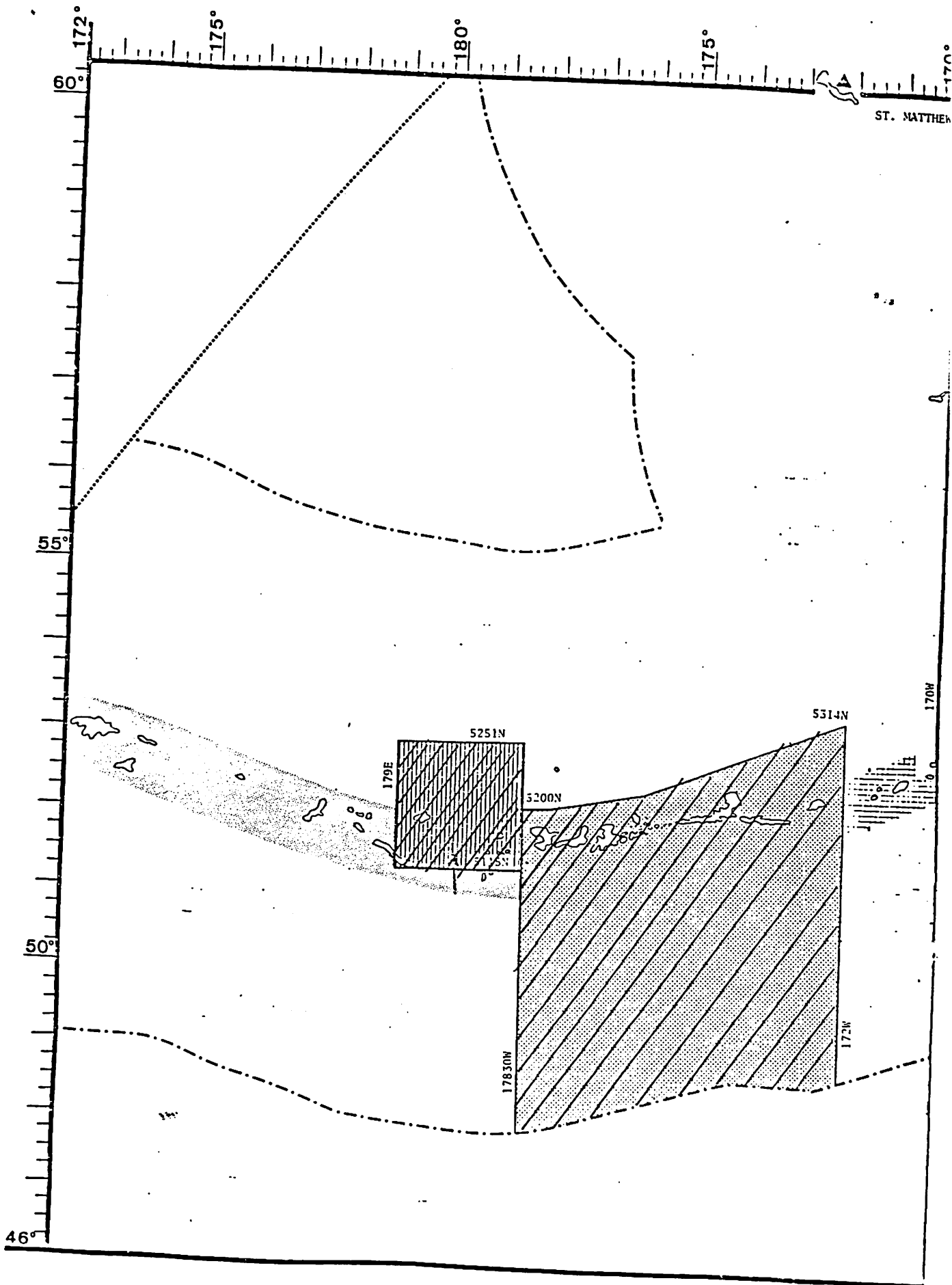
CHUGACHK ISLANDS NATIONAL WILDLIFE REFUGE
Chugachk I.

170°

168°

166°

FOX ISLANDS



FOR ILLUSTRATIVE PURPOSES ONLY

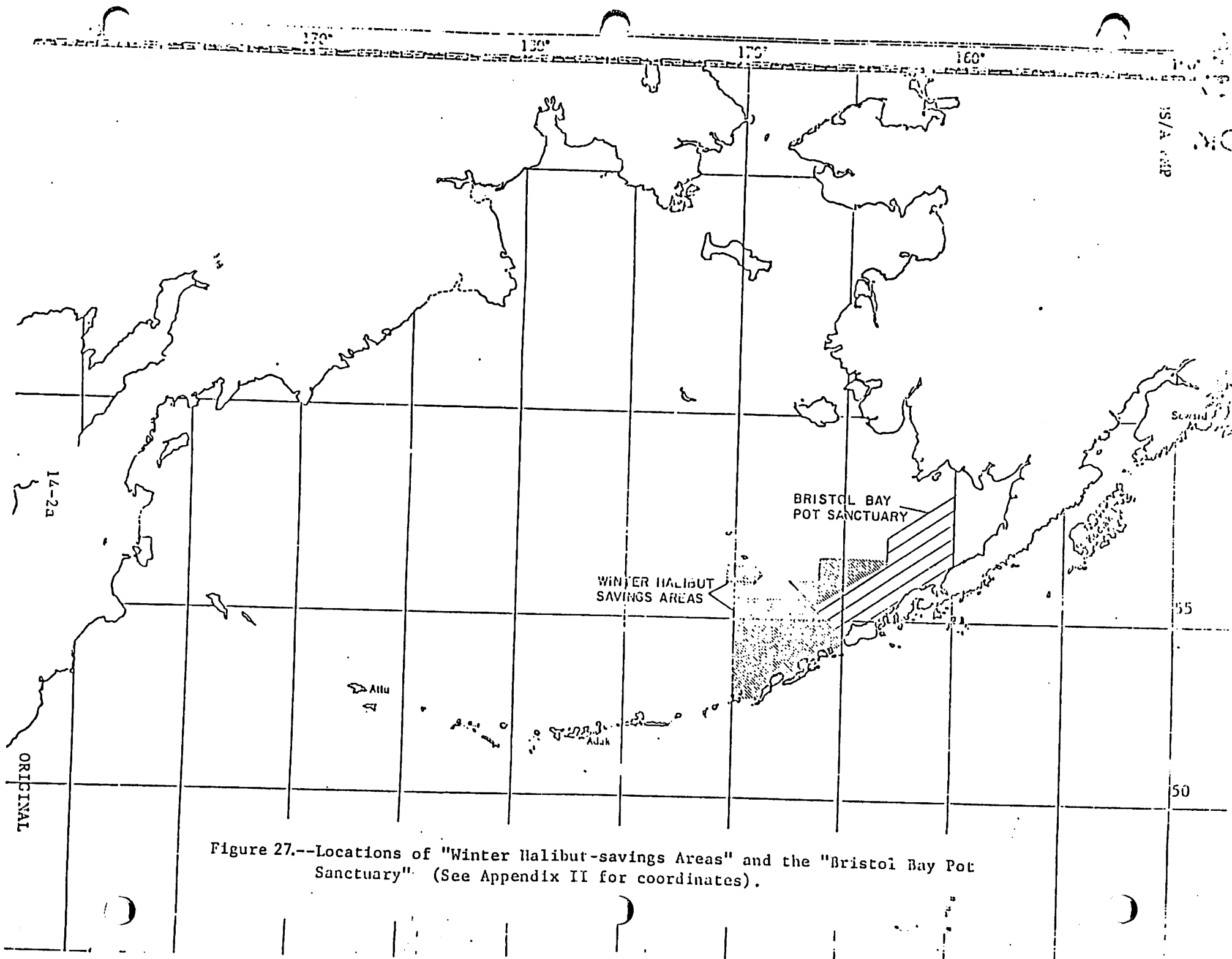


Figure 27.--Locations of "Winter Halibut-savings Areas" and the "Bristol Bay Pot Sanctuary". (See Appendix II for coordinates).

**Egg production and Bristol Bay
Red King Crab 1979-1983**

**Report to: North Pacific Fishery Management
Council and the Alaska Board
of Fisheries.**

**Anchorage, Alaska
March 26-30, 1984**

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

Severe declines in the abundance of Bristol Bay red king crabs have been accompanied by a drastic reduction in the reproductive potential of this stock. Part of the decline in reproductive potential has been due to abnormalities in breeding and part due to sheer declines in abundance. A review of the past five years data indicates that abundance of mature females has declined by at least 93% while egg production declined by 94% (Table 1). Current egg production is probably 10 to 20% of average production if 1980 and 1981 are regarded as representing the normal situation. Declining populations have also been accompanied by a decrease in the size of mature females (Fig. 1).

REFERENCES

- Otto, R. S., R. A. MacIntosh and W. S. Meyers, 1983. Current status of reproductive conditions in Bristol Bay red king crab. Report to: North Pacific Fishery Management Council and the Alaska Board of Fisheries. Anchorage, Alaska, March 29-30, 1983. National Marine Fisheries Service, Kodiak Facility, P.O. Box 1638 Kodiak, AK. 14 p. (mimeo)
- Hayes, E. B. 1968. Relation of fecundity and egg length to carapace length in the king crab, Paralithodes camtschatica. Proc. Natl. Shellfish Assoc. 58: 60-62.

Table 1 -- Estimated egg production and abundance of mature female red king crab in Bristol Bay (Area T)

<u>Year</u>	<u>Eggs (Trillions)^{1/}</u>		<u>Millions of Females >89 mm ^{2/}</u>
	<u>Survey</u>	<u>Adjusted</u>	
1974	12.3	-	110.9
1980	3.2	5.9	67.6
1981	6.5	7.1	67.3
1982	2.5	2.9	54.8 ^{3/}
1983	0.7	-	9.7

1/ Computed by prorating clutch sizes by population estimates and applying Haynes' (1968) equation: $\text{eggs} = .247.4 + 3,319 (\text{carapace length})$. Adjusted values are computed for data after June 15 in years when the survey occurred during part of the mating period.

2/ 90 mm is the median size of maturity.

3/ Abnormal females that apparently failed to molt were observed during the summer and fall of 1982; they had apparently died by Feb. 1983 (Otto, et al., 1983)

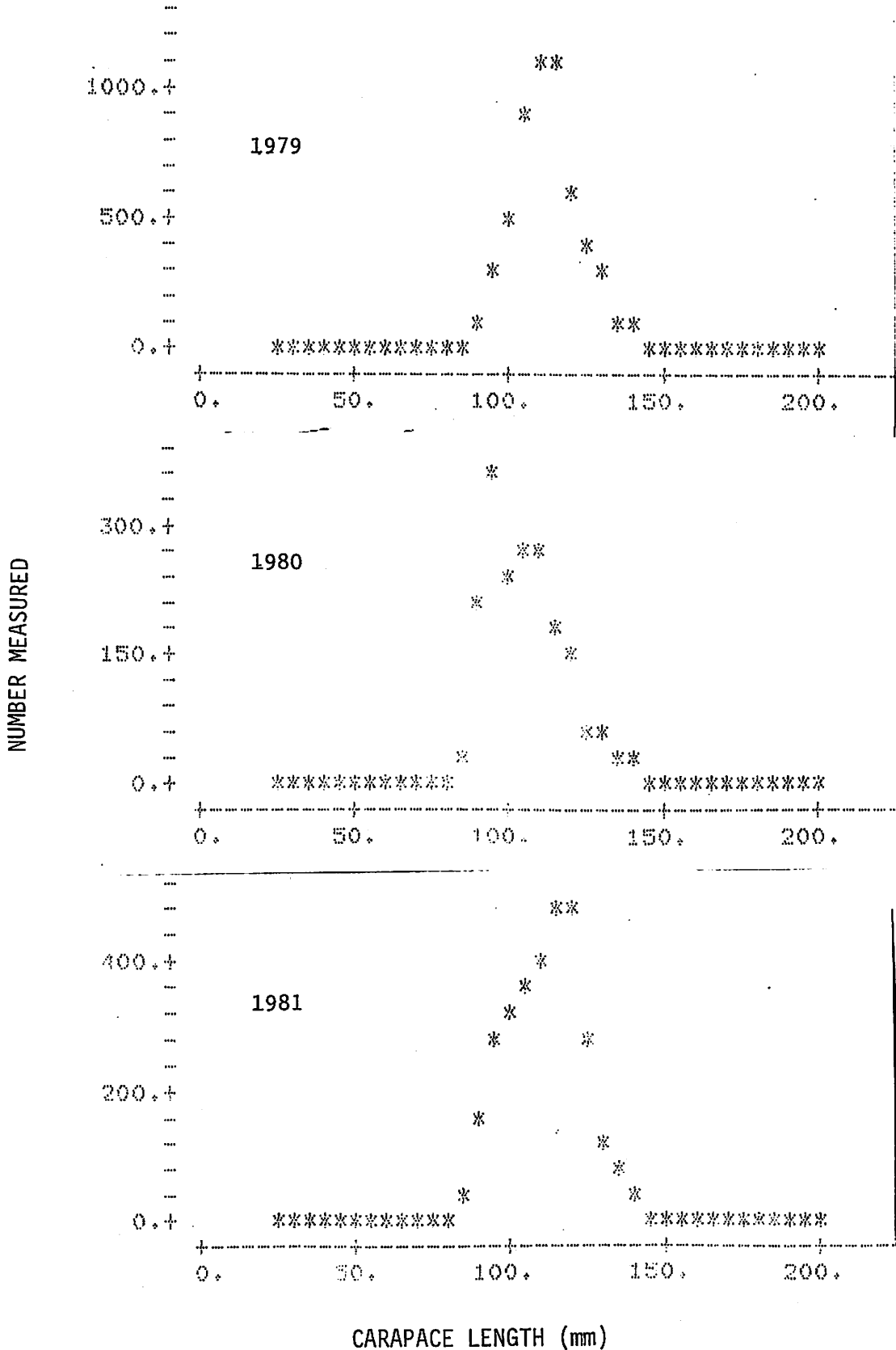
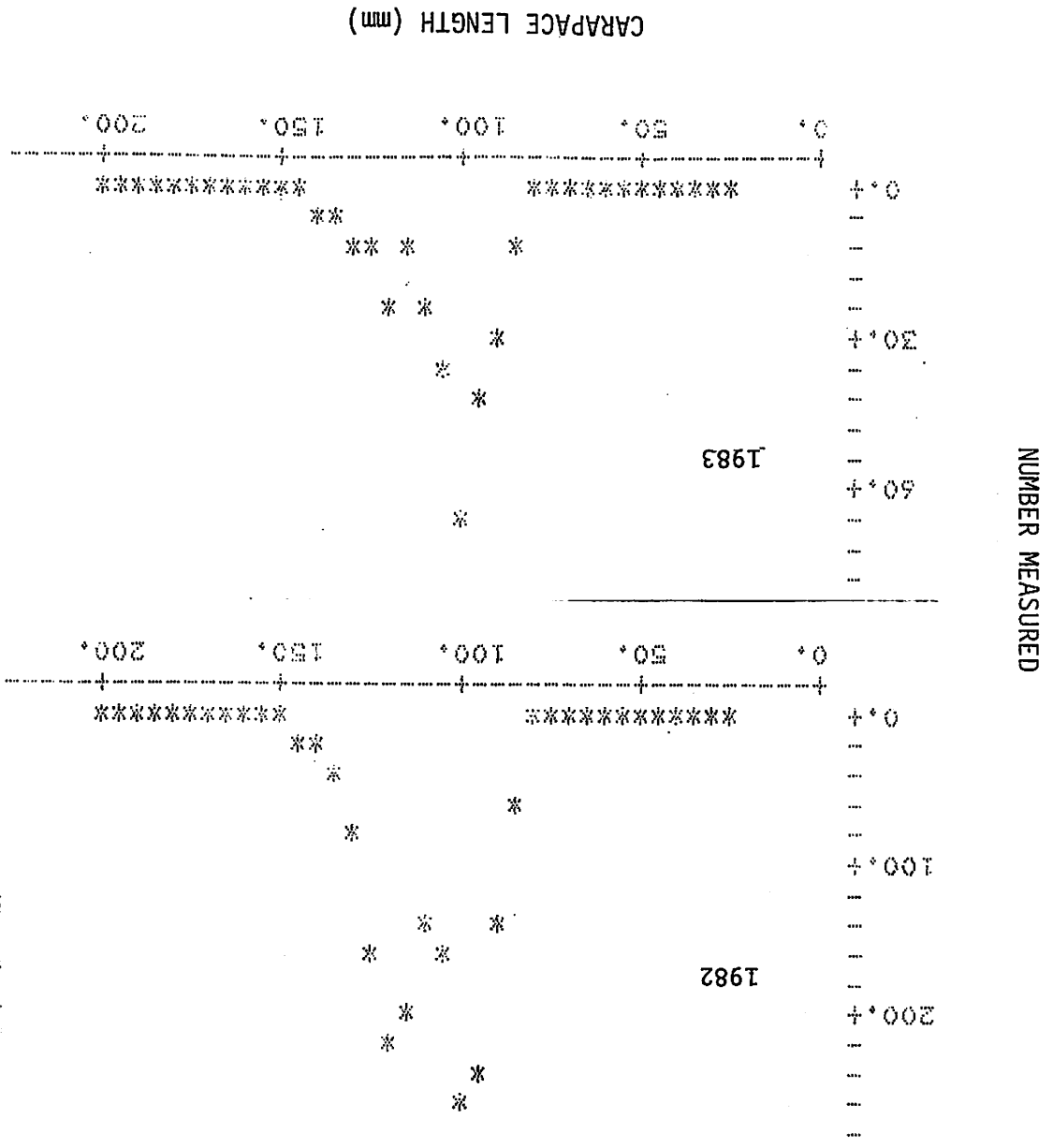


Figure 1. Size frequency distributions for mature female red king crab taken during NMFS surveys in Bristol Bay.

Figure 1. (continued)



A Summary of Data on the
Size at Maturity and Reproductive
Biology of Golden King Crab with
Proposed Size Limits.

Report to: North Pacific Fishery Management
Council and the Alaska Board
of Fisheries.

Anchorage, Alaska
March 26-30, 1984

Robert S. Otto
National Marine Fisheries Service
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SUMMARY

1) Biological observations and measurements of nearly 8,000 golden king crab were taken between February and November of 1983.

2) Legal sizes calculated from these data averaged 5.7 in. (mm) for combined Pribilof Canyon-Zhemchug Canyon data.

3) Legal sizes in the Eastern Aleutians averaged in. (mm).

4) Spawning and mating are not synchronous and occur over most of the year.

5) To the extent that molting and spawning are correlated in other king crabs, molting in golden king crabs probably occurs over most of the year.

6) Available data do not indicate any period of the year during which the fishing season should be closed for the purpose of protecting golden king crab during mating and molting.

INTRODUCTION

Golden king crab (*Lithodes aequispina*) are referred to as brown king in Alaska fisheries regulations. Fisheries for this species were minor or incidental to other king crab fisheries until recently. Declining abundance of red and blue king crab (*Paralithodes camtschatica* and *P. platypus*) stocks in almost all areas of the state, as well as high dockside prices, led to rapid development of directed fisheries over the past three fishing seasons. Landings from western Alaska reached 6.4 million pounds in the 1982-1983 season and had reached 10.3 million pounds (up 61%) as of February 18, 1984. The species made up 40% of western Alaskan king crab landings in the 1983-1984 season.

Until 1983, there had been little biological research on golden king crab because fisheries were minor and because the species occurs in deeper water than that usually covered by stock assessment surveys. In 1983, the National Marine Fisheries Service (NMFS) initiated specialized studies on golden king crab. Much of this work was accomplished through cooperative research with industry; either through charters or by placing biologists aboard commercial vessels at the skipper or owner's invitation. We are particularly grateful for the cooperation of the North Pacific Vessel Owner's Association, Mr. Dave Stanchfield (F/V Morningstar), Mr. Ed Compton (F/V Valiant), Mr. Scott Bowlden (F/V Valiant), and Mr. Joe Wabey (F/V American Eagle).

Collections of biological data extended from February through November and included data from the Zhemchug Canyon, the Pribilof

Canyon and the eastern Aleutians (Table 1). I have also drawn on data collected previously by Dr. Dave Somerton in the Northern Bering Sea and by Mr. Dave Clausen at the NMFS Auke Bay Laboratory in the Lynn Canal-Icy Straits area.

The purpose of this report is to summarize the 1983 data on golden king crab as they pertain to size limits and fishing seasons. Previously available data were summarized at last year's meeting (Otto 1983).

METHODS

The vast majority of crabs included in this study were taken in pots (Table 1). This causes some difficulty because pots are selective for larger crab and sample sizes for crab at or below the size at maturity were small. This problem was particularly acute for samples of males (Fig. 1) and consequently estimates of male size at maturity are preliminary.

The first priority in this research was to establish the size of maturity and the timing of spawning. Other biological observations included morphometric data, fecundity samples (whole clutches), ovarian samples, pathological samples (necropsy), incidence of parasitic barnacles (*Briarosaccus*) and observations on commensal snailfish eggs deposited in the branchial (gill) chamber.

MORPHOMETRIC DATA

These data were analyzed by regression techniques to determine relationships between length and width (with and without spines), length and merus length, and length and weight.

The relationship between length and chelaped (claw) height was used to characterize male size at maturity (see below).

Morphometric relationships showed little variation from area to area when adequate sample sizes were available (Table 2). Pooled data for all areas provide the following relationships where measurements are in mm and weight is in grams.

- 1) Carapace width without spines - $2.77 + 1.08$ (Carapace length)
- 2) Carapace width with spines - $0.50 + 1.13$ (Carapace length)
- 3) Merus length = $- 26.11 + 0.96$ (Carapace length)
- 4) log. (weight) = $- 7.90 + 3.10 \log_e$ (Carapace length)

These relationships allowed conversion of legal size to carapace length and weight. Conversions were necessary because biologists standardly use carapace length as a measure of size and measure carapace width without spines. Last year, I assumed that the difference between widths measured with and without spines was 5 mm, but present data indicate that it is about 8 mm and increases linearly with length (or width). The relationship between merus length and carapace width may be useful in measuring processed crab.

SIZE AT MATURITY

Size at maturity varied considerably between areas (Table 3). Female size at maturity was judged by determining the size at which 50% of the females were either carrying eggs or empty egg cases (Fig. 2). Male size at maturity was judged by fitting two straight lines to the data by the method of Somerton (1980). The intersection at the two lines is used as a measure of the size at maturity (Fig. 3). This method relies on the fact that the size

of the male's claw (chela) increases in proportion to carapace size at the maturity molt. Size at maturity for the northern district is 97 mm for females and 92 mm for males. The size maturity in the Northern District is hence similar to that of the Pribilof Canyon but considerably different from that of the Zhemchug Canyon. A preliminary estimate for the size at maturity in the Lynn Canal-Icy Straits area is 105 mm for females (Dave Clausen, Auke Bay Laboratory, personal communication), and is hence similar to the eastern Aleutians and the Zhemchug Canyon.

In all cases, the size at maturity for females is more precise than that for males. The mean size at maturity for males is larger than that of females in all areas (except the Northern District). Table 3 shows that 95% confidence intervals for males and females overlap in all three areas.

LEGAL SIZE

The current legal size (width with spines) is 5.5 in. (140 mm) in the Pribilof District (includes Pribilof Canyon and almost all of the Zhemchug Canyon), and 6.5 in. (165 mm) in the eastern Aleutians. These size limits were based on last year's report and the May cruise on the F/V American Eagle (cooperative with North Pacific Fishing Vessel Owner's Association) for the Pribilof and Northern Districts. The size limit in the eastern Aleutians was set equal to that for red king crab by default due to lack of data.

Calculations below are based on data contained in Tables 2 and 3. Equations for all areas combined are used for morphometric conversions. No growth information is available and

golden crab are assumed to grow at rates comparable to red king crab (15 mm per molt).

Pribilof District

Combining data for the Pribilof and Zhemchug Canyons results in sizes at maturity of 95 mm carapace length for females and 111 mm carapace length for males. Converting these to width with spines (for males) and assuming that size of maturity for males could be the same as that of females results in the following:

<u>Case</u>	<u>Width with spines + 2 molts growth</u>
Based on males:	125 + 30 = 155 mm = 6.1 in.
Based on Females:	107 + 30 = 137 mm = 5.4 in.
Average	116 + 30 = 146 mm = 5.7 in.

Accepting the average, there seems little point in changing the size limit by 0.2 inches. Calculated weights corresponding to the above are 2.2 kg. or 5.0 lbs. (based on males), 1.5 kg. or 4.1 lbs. (based on females) for an average of 1.9 kg. or 4.1 lbs.

Eastern Aleutians

Following the same procedure, we have carapace lengths at maturity of 118 mm for males and 106 for females. Converting to width with spines results in the following:

<u>Case</u>	<u>Width with spines + 2 molts growth</u>
Based on males	133 + 30 = 163 mm = 6.4 in.
Based on females	119 + 30 = 149 mm = 5.9 in.
Average	126 + 30 = 156 mm = 6.1 in.

Accepting the average, the size limit in the eastern Aleutians could be lowered to 6.0 in. Corresponding weights for the above are 2.6 kg. or 5.8 lbs. (based on males), 2.0 kg. or 4.4 lbs. (based on females) for an average of 2.3 kg. or 5.1 lbs.

Other Areas

There are no new data for the Northern District and hence no reason to change the 5.5 mm size limit. To the extent that samples from the Lynn Canal-Icy Straits area are similar to those from the eastern Aleutians, size limits should also be the same. Data are however, preliminary. There is insufficient data to calculate size at maturity for other areas of the state.

TIMING OF SPAWNING

Data given in last year's report indicated that spawning was synchronous but occurred starting in February in the Pribilof Canyon and Eastern Aleutians and later (June-July) in the Northern District.

Collections taken over the past year showed that spawning (and presumably molting) occurs over most of the year (at least February through November). Females with empty egg cases, new uneyed eggs, new eyed eggs (eye pigment visible, embryo not visible), and old eyed eggs (eye and well developed embryo), occurred in all but the February collection. These observations are corroborated by those of fishermen and biologists in all areas (except possibly the Northern District). Further, the size frequencies of females bearing eggs of various types do not show any clear trend when viewed from area to area over the year. It

is possible that spawning peaks from May through October but the peak is clearly not a sharp one.

Interpretation of the timing of spawning is complicated by the fact that there appears to be a fairly long lag period between hatching of eggs and subsequent mating or extrusion. Ovarian eggs collected from females that were bearing both hatching eggs and empty egg cases had a diameter ranging from 1.3 to 1.9 mm. External egg diameters are 2.2 to 2.4 mm for new (uneyed eggs). Assuming that eggs are roughly spherical and that they would have a diameter of 2.2 mm just prior to extrusion, ovarian eggs taken from females with hatching external eggs had 50-70% the volume of full term eggs. The spawning cycle of golden king crab hence remains unknown, but it seems probable that the period between matings exceeds one year.

Table 1 - Collections of golden king crab during 1983.

AREA ¹	TIMES	MALES	FEMALES	NOTES
Zhemchug Canyon ²	May, July	661	1594	<u>American Eagle</u> ³ , <u>Valiant</u>
Pribilof Canyon ²	February, May, July, October	1286	3178	<u>Miller Freeman</u> , <u>American Eagle</u> ² , <u>Valiant</u> , <u>Morningstar</u>
E. Aleutians	February, November	552	687	<u>Morningstar</u> , <u>Valiant</u>
TOTALS	February- November	2499	5459	

¹ Minor collections from other areas excluded.

² Biological measurements only; excludes 1490 males tagged during July for which only lengths and widths (without spines) were taken.

³ This cruise was a joint venture between the North Pacific Vessel Owner's Association and the NMFS.

Table 2 - Morphometric relationships for male golden king crab (lengths and widths are in mm, weight in grams).

AREAS	MEASURE	EQUATION	R ²
Zhemchug	Width:Length ¹	$W = -8.06 + 1.13L$	0.98
Pribilof	Width:Length	$W = -4.47 + 1.10L$	0.96
E. Aleutians	Width:Length	$W = -2.46 + 1.07L$	0.97
All	Width:Length	$W = -2.78 + 1.09L$	0.97
Zhemchug	Weight:Length	$\log_e W = -8.24 + 3.17 \log_e L$	0.96
Pribilof	Weight:Length	$\log_e W = -8.25 + 3.17 \log_e L$	0.96
E. Aleutians	Weight:Length	$\log_e W = -8.57 + 3.22 \log_e L$	0.88
All	Weight:Length	$\log_e W = -7.90 + 3.10 \log_e L$	0.96
All ²	Merus:Length	$M = -26.11 + 0.96L$	0.90
All ³	Width:Length	$W = 0.50 + 1.13L$	0.97

¹ Width without spines.

² Insufficient data for individual areas.

³ Width with spines.

Table 3 - Calculated size at maturity for golden king crab
(carapace length in mm).

AREA	MALES	FEMALES
	MEAN \pm 2 STD. ERR	MEAN \pm 2 STD. ERR
Zhemchug	112.1 \pm 13.4	107.2 \pm 0.34
Pribilof	110.0 \pm 18.4	92.4 \pm 2.8
East Aleutians	117.5 \pm 12.0	106.1 \pm 1.2

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Otto, R.S. 1983. A summary of NMFS data on golden king crab with proposed size limits and fishing seasons. Report to: North Pacific Fishery Management Council and the Alaska Board of Fisheries, Anchorage, Alaska, March 24-30, 1983. National Marine Fisheries Service, Kodiak Facility, P.O. Box 1638, Kodiak, AK 99615. 10 pp.

Somerton, D.A. 1980. A computer technique for estimating the size of sexual maturity in crabs. Can. J. Fish. Aquat. Sci. 37:1488-1494.

Figure 1a. Size frequency of male and female golden king crab from Zhenchug Canyon collected in May-July, 1983.

WIDTH OF INTERVAL	NUMBER OF OBSERVATIONS		MALE
70	2	*	
80	26	***	
90	150	*****	
100	338	*****	
110	264	*****	
120	194	*****	
130	260	*****	
140	331	*****	
150	158	*****	
160	23	***	
170	1	*	

WIDTH OF INTERVAL	NUMBER OF OBSERVATIONS		FEMALE
70.0	2	*	
80.0	50	*****	
90.0	238	*****	
100.0	386	*****	
110.0	466	*****	
120.0	279	*****	
130.0	117	*****	
140.0	49	*****	
150.0	7	*	

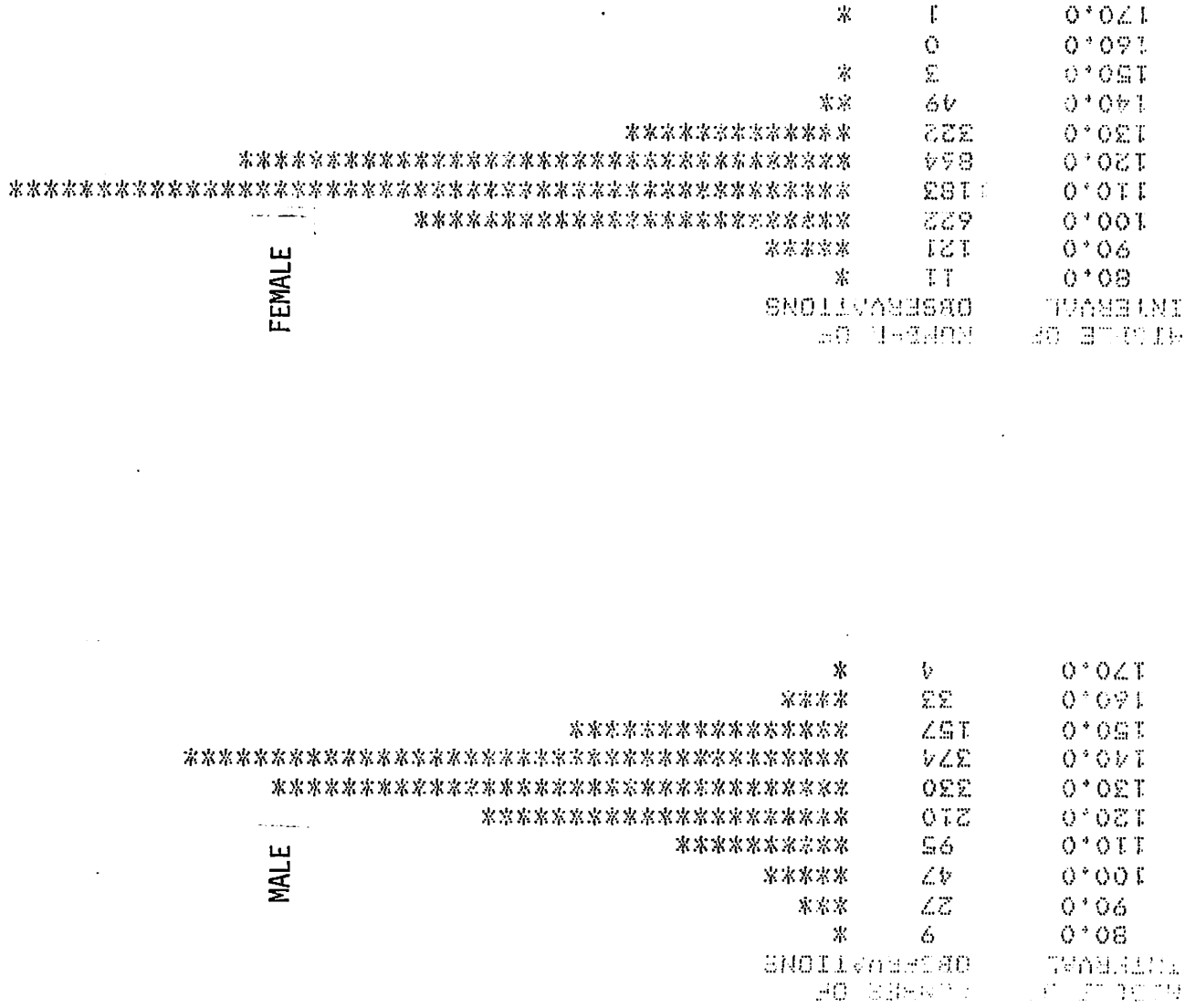


Figure 1b. Size frequency of male and female golden king crab from Pribilof Canyon collected in May-October, 1983.

Figure 1c. Size frequency of male and female golden king crab from the eastern Aleutians collected in February, 1983.

WIDTH OF INTERVAL	NUMBER OF OBSERVATIONS		
80.0	6	***	
90.0	10	*****	
100.0	32	*****	MALE
110.0	31	*****	
120.0	29	*****	
130.0	35	*****	
140.0	98	*****	
150.0	57	*****	
160.0	39	*****	
170.0	41	*****	
180.0	19	*****	
190.0	4	**	
200.0	1	*	
210.0	1	*	

WIDTH OF INTERVAL	NUMBER OF OBSERVATIONS		
80.0	2	*	
90.0	4	*	
100.0	10	**	FEMALE
110.0	69	*****	
120.0	91	*****	
130.0	171	*****	
140.0	189	*****	
150.0	27	*****	
160.0	1	*	

Figure 2a. Mean size at maturity of Zhemchug Canyon female golden King crab caught in May-July, 1983.

SIZE		% NATURE	MATURE FEMALE CRAB FOOD OR 100 DAYS									
			10	20	30	40	50	60	70	80	90	100
20-24	0.0000	I*										
25-29	0.0000	I*										
30-34	0.0000	I*										
35-39	0.0000	I*										
40-44	0.0000	I*										
45-49	0.0000	I*										
50-54	0.0000	I*										
55-59	0.0000	I*										
60-64	0.0000	I*										
65-69	0.0000	I*										
70-74	0.0000	I*										
75-79	0.0000	I*										
80-84	0.0000	I*										
85-89	0.0217	I**										
90-94	0.0137	I*										
95-99	0.0387	I**										
100-104	0.2439	I*****										
105-109	0.5660	I*****										
110-114	0.8052	I*****										
115-119	0.8929	I*****										
120-124	0.9820	I*****										
125-129	1.0000	I*****										
130-134	0.9836	I*****										
135-139	0.9714	I*****										
140-144	1.0000	I*****										
145-149	1.0000	I*****										
150-154	0.0000	I*										
155-159	0.0000	I*										
160-164	0.0000	I*										
165-169	0.0000	I*										
170-174	0.0000	I*										
175-179	0.0000	I*										
180-184	0.0000	I*										
185-189	0.0000	I*										
190-194	0.0000	I*										
195-199	0.0000	I*										

Mean size at maturity
107 mm

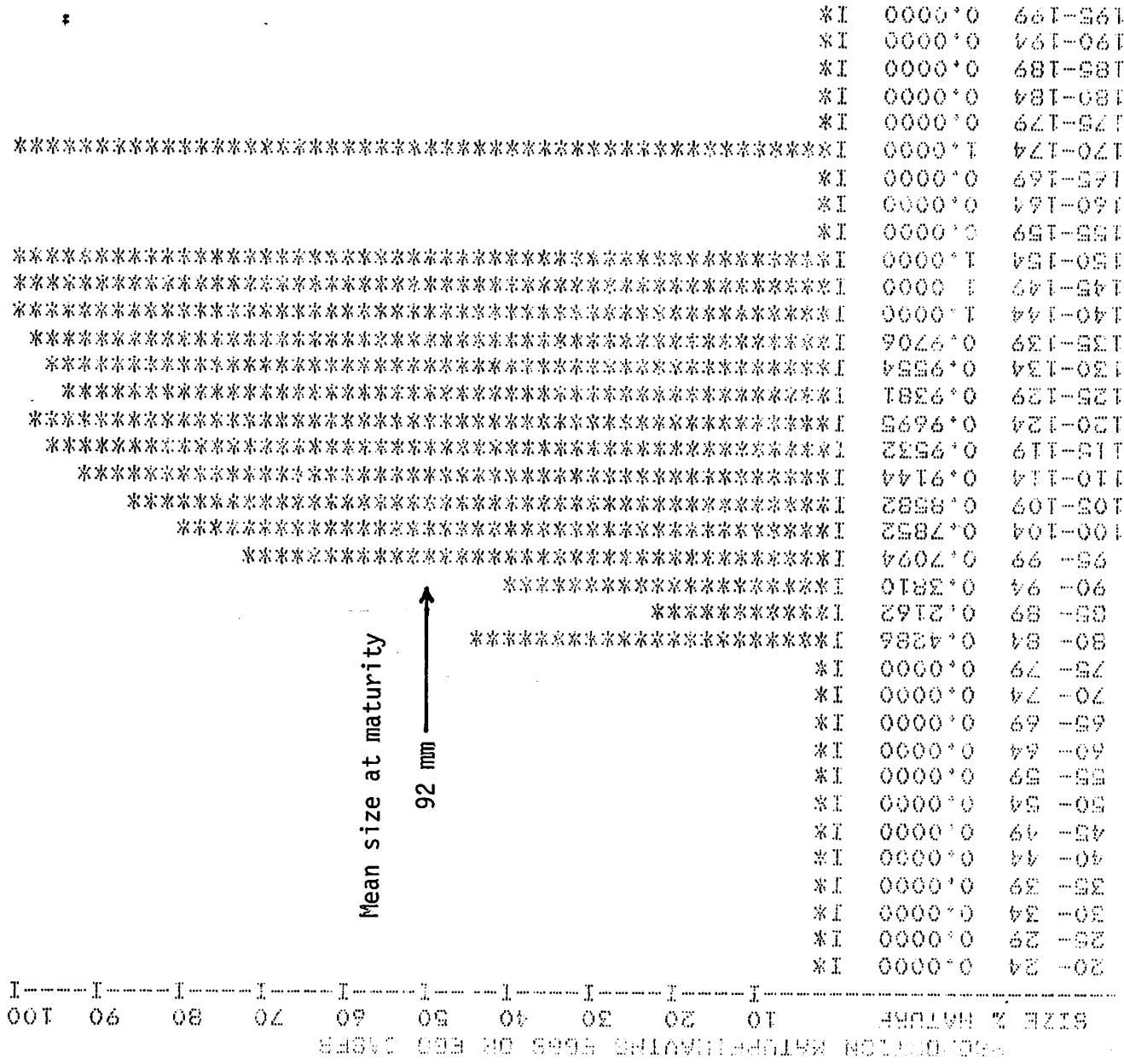


Figure 2b. Mean size at maturity of Pribilof Canyon female golden king crab caught in May-October, 1983.

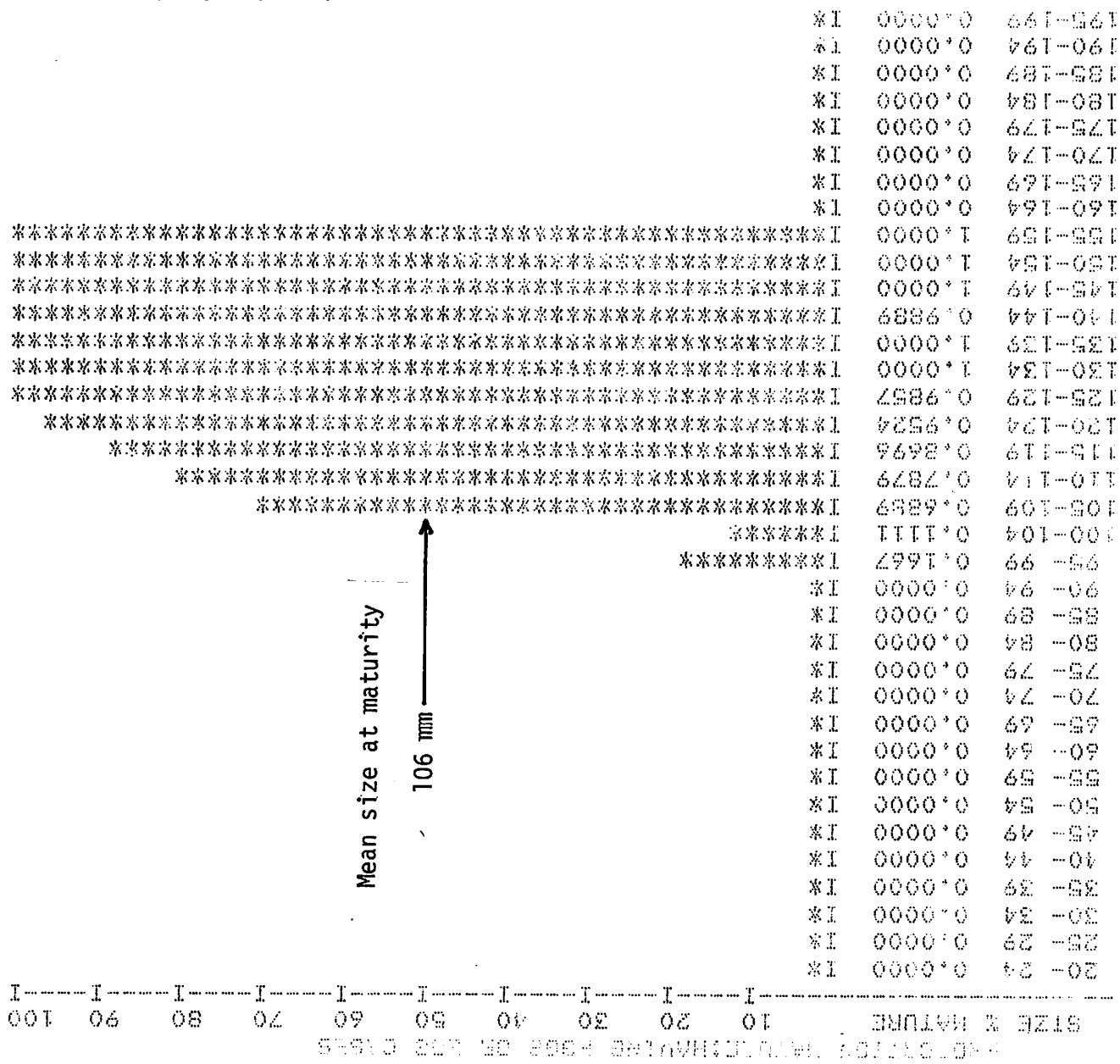


Figure 2c. Mean size at maturity of eastern Aleutian female golden king crab caught in February and November, 1983.

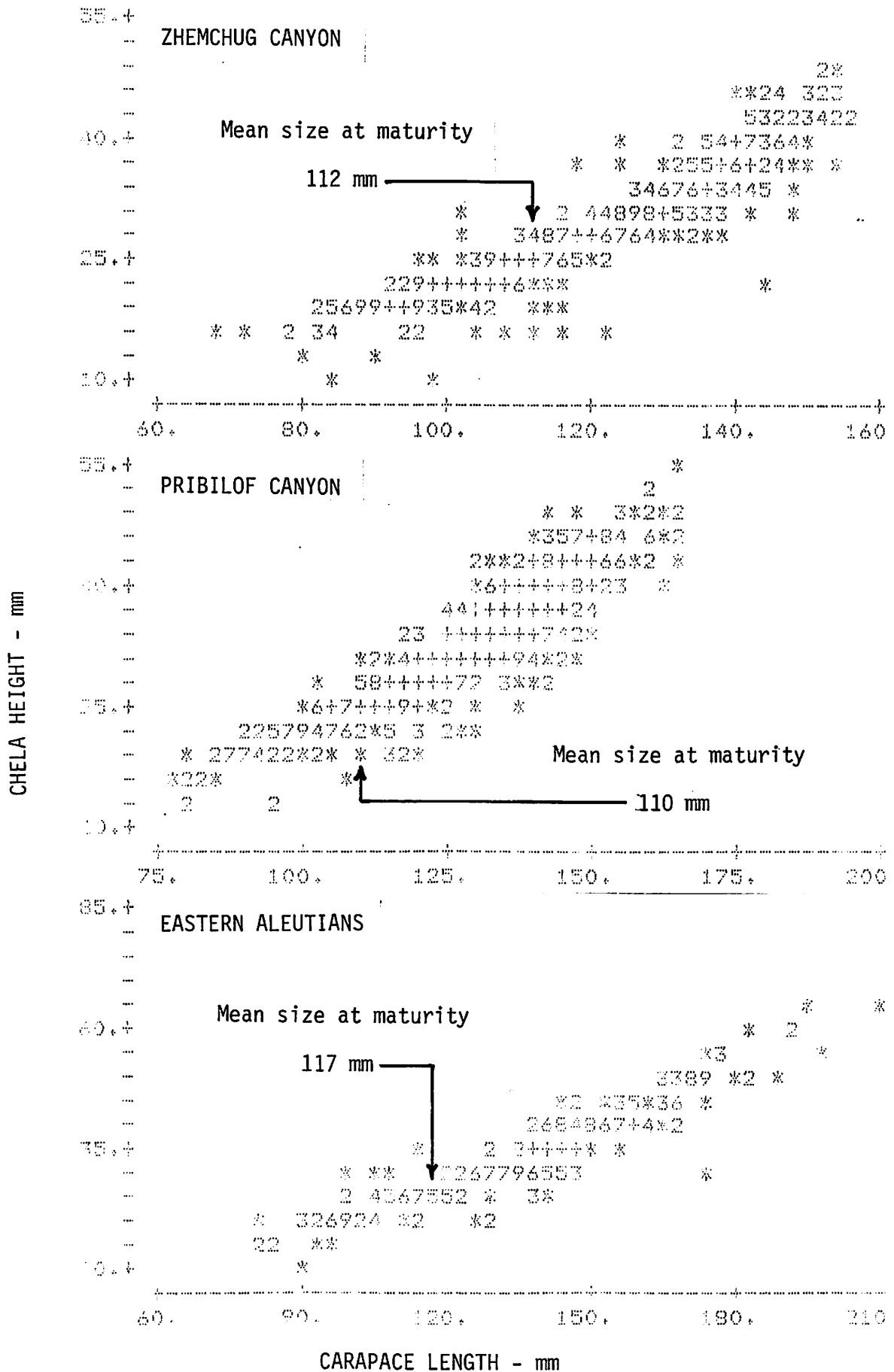


Figure 3. Mean size at maturity as determined by chela allometry for male golden king crab from the Zhemchug Canyon, Pribilof Canyon, and eastern Aleutian areas.

King Crab Research Summary

by Steve Davis

During the late 1970s, Alaskan king crab fisheries produced record harvests. In 1980, Alaska harvests totaled 186 million pounds of king crab with 130 million pounds being harvested from Bristol Bay. Since 1980, king crab harvests have experienced a dramatic decline. In 1982, Bristol Bay produced only 3 million pounds of king crab and in 1983, the area was closed to fishing because the level of sexually mature crabs was the lowest on record.

Why has the king crab population declined so dramatically? Is the decline due to a normal fluctuation in population size? What contributed to the decline? Will the king crab resource recover? These questions have been asked since 1981 and remain unanswered due to a general lack of scientific information on king crab. However, shellfish biologists familiar with Alaskan king crab have identified nine possible causes of the decline. They are (not necessarily in order of possibility): (1) disease; (2) predation by cod and halibut; (3) mortality from derelict commercial fishing gear of all types; (4) loss of king crab to trawls and Tanner crab pots; (5) loss of reproductive potential; (6) ecological and environmental factors; (7) commercial fishing activity; (8) tagging mortality; and (9) while not a cause of significant mortality, survey techniques could be improved for greater accuracy.

There are several ongoing stock assessment and research programs being conducted on Alaskan king crab. The programs are being run by state, federal and academic organizations. There is no coordinating body monitoring these programs and identifying new areas for investigation. Proposals for additional research projects have been submitted to funding agencies. Still, there are areas of king crab research that have been identified that will probably receive no funding. The following is a brief review of ongoing and proposed research and suggestions for possible future investigations. This summary is being provided for your general information.

Stock-Assessment Surveys

NWAFC - Summer Trawl Survey in the Bering Sea/Aleutians; provides information pertaining to population size, size frequency, sex ratio and overall condition of king and Tanner crabs. Also supplies data on other fish species including possible crab predators.

ADF&G - Summer Pot Survey in the Dutch Harbor, Kodiak, Cook Inlet, Chignik and South Peninsula areas; provides information on relative abundance of localized crab stocks based on CPUE. During the survey, the general condition of egg clutches is noted.

On-going Research

NWAFC (Seattle) - Dr. Al Sparks is conducting an intensive pathological investigation into the fecundity problem with king crab. Specifically he is examining Bering Sea red king crab for a possible viral disease and a microsporidian (Family Protozoa) where he has already found some evidence. He believes that both diseases could be strong factors contributing to the king crab decline. In king crab where such diseases have been found, the crab have been sterile.

University of California (Bodega Bay Lab) - Dr. Dan Wickham is currently working with ADF&G in Kodiak investigating the apparent outbreak of worm infestation in egg clutches. It has been identified as a Nemertine worm, similar to one found off California in Dungeness crab eggs. This worm is thought to be an egg predator and has become very abundant in Cook Inlet and some Kodiak crab stocks.

A proposal is currently being prepared by University of Alaska - Sea Grant to expand this investigation here in Alaska.

NWAFC (Auke Bay) - Dave Clauson is studying brown king crab biology on a part-time basis.

IPHC - The halibut commission is continuing its study of crab pot inserts, designed to reduce the incidental take of halibut in crab pots.

Proposed Research

University of Alaska

- Size at maturity study for Pribilof blue king crab. Proposal submitted to U.A. Sea Grant; scheduled to start in 1985, will probably take several years to complete.
- Effect of low male abundance to king crab molting, mating and egg extrusion. Proposal submitted to the U.A. Sea Grant; scheduled to begin in 1985.

*ADF&G

- Identification and evaluation of fishery conflicts; evaluate the incidental catch of king crab, Tanner crab and other prohibited species in trawl fisheries and non-target pot fisheries.
- Adak king crab stock assessment; assess Adak red king crab stocks, determine optimum harvest levels and forecast future abundance.
- Norton Sound king crab studies; provide in-season monitoring of the summer commercial fishery and investigate migrational patterns of stock and impact on winter subsistence fisheries.

- Population assessment equipment for shellfish, groundfish and herring; provide two new state-of-the-art tag recovery devices for non-visible king and Tanner crabs in order to improve the estimation of commercial fishery exploitation rates associated with the problem of non-reporting of visible tags.
- Northeastern Bering Sea king crab research; provide essential population assessment information on blue king crab stocks in the St. Matthew and Pribilof Island regions.
- Assessment feasibility of Aleutian brown king crab stocks; determine the feasibility of assessing deep water brown crab stocks using conventional pot indexing methods developed for red king crab.

Additional Ideas for Future Crab Research (developed by King Crab PDT)

- Monitor Foreign Incidental Catch of Crabs More Precisely
 - a. 100% observer coverage
 - b. More detail on crab size and condition
 - c. Program paid for by industry or state
- Develop Disease Study Capability
 - a. Fund or support (State) Grischkowsky, Sparks (NMFS) or both
 - b. Possible new state pathologist positions
 - c. Collect tissue or live crab samples for other investigators to use
 - d. Fund nemertean egg predator studies
- Determine Major King Crab Predators, Particularly Predation on Crabs 3 Years and Older
 - a. Study feeding habits of cod at key times in key areas
 - b. Study predation on juvenile and larval crab
 - c. Determine other major predators (Sculpins, yellowfin sole, etc.)
- Study Reproductive Condition of Females
 - a. Progressive egg loss evaluation through multiple surveys
 - b. Determination of cause through sample analysis
 - c. Support existing and promote new studies in nemertean egg predation
- Improve Crab Assessment Surveys
 - a. Increase funding so surveys can be conducted for all major stocks
 - b. Charter funds for re-examination of key problem areas
 - c. Develop position on whether surveys can be reduced during low abundance periods

*Note: The above ADF&G proposals have been submitted for inclusion in the 1984 fiscal year budget request. The research programs total over one million dollars and have been submitted as part of ADF&G's budget request the last two years. They have not been funded.

- Handling and Gear Mortality
 - a. Evaluate pot and trawl on-bottom mortality
 - b. Evaluate pot and trawl off-bottom mortality
- Study on Rehabilitation of Crab Stocks
 - a. Investigate hatcheries or aquaculture systems (of immediate importance regarding future planning of facilities for Kodiak Technological Center)
 - b. Reintroduce crabs into depleted areas (requires disease-free crabs)
- Improve Recovery of Unreported Tagged King Crab
 - a. Public education
 - b. Improve reward system
 - c. Improve recovery effort
 - d. Perform quantitative in-season evaluation of recovery program success
- Development of Non-visible Permanent Crab Tag
 - a. Macro or micro-wire tag and coding development
 - b. detecting equipment funds
- Research Facilities and Equipment Upgrades
 - a. Marine lab facility - ADF&G or Kodiak Technological Center
 - b. Underwater video, 2-person submersible, diving gear, aquariums and/or holding pens for field or laboratory
- Reduce Predation Through Increased Groundfish Utilization
 - a. promote marketing
 - b. Support for Alaska Seafood Marketing Institute
 - c. Impose few restrictions on groundfish fishery
- Examine Correlation of Environmental Parameters With King Crab Recruitment
 - a. Effects of environmental change on early life history and larval survival
 - b. Effects of temperature on reproduction

Other

- International King Crab Symposium; to be held during January 1985; will draw together worldwide experience concerning the research and management of king crab. To be jointly funded by NPFMC, ADF&G and U.A. Sea Grant.
- Dr. Jerry Reeves (NWAFC) plans to prepare a report outlining all the various hypotheses for the king crab decline and summarizing what is currently known about king crab biology. He hopes to be able to weigh the many possible causes, based on our scientific knowledge, and list them in order of likelihood. For example, in 1982 the hypotheses that handling mortality was a primary factor was put forward because of the large number of pots being lifted in recent years. In the 1982 trawl survey, there appeared a larger number of juvenile crabs about 3-4 years away from the fishery. Following a shortened Bering Sea king crab fishery which resulted in a reduction in pot lifts from 500,000 to 150,000, the 1983 survey showed that this age-group of crab suffered heavy mortality between 1982-83. It appears that something besides handling mortality is affecting the crab stocks.

Important Synonyms

- NWAFCC - Northwest and Alaska Fisheries Center
- ADF&G - Alaska Department of Fish and Game
- U.A. - University of Alaska
- IPHC - International Pacific Halibut Commission
- NPFMC - North Pacific Fishery Management Council