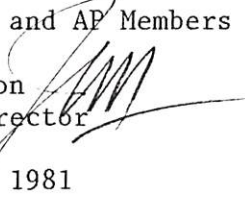


M E M O R A N D U M

TO: Council, SSC and AP Members

FROM: Jim H. Branson
Executive Director 

DATE: November 23, 1981

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

ACTION REQUIRED

Council and Board discussion on and scheduling of a joint Council/Board public hearing in Seattle prior to the March meeting.

Recommendations on cover letter

BACKGROUND

As outlined in the Joint Statement of Principles and the BS/AI King Crab FMP adopted by the Council and the Board last September, both bodies have agreed to host one joint public hearing in Seattle, in order to provide all interested persons and agencies the opportunity to comment on the management of the fishery. The Council and Board may want to discuss the scheduling of the hearing at this meeting.

Status of King Crab Package

A package of documents consisting of the BS/AI King Crab FMP, DEIS and RIR were submitted to NMFS for a regional review on October 9. In addition to reviewing the documents, the Regional Office is preparing all cover documents, pre-ambles, etc. necessary for Secretarial review. The package was returned to the Council office on November 23. After incorporating the suggested revisions to all three documents, the package will be forwarded to Washington to begin NEPA and Secretarial review. A cover letter to the package prepared by the Executive Director, is enclosed for your information. (Item E-3(a)). As earlier suggested by the Council, due to the innovative management concepts being presented in these documents, it may be advantageous to conduct a "walk-through" of the plan with the Central office review staff. The Council may wish to discuss this meeting and who should be involved.

Summary of the 1981 King Crab Fishery

Most of the 1981 BS/AI king crab fishery is now complete, and it is apparent that this year's catches upheld the earlier harvest forecasts by NMFS and ADF&G. Segments of the fishery (Dutch Harbor, Adak, Bristol Bay's 7" season) are still in progress. A summary of the king crab fishery to date is provided for your information (Item E-3(b)).

North Pacific Fishery Management Council

Clement V. Tillion, Chairman
Jim H. Branson, Executive Director

Mailing Address: P.O. Box 3136DT
Anchorage, Alaska 99510

Suite 32, 333 West 4th Avenue
Post Office Mall Building



Telephone: (907) 274-4563
FTS 271-4064

November 16, 1981

Mr. William G. Gordon
Assistant Administrator for Fisheries
National Marine Fisheries Service
3300 Whitehaven Street, Page Bldg. 2
Washington, D.C. 20235

Dear Bill:

Attached is the Bering Sea/Aleutian Island King Crab Fishery Management Plan (FMP) which was adopted by the Council and is being sent to you to begin Secretarial review. With the FMP is the Draft Environmental Impact Statement (DEIS) and Regulatory Impact Review (RIR) as required by the National Environmental Impact Protection Act and Executive Order 12291. These documents culminate 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 successful management of king crab by the State of Alaska.

During the preparation of this FMP two new managerial concepts have evolved. This is a framework plan. The FMP's the Council has developed since the enactment of the MFCMA have not responded to changes in the fishery in a timely manner and amendments have been expensive in both time and money. Existing FMP's contain management measures which are too specific and are mirrored in the implementing fisheries regulations. To modify a regulation requires both a plan and a regulation amendment; a long and arduous task at best. This is a burdensome procedure which contributes little to effective management.

In an attempt to solve this problem and minimize the cost of management, the Council originally proposed to allow continued management of the resource by the State of Alaska (Alaska Board of Fisheries) but with Council participation through joint meetings, public hearings and Council review of State regulatory actions. Documents were prepared which outlined the procedures both organizations would use and provided a basis for any management actions. The management objectives and measures in those documents were designed to be consistent with the national standards, with the laws of the State of Alaska, and did not discriminate between users of the resource.

However, following public review of this management proposal it was clear that it was not acceptable to many people. A majority of the comment received indicated a preference for a Federal FMP. In response to those comments the Council chose to develop a framework FMP which, unlike traditional FMP's,

Mr. William G. Gordon
November 16, 1981
Page 2 of 3

would not require frequent amendment and would leave much of the regulatory and management process in the hands of the State, but with Council and Secretarial review of the process. The Secretary, of course, has the power to override any State action if it is contrary to the MFCMA or other applicable law. This is accomplished by a plan that is flexible enough to accommodate changes in the fishery, while still providing clear guidelines for developing fishery regulations. The format of the plan reflects this new approach. The "management body" of the plan (i.e., management objectives and measures) is presented first, with all reference and supportive information provided in the plan appendices, DEIS, and RIR. All of the enclosed documents should be considered and approved as a management package.

The second new concept provides for the regulatory implementation of this FMP by Secretarial delegation of regulatory authority to the State of Alaska. The advantages of this proposal are clear. The Administration's and the Council's desire to provide for faster implementation of management measures, simplify paperwork and avoid unnecessary duplication in costs and effort would be achieved under this proposal. In addition, the Secretary would be able to utilize the well established and experienced State biological, managerial and enforcement corps.

There are probably several alternatives involving various degrees and methods of "federalizing" state management regulations under the proposed FMP. The Council legal staff is currently examining those alternatives in light of the advantages and disadvantages of each. Regulatory proposals based on each alternative will be reviewed by the Council prior to submission to the Secretary.

Several of your staff members who have reviewed some of the earlier drafts of this FMP have suggested that the body of the Plan be considerably expanded to include a complete history of the king crab fishery and the evolution of management over the years under the State system. They also suggested a greatly expanded discussion of the rationale behind some of the Council's decisions that went into the drafting of this Plan. We appreciate their suggestions and the time they have taken to study this problem. In large part the Council concurs with those recommendations, but in the interest of time, feels that it is more important to get this document package back to you for review than it is to re-write and try for the "perfect" plan as a first submission. This package, if used in its entirety, contains the necessary material to present and justify the Plan's proposals. Because this is the first true framework plan that we have sent back for review, and the first one in which we suggest federalizing state regulations and allowing a state management agency to retain day-to-day control of the fishery, we feel that the review should begin as soon as possible. If these two concepts won't fly, there is not much point in spending the time and money to expand the FMP as suggested.

Mr. William G. Gordon
November 16, 1981
Page 3 of 3

We believe that these approaches are good ones, that they can save the federal government a great deal of time and money, and be completely responsive to the MFCMA. I am sure that the Department reviewers are going to have numerous questions about this material and about the concepts we are advocating. We would like to work closely with them to resolve those questions as quickly and simply as possible. I suggest that after Department personnel, preferably at all of the applicable levels, have had a chance to study this package, we send a small delegation to Washington to work directly with those reviewers. I think that most of the problems can be clarified at such a meeting. If we do run into insurmountable obstacles, we should be able to put our heads together and figure out a way to overcome them.

The Council decision on this FMP was not a unanimous one. Enclosed is a minority report and a letter from the Director of the Washington Department of Fisheries expressing the views of those Council members who voted against the adoption of the FMP.

Please let me know your thoughts on the timing and format for a review meeting as suggested in the preceding paragraph.

Sincerely,

Jim H. Branson
Executive Director

enclosures

1981 KING CRAB FISHERY SUMMARY

Eastern Bering Sea (Bristol Bay; Area T)

The 1981 Bristol Bay fishery opened on September 10, with tank inspections being given on September 15th. The first week's catch was 2.9 million pounds compared to 16.9 million pounds in 1980 and CPUE decreased from 63 crab per pot in 1980 to 24 in 1981. The fishery has been in progress for twelve weeks and CPUE has steadily declined each week from 24 to 5 crab per pot (Figure 1). As of October 15, the biological samples collected and analyzed indicate that 46 percent of the harvested crab are old shell (compared to 11 percent last year), 69 percent are post recruits and 62 percent are over 7 inches. This information tends to verify the NMFS survey estimate not only in numbers of crab available but also in shell condition of crab. Preliminary analysis of skipper interviews by the State indicate that distribution of crab in 1981 appears to be north and east of the 1980 distribution and that fishermen have intensively fished the entire area without finding any new concentrations of crab.

The harvest through October 18 was 29.8 million pounds which was delivered by 107 vessels (Figure 2). The reduction in number of vessels from a high of 179 was due to many vessels leaving the Bristol Bay grounds in search for crab elsewhere in the Bering Sea. Due to the indications of low stock abundance, ADF&G closed the Bristol Bay area (Area T) 6½" king crab fishery on October 20. The total harvest from Bristol Bay at this point was approximately 30 million pounds. Prices for king crab were as high as \$1.80 this season.

During the spring Board of Fisheries meeting, the Board adopted regulations to provide a second season for seven inch crab once the fishing mortality rate was achieved during the first season on recruit crab. This was achieved on October 20. In addition, requests for a second season were made by the majority of the Seattle-based fleet. Therefore, ADF&G opened a second season for 7 inch crab on October 25. As of November 15, a total of 32.6 million pounds of king crab have been landed from the eastern Bering Sea with as many

as 89 vessels participating in the fishery (Figure 2). It is doubtful whether the lower end of the OY range of 40 million pounds can be reached by December 15 (the scheduled second season closure).

Bering Sea (Area Q)

The Bering Sea fishery for red and blue king crab opened September 15th, with up to 54 vessels fishing. The season closed on October 28, with a total of 1.1 million pounds of red king crab (compared to 918,000 in 1980-81) and 7.0 million pounds of blue king crab (compared to 2.0 million pounds in 1980-81) having been landed.

Kodiak (Area K)

The Kodiak king crab fishery began on September 15 and has been doing quite well. As of November 15, 18.3 million pounds have been landed compared to 16.3 million pounds at the same time last year. The increase in harvest is partially due to the increase in fishing effort in the area. This year 215 vessels have made deliveries with 128 vessels still fishing as of November 3. This compares with 164 vessels making deliveries last year.

Prices have been unusually high in the Kodiak area with as much as \$2.15 per pound being paid by processors. Compounding the Kodiak processors' economic problem was the arrival of five floating processors to the area this year. This situation has had a detrimental effect on the local economy with three processors having closed their operations by October 5th.

Eastern Aleutians (Dutch Harbor; Area O)

Approximately 80 vessels were present for the opening of the Dutch Harbor fishery November 1st. This is about 40 vessels fewer than fished last year. As of November 15, 4,750^{thousand} ~~million~~ pounds have been landed, compared to 4.2 million pounds at the same time last year.

Western Aleutians (Adak, Area R)

About 35 vessels had their tanks inspected for the opening of the Adak fishery on November 1st. One floating processor was on the grounds with a second floater and as many as six catcher/processors expected to arrive soon. Last year 18 vessels fished this area. As of November 15, 500 thousand pounds have been landed.

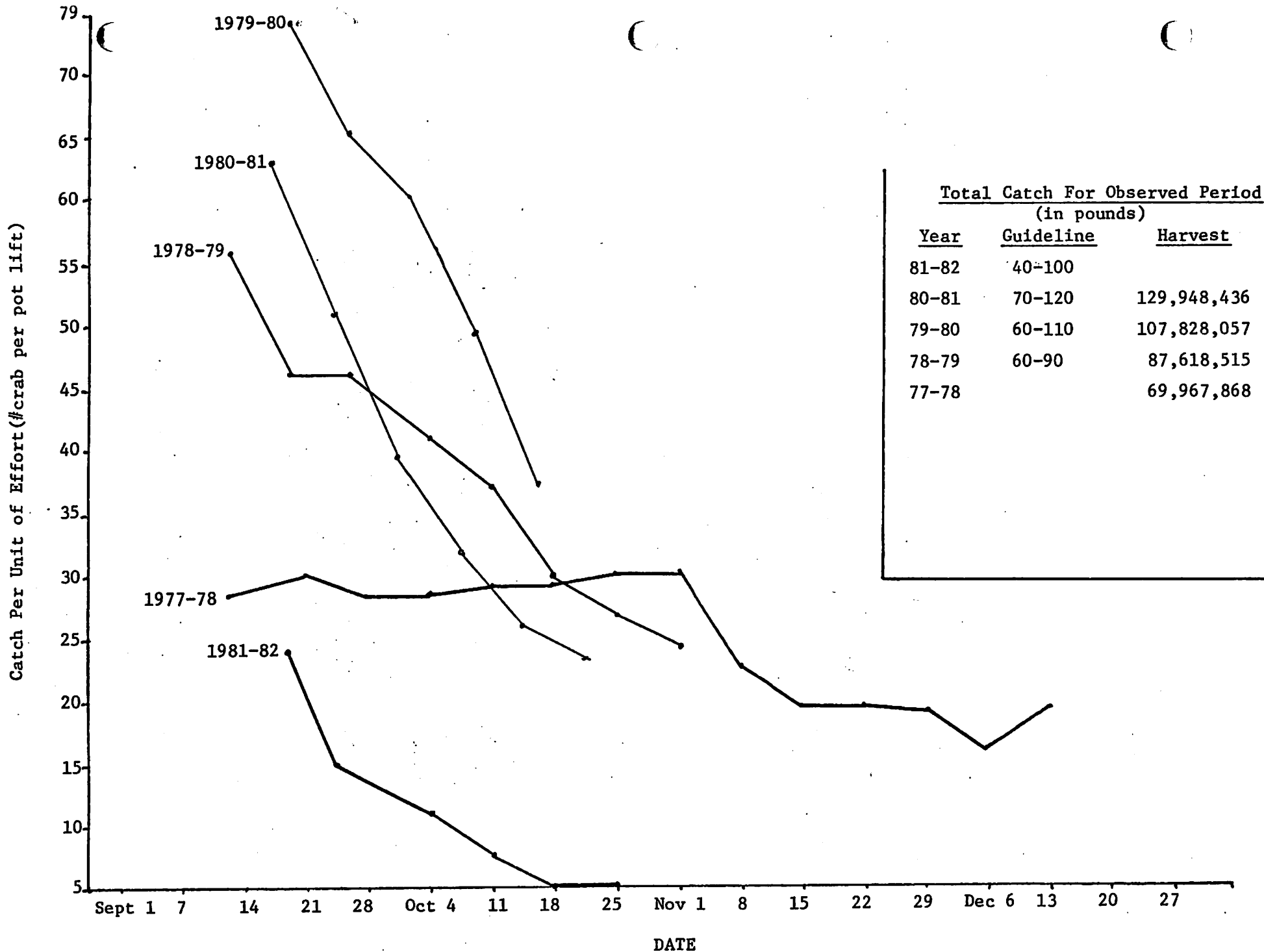
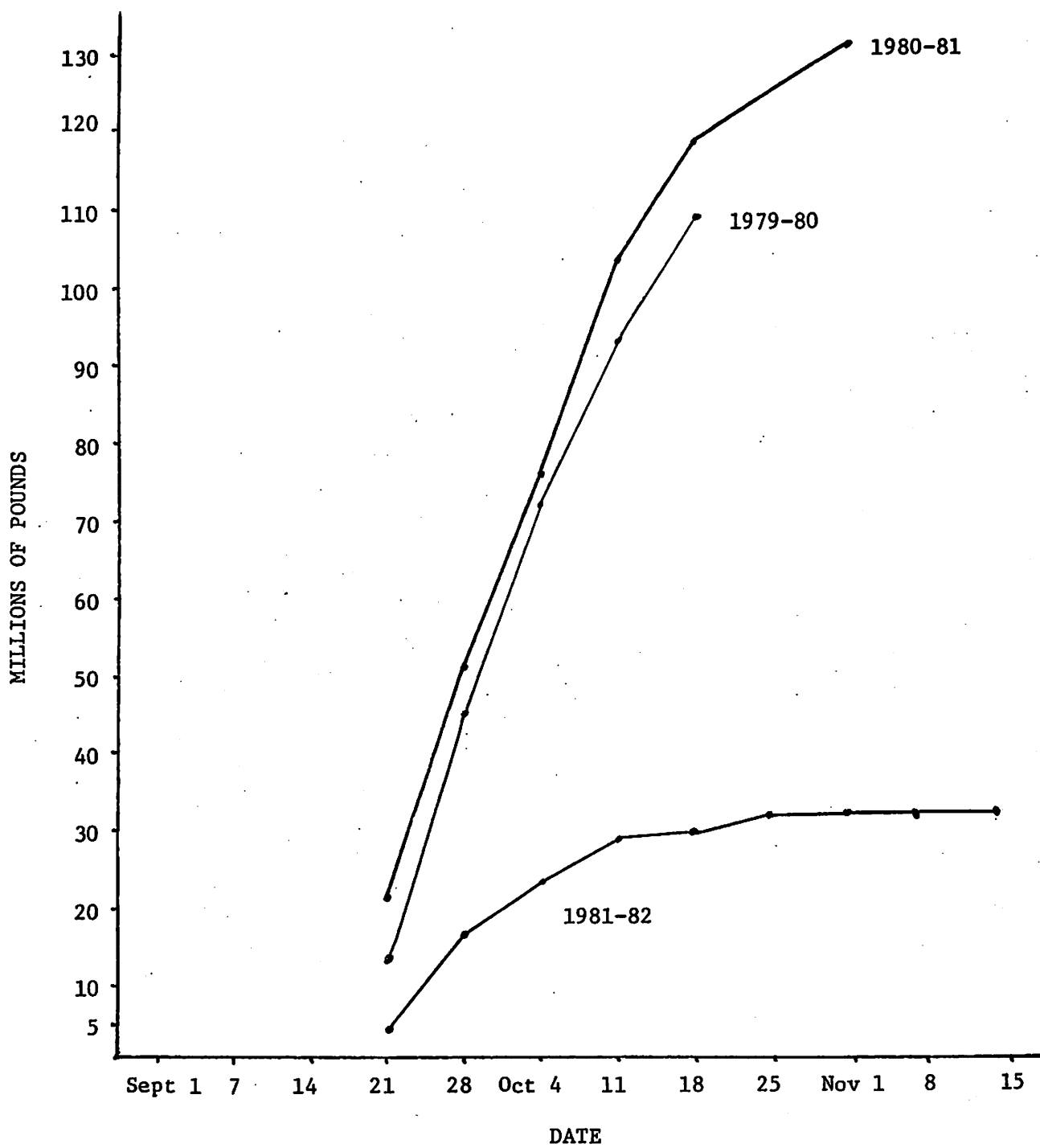


Figure 1. Eastern Bering Sea Red King Crab Catch Per Unit of Effort for the 81-82,80-81,79-80,78-79,and 77-78 Seasons. (Source: ADF&G Statistical Leaflets)



Total Catch for Observed Period (in pounds)		
Season	Guideline	Harvest
1981-82	40-100	
1980-81	60-120	129,948,436
1979-80	60-110	107,828,057

Figure 2. Cumulative catch of Eastern Bering Sea Red King Crab for the 81-82, 80-81, and 79-80 season. (Source: ADFG Statistical Leaflets)

North Pacific Fishery Management Council

Clement V. Tillion, Chairman
Jim H. Branson, Executive Director

Suite 32, 333 West 4th Avenue
Post Office Mall Building



Mailing Address: P.O. Box 3136DT
Anchorage, Alaska 99510

Telephone: (907) 274-4563
FTS 271-4064

DRAFT

A STUDY PROPOSAL

December 1981

DETERMINATION OF THE FEASIBILITY OF A CRAB OBSERVER PROGRAM IN PROVIDING SPECIFIC DATA NEEDS FOR THE MANAGEMENT OF THE KING AND TANNER CRAB FISHERIES

Short Title

Supplemental king and Tanner crab data base for NMFS Trawl Survey

Relevant Fishery Management Plans

King and Tanner crab.

Objectives and Needs

The sudden reduction in the availability of both legal and sublegal male king crab in the southeastern Bering Sea red king crab stocks when compared to the previous year trawl survey produced the obvious concern by the industry in respect to the accuracy of the 1981 trawl survey and to the current status of the stock. Many hypotheses on the reduction of male crab have been presented but little data exists to support or negate many of them. For the southeastern Bering Sea there are currently two sources of biological data: (1) the NMFS summer trawl survey; and (2) the ADF&G dockside survey program. The summer trawl survey is used to produce a pre-season harvest estimate for the king crab fishery, while the dockside survey provides information used for the in-season management of the fishery. Unfortunately, most of the in-season information pertains to only crab that are brought to port. Data on species and sex composition, size frequency, and condition of discarded crab are not available. Gear and fishery descriptions are also needed to supply information on the types of gear used, soak times and handling of crab. It is

proposed here that a pilot crab observer program be developed in order to supplement the current NMFS and ADF&G data base. This program would provide in-season biological data, not previously available. Of the proposed observer program objectives, the following appear to have the highest priorities:

1. Female fecundity - should the 1982 trawl survey indicate a reduced female population level, the degree of fecundity levels is an important data base to compare with the trawl survey results.
2. Estimate of handling mortality - recording of actual mortalities and potential mortalities of crab returned to water, such as leg loss, damaged shells, and floaters that are subject to bird predation.
3. Gear evaluation - recording of incidental catch rates of non-target species, sublegal and female crab of target species. Other important factors to evaluate would be: (a) gear mesh size/sorting relationship; and (b) mortality rate versus pot handling technique.
4. Affect of long-term pot storage - pre-season observer trips aboard vessels removing gear from long-term storage may produce some information in relation to mortality of crab in stored gear.

A council appointed committee is currently developing a crab observer program. Discussion of program objectives and some historical background information is provided as Attachment 1, 2, and 3.

Expected Benefits

The collected data from an observer program will provide valuable contributions to the king and Tanner crab data base. Accumulated information from all sources will allow for the testing of hypotheses proposed for the decline in crab stocks, and an examination of current fishing techniques will be possible. It may also provide a basis for more accurate interpretation of trawl survey results.

Work to be Performed

ADF&G in Kodiak will have the lead role in developing and coordinating this program, with NMFS and the fishing industry providing support. Permanent personnel of the ADF&G and NMFS will serve as training supervisors of seasonal employees utilized for the observer program. No additional costs will be required for this function.

Seasonal personnel requiring two additional employees will be necessary to supplement the existing dockside sampling program of ADF&G and NMFS in order to initiate a pilot program. The additional personnel will provide alternating of sea duty time with personnel assigned to the dockside sampling. Experienced samplers will be utilized for the initial observer trips until the new personnel have been fully trained under the more closely supervised dockside sampling program.

Urgency and Duration

It is important that this program be developed and incorporated into the current research plan as soon as possible. The Tanner crab season for the Southeastern Bering Sea will begin on February 15, 1982. Although it is doubtful as to whether this program can be developed by that time, it would be helpful to have observers in place prior to the season end. This would allow examination of the impact on king crab by the Tanner crab fishery and provide biological information prior to the 1982 NMFS trawl survey. The program would then continue into the 1982 king crab season.

Proposed Budget

Tanner Crab

Shipboard observations will be conducted throughout the major portion of the Tanner crab season (February 15 - July 15).

Two (2) seasonal Fishery Biologist I positions will be required for a total of 10 man months.

10 man months @ 2,846 \$28,460

King Crab

Shipboard observations will be conducted from pre-season removal of gear from pot storage areas until the conclusion of the major fishing effort on king crab (September 1 - December 15).

Two seasonal Fishery Biologist I positions will be required for a total of 7 man months.

7 man months @ 2,846 19,922

Total Personnel Services \$48,382

Travel and Per diem

Air transportation from Kodiak and return to Kodiak for observation duties.

<u>Personnel</u>	<u># Trips</u>	<u>Travel</u>	<u>Per Diem</u>	<u>Location</u>	<u>Cost</u>
1. Training Supervision	2	1,692	20 days @ 76.00	Dutch Harbor	\$ 3,212
2. Observer Personnel	4	3,384	16 days @ 76.00	Dutch Harbor	4,600
3. Board and room aboard non-volunteer vessels estimated 1/3 of sea duty days					
		Tanner crab = 130 days (40 days @ 21.00 per day)			840
		King crab = 90 days (30 days @ 21.00 per day)			630
4. Board and room aboard processors during inport exchange periods			25 days @ 21.00 per day		<u>525</u>
				Total Travel	\$ 9,807

Contractual Services

1. 10 hours twin engine charter for movement of personnel from Dutch Harbor to Akutan and other processor locations at 450 per hour	\$ 4,500
2. Communications	2,000
3. Data reproduction costs, forms, etc.	<u>2,000</u>
Total	\$ 8,500

Commodities

1. 4 survival suits @ 250 for volunteer observers and new personnel	\$ 1,000
2. 4 calipers @ 100	400
3. 4 sets deck gear @ 100	400
4. Miscellaneous supplies	<u>1,000</u>
Total	\$ 2,800

TOTAL ESTIMATED COST \$69,489



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

December 1, 1981

TO: John Harville, Don Bevan, Jim Branson, Jerry Reeves, Jack Lechner,
 Fred Gaffney, Dick Goldsmith, Steve Davis, and Judy Willoughby
 North Pacific Fishery Management Council

FROM: *Robert S. Otto*
 Robert S. Otto, NMFS, Kodiak

SUBJECT: Crab observer program

I send this as my contribution since I will be unable to attend your December 7 meeting. I am involved in planning for the subject program as a member of the Funding Sub-group and as chairman of the Scientific Sub-group.

With respect to funding, the current status of the NMFS budget probably precludes development of any new capabilities. Budget projections indicate decreasing funding in the future. Possible NMFS support is probably limited to supplying personnel.

I have discussed various aspects of proposed observer coverage with members of the Scientific Sub-group and what follows is my consensus of our feelings. Members of the sub-group may wish to change or delete portions of what is below.

Background - At the September meeting of the NPFMC in Kodiak, information was provided that indicated differential mortality between sub-legal male and female crabs. Basically, male populations appeared to be declining faster than female populations even after accounting for landings. Various possible causes were presented and among them was the possibility of mortalities related to repeated handling of sub-legal crabs. Members of industry (Mr. Goldsmith in particular) volunteered their support for an observer program and others suggested that the questions of halibut by catch/mortality could also be examined. Catcher-processor vessels were also discussed at various times.

Problems that need to be addressed - Within the above context, we need to consider two types of vessels (non-processing, catcher-processor), three fisheries (C. bairdi, C. opilio, red king crab), and four species (ranked roughly as red king crab, halibut, C. bairdi, and C. opilio). This breakdown results in 24 experimental cells within which we may wish to sample. Given potential costs (see Lechner), it is not feasible to attack all at once. Cells involving tanner crab fisheries are most immediately available in time and have been proposed candidates for pilot projects. Those involving red king crab are probably most important but remote in time. Halibut bycatch occurs in all crab fisheries and can perhaps be considered as an observation within (the remaining 18) cells.



The group as a whole needs to decide which cells in this experimental framework should receive priority. I would suggest that a pilot project include at least one catcher-processor and one non-processor and consider C. bairdi and C. opilio fisheries (i.e., early and late or summer fishing).

I view the problem of by catch induced mortality as involving two primary classes of processes: 1) Those associated with capture or fishing (gear type, mesh size, gear losses, soak time, timing of fishing, etc), and 2) those associated with handling (sorting of crab, holding, method of discard). While these are not entirely exclusive, the dichotomy is useful in that the first is somewhat independent of vessel/crew while the second is almost entirely dependent. I feel that pilot projects should concentrate on the first class of processes (e.g. what is the size frequency of male and female crab taken in pots with 8 inch mesh) in order to determine whether crab being subjected to bycatch correlate with the size-sex groupings where apparent deficits in abundance exist. Secondly, focusing on this class may help avoid some of the fishermen-observer interaction alluded to by the logistics group (p. 3).

Assumptions (partial or minimal)

- 1) Observer data is not to be used for enforcement purposes.
- 2) Vessel participation is voluntary.
- 3) Some pilot project will be conducted involving no more than four observers before a major project is undertaken.
- 4) Funds or manpower will be made available as discussed at the September meetings.

Objectives

- 1) Direct
 - a) Quantify factors associated with mortality of species or size groups of species taken incidentally to crabbing.
 - b) Recommend solutions to problems detected (if any).
- 2) Indirect
 - a) Ancillary biological data to augment existing data base.
 - b) Observation and documentation of fishing practices.

(Obviously the above can be expanded on considerably.)

Options

Various options for attacking problems in the above areas have been discussed.

- 1) Augmented interviews - As pointed out elsewhere (Lechner), weak points are that catcher-processors are left out and that only subjective information on by catch would be available. I feel, however, that some additional information might be useful. An inventory of gear characteristics of the fleet by fishery, for example, will probably be necessary both from a sampling and analytical point of view.

- 2) Limited (pilot?) on-board sampling with augmented interviews.
- 3) Pilot on-board sampling followed by some(?) further development.
- 4) Final program (funding).

I suspect that it is worth considering these as phases as well as options. Basically I think that a great deal of impetus for on-board observations has dissipated and there is no longer quite the same sense of urgency that was present in September. Thereby, items one and two might be considered either this year or next. Here I suspect that indirect objectives will be more easily met than direct ones and hence more information should be gathered before expending a lot of money.

Data - We have skirted this problem on several occasions without really addressing it. I had felt that the standard crab data set (size, sex, shell condition, eggs, etc.), augmented by information on the condition of crab was sufficient. Others have mentioned tagging, gear information, general observation, etc. as being necessary. I had intended to append copies of our observer manual to this memo, but upon review, do not find them particularly useful. At this point, a pilot project should probably include the following as a minimum.

A. Direct objectives

1. Gear/Fishery description
 - a. mesh size
 - b. pot type and size
 - c. time between hauls
 - d. depth
2. Biological data
 - a. species composition
 - b. sex composition
 - c. size frequency
 - (a-c) the above are to be taken in combination.
 - d. condition of crabs (missing legs, cracked carapace, etc.)

B. Indirect objectives

1. Molting data
 - a. shell condition
 - b. occurrence of molting
2. Spawning - reproductive
 - a. clutch size
 - b. condition of eggs.

Obviously much more can be taken, but I suggest that the above would keep an observer busy if he sampled one pot in 5 - 10 depending on catch.

Sampling - Due to the voluntary nature of the proposed participation and the small number of people currently contemplated, I think we can defer discussion of sampling designs. I think an experimental framework as outlined above would be adequate at present. It would, of course, be nice if observations on

processing and non-processing vessels could be taken in about the same area.

Training - I suggest that one common training session be conducted for all persons involved.

CRAB OBSERVER COMMITTEE
Logistic Subgroup Report

The Logistic Subgroup met in Seattle on October 29, 1981. The purpose of the meeting was to identify the problems in organizing an observer program for the crab fishing fleet. The following were participants at the meeting:

Steve Davis, North Pacific Fishery Management Council
Bart Eaton, Fisherman, Council Member NPFMC
Dick Goldsmith, North Pacific Fishing Vessel Owners Assn.
Dick Pace, Universal Seafoods
Dennis Peterson, Fisherman
Bob Resoff, Alaska Crab Institute
Judy Willoughby, North Pacific Fishery Management Council
Bill Woods, Pan-Alaska Seafoods

Following introductions, the meeting began with a review of the following events which led to the idea of a crab observer program:

1. Results of 1981 NMFS Bering Sea Trawl Survey indicate a more severe decline in king and Tanner crab stocks than was earlier predicted.
2. The initial fishing community's response to the survey was not to believe the results and to question the validity of the survey (this response occurred prior to the opening of king crab fishing season).

3. The fishing community proposed a crab observer program to collect in-season crab data and a possible means to either support or refute the summer trawl surveys.
4. September 10, 1981 king crab season opened. It was soon apparent that the king crab harvest would conform to that predicted by the 1981 survey. King crab catches were very low with similar harvest expected with Tanner crab.
5. A renewed interest in a crab observer program to help compliment the summer trawl surveys and to fill deficiencies in the data base.

The Subgroup then discussed the objectives of the observer program. Although this is the task assigned to the Scientific Subgroup, we agreed on two general objectives: (1) To provide crab data not currently available by trawl surveys. We recognized that from fish tickets and dockside surveys, there exist in-season data on the crab being brought to port. What is lacking is data on crabs being discarded at sea (i.e. sex and size distribution, condition of discarded crab, and composition of catch). There is also a need for similar data from catcher/processor vessels. And, (2) The results from the program could be used as a means to provide better procedures for handling non-legal crabs. It was emphasized that the observers were not enforcement officers and that the collected data would not be used by enforcement agencies. The placement of observers on fishing vessels would be on a voluntary basis.

The question arose on the number of vessels that might be available to participate in the program beginning with the Tanner crab season

(February 15, 1982). Although actual names of vessels were not provided, the representatives of the fishing industry felt that there would be more vessels available than observers. That lead to the question of how many observers were needed for the program. NMFS currently strives for 20% fleet coverage in its observer programs. Using the same figure, that would require coverage on 40 boats in order to provide statistically viable data for the fleet as a whole. An estimated cost of supporting an observer program for both king crab and Tanner crab fisheries would be approximately \$550,000 (see Attachment 1). However, fewer observers would be needed if the program were designed as a pilot project. Recruiting observers appeared to be a potential problem. The NMFS foreign observer program, utilizes fishery students recruited through the University of Washington. Fishery students make excellent observers since they are familiar with the science and train easily. They are also easily obtainable and less expensive than professional biologists. Since crab fishing occurs primarily during the Fall through Spring months, and due to the hostile weather common in Alaska waters during this period, recruitment of students may be difficult. A list of problems facing the development of an observer program was prepared and is provided as Attachment 2. Each problem will need to be addressed.

Some members of the subgroup felt that the data collected by observers would not be useful due to the many variables in the actual fishing by individual vessels. They thought that fishermen might fish differently, handle crab differently, fish slower, etc., with an observer on board than without one.

With the high costs involved, and the uncertainty of fishermen influencing the data collected, the idea of expanding the present State of Alaska dockside

survey was discussed. Re-modeling the interview form to provide more quantitative data might achieve many of the same objectives as an observer program. However, catcher/processor data would not be obtained with this alternative. The Subgroup suggests that if this alternative proves viable, the interviewer should be knowledgeable with the fishery and become a long-time participant in the program. Ideally, these interviewers would also be involved in the analysis and reporting of the data. It was felt that these interviewers would become familiar to the skippers of the fishing vessels who in turn would be more inclined to spend time with the interviewer. In addition, if the skippers were provided with a list of the kind of questions to be asked by the interviewer prior to their leaving for the grounds, the data supplied by the skipper would probably be more quantitative and accurate.

If the Council determines that an observer program is needed, then efforts should be made to begin a pilot program with the Tanner crab season.

(Attachment 1: ESTIMATED BUDGET)

(Attachment 2: LOGISTIC PROBLEMS)

BERING SEA SHIPBOARD OBSERVER PROGRAM

Line Item Allocation

<u>100 Permanent</u>	<u>100 Seasonal</u>	<u>200</u>	<u>300</u>	<u>400</u>	<u>500</u>	<u>Total</u>
45.8	350.0	123.0	10.5	14.9	0	544.2

General Description

In 1981 one hundred sixty-nine fishing vessels and eleven catcher/processors harvested Tanner crab in the Bering Sea from January through July. Currently, 212 fishing vessels and 11 catcher/processors are fishing for king crab in Area "Q" and "T" (Bering Sea). The Department of Fish and Game monitors the catch of crab utilizing dockside samplers who interview approximately 60 to 70 percent of the vessels. The current program has two weak points, which are that no samples are collected from catcher/processors and no biological information can be collected on sublegal crab or female crab from the vessels contacted at processor's docks.

A shipboard observer program would increase knowledge of fishing performance and especially it would insure catcher/processors adhered to regulations and reported their catches accurately.

The program would be quite expensive to operate depending on coverage of the existing fleet. The area is remote and commercial transportation and housing facilities would have to be utilized. Individuals would be trained and assigned vessels at Dutch Harbor. Individuals would be expected to stay aboard the vessel during its participation in the fishery.

Major Objectives

1. Collect data on sublegal and female crab.
 - a. Lengths
 - b. Weights
 - c. Shell condition
 - d. Number, etc.
2. Monitor catches and report same when placed aboard catcher/processors.

3. Keep accurate log of fishing procedures - sorting CPUE, Area and depth fished.

100 Personal Services

1. Permanent Personnel - Fishery Biologist II
 - a. Stationed at Dutch Harbor training officer and co-ordinator for observer program (new position) \$ 45,818

100 Personal Services

1. Tanner crab (February 15 - July 15).
 - a. *F.B.I - 14A - 5 man months @ 2,846 14,230
 - 18 F.B.I - 90 man months @ 2,846 256,140
 2. King crab (September 15 - November 1)
 - a. **F.B.I - 14A - 1.5 man months @ 2.846 4,269
 - 22 F.B.I - 33 man months @ 2,846 93,918
- Total \$350,058

200 Travel and Per Diem

Air transportation from Kodiak to Dutch Harbor and return to Kodiak for forty observers during the two fisheries.

<u>Personnel</u>	<u>Travel</u>	<u>Per Diem</u>	<u>Location</u>	<u>Costs</u>
(1) F.B.I	846.00	4 days @ 76.00 - 296.00	Kodiak/Dutch	\$ 1,142
(40) F.B.I				45,680

Board and room aboard vessels:

King crab fishery

1. 45 days @ 21/day 945
 - a. 22 F.B.I x 945 20,790

Tanner crab fishery

1. 150 days @ 21/day 3,150
 - a. 18 F.B.I x 3,150 56,700

Total \$123,000

* 10 percent coverage - 180 vessels - 18 positions.

** 10 percent coverage - 223 vessels - 22 positions.

300 Contracts

1. Communications	
a. Telephone	\$ 2,000
b. Telegram	500
c. Xerox	2,000
2. Aircraft Charter	
a. 10 hrs. twin engine @ 400/hr.	4,000
b. 10 hrs. single engine @ 200/hr.	<u>2,000</u>
	Total \$ 10,500

400 Commodities

1. Survival suits @ 250 each x 22	\$ 10,000
2. 22 calipers @ 100 each	2,200
3. 22 pairs rain gear @ 100 each	2,200
4. Misc. supplies	<u>5,000</u>
	Total \$ 14,400

500 Equipment

Total proposed budget for observer program covering the King and Tanner crab fishery = \$544,446 (10% coverage of fleet)

Total proposed budget for just:

King crab (10% coverage) = \$203,300
Tanner crab (10% coverage) = \$395,864

Tanner crab pilot project (6 observers only) = \$102,927

Assumes project will be continued through the entire fishing season (i.e. 5 months).

King crab pilot project (6 observers only) = \$43,161

Assumes project will be continued through the entire fishing season (i.e. 1.5 months).

ESTIMATED BUDGET FOR CRAB OBSERVER PROGRAM

King Crab Season Only

\$139,736	Salaries (22 observers plus 1 F.B.II)
25,124	Travel and Per diem
70,790	Room and Board on Vessels
5,250	Communications and Aircraft Charter
<u>12,400</u>	Commodities
\$203,300	

Tanner Crab Season Only

\$301,958	Salaries (18 observers and 1 F.B.II)
20,556	Travel and Per diem
56,700	Room and Board on Vessels
5,250	Communications and Aircraft Charter
<u>11,400</u>	Commodities
\$395,864	

Tanner Crab Pilot Project (6 observers) assuming 5 months

\$ 85,380	Salaries	
6,852	Travel and Per diem	
5,670	Room and Board on Vessels	- Dennis reminded us that we probably
1,575	Communications	won't need to worry about it.
<u>3,450</u>	Commodities	
\$102,927		

King Crab Pilot Project (6 observers) assuming 1.5 months

\$ 25,614	Salaries
6,852	Travel and Per diem
5,670	Room and Board on Vessels
1,575	Contracts
<u>3,450</u>	Commodities
\$ 43,161	

CRAB OBSERVER PROGRAM

Logistical Problems

Transportation of observers

- to and from place of hire to Dutch Harbor

Lodging of observers while in port (usually prior to going on board or waiting for flight out).

Food while in port

Equipment -

- survival suits
- special clothing, gloves, boots, etc.
- measuring equipment (maybe already available from NMFS)

Salaries of observers

Insurance of observers

Onboard Ship

- Bunk space
- Deck space
- Food
- Duration of trips

Special training of observers

Data needs

Analysis of data - who will do it. Probably NMFS

Publication results

North Pacific Fishery Management Council

Clement V. Tillion, Chairman
Jim H. Branson, Executive Director

Suite 32, 333 West 4th Avenue
Post Office Mall Building



Mailing Address: P.O. Box 3136DT
Anchorage, Alaska 99510

Telephone: (907) 274-4563
FTS 271-4064

December 11, 1981

CRAB OBSERVER PROGRAM COMMITTEE

AGENDA

- A. Review subgroup reports
 1. Scientific
 2. Logistic

- B. Determine feasibility of continued development of the observer program
 1. Cost/Benefit
 2. Target date for initial operation
 3. Practicality of combining this program with the halibut mortality study

- C. Prepare committee report



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

December 1, 1981

TO: John Harville, Don Bevan, Jim Branson, Jerry Reeves, Jack Lechner,
Fred Gaffney, Dick Goldsmith, Steve Davis, and Judy Willoughby
North Pacific Fishery Management Council

FROM: *Robert S. Otto*
Robert S. Otto, NMFS, Kodiak

SUBJECT: Crab observer program

I send this as my contribution since I will be unable to attend your December 7 meeting. I am involved in planning for the subject program as a member of the Funding Sub-group and as chairman of the Scientific Sub-group.

With respect to funding, the current status of the NMFS budget probably precludes development of any new capabilities. Budget projections indicate decreasing funding in the future. Possible NMFS support is probably limited to supplying personnel.

I have discussed various aspects of proposed observer coverage with members of the Scientific Sub-group and what follows is my consensus of our feelings. Members of the sub-group may wish to change or delete portions of what is below.

Background - At the September meeting of the NPFMC in Kodiak, information was provided that indicated differential mortality between sub-legal male and female crabs. Basically, male populations appeared to be declining faster than female populations even after accounting for landings. Various possible causes were presented and among them was the possibility of mortalities related to repeated handling of sub-legal crabs. Members of industry (Mr. Goldsmith in particular) volunteered their support for an observer program and others suggested that the questions of halibut by catch/mortality could also be examined. Catcher-processor vessels were also discussed at various times.

Problems that need to be addressed - Within the above context, we need to consider two types of vessels (non-processing, catcher-processor), three fisheries (C. bairdi, C. opilio, red king crab), and four species (ranked roughly as red king crab, halibut, C. bairdi, and C. opilio). This breakdown results in 24 experimental cells within which we may wish to sample. Given potential costs (see Lechner), it is not feasible to attack all at once. Cells involving tanner crab fisheries are most immediately available in time and have been proposed candidates for pilot projects. Those involving red king crab are probably most important but remote in time. Halibut bycatch occurs in all crab fisheries and can perhaps be considered as an observation within (the remaining 18) cells.



The group as a whole needs to decide which cells in this experimental framework should receive priority. I would suggest that a pilot project include at least one catcher-processor and one non-processor and consider C. bairdi and C. opilio fisheries (i.e., early and late or summer fishing).

I view the problem of by catch induced mortality as involving two primary classes of processes: 1) Those associated with capture or fishing (gear type, mesh size, gear losses, soak time, timing of fishing, etc), and 2) those associated with handling (sorting of crab, holding, method of discard). While these are not entirely exclusive, the dichotomy is useful in that the first is somewhat independent of vessel/crew while the second is almost entirely dependent. I feel that pilot projects should concentrate on the first class of processes (e.g. what is the size frequency of male and female crab taken in pots with 8 inch mesh) in order to determine whether crab being subjected to bycatch correlate with the size-sex groupings where apparent deficits in abundance exist. Secondly, focusing on this class may help avoid some of the fishermen-observer interaction alluded to by the logistics group (p. 3).

Assumptions (partial or minimal)

- 1) Observer data is not to be used for enforcement purposes.
- 2) Vessel participation is voluntary.
- 3) Some pilot project will be conducted involving no more than four observers before a major project is undertaken.
- 4) Funds or manpower will be made available as discussed at the September meetings.

Objectives

- 1) Direct
 - a) Quantify factors associated with mortality of species or size groups of species taken incidentally to crabbing.
 - b) Recommend solutions to problems detected (if any).
- 2) Indirect
 - a) Ancillary biological data to augment existing data base.
 - b) Observation and documentation of fishing practices.

(Obviously the above can be expanded on considerably.)

Options

Various options for attacking problems in the above areas have been discussed.

- 1) Augmented interviews - As pointed out elsewhere (Lechner), weak points are that catcher-processors are left out and that only subjective information on by catch would be available. I feel, however, that some additional information might be useful. An inventory of gear characteristics of the fleet by fishery, for example, will probably be necessary both from a sampling and analytical point of view.

- 2) Limited (pilot?) on-board sampling with augmented interviews.
- 3) Pilot on-board sampling followed by some(?) further development.
- 4) Final program (funding).

I suspect that it is worth considering these as phases as well as options. Basically I think that a great deal of impetus for on-board observations has dissipated and there is no longer quite the same sense of urgency that was present in September. Thereby, items one and two might be considered either this year or next. Here I suspect that indirect objectives will be more easily met than direct ones and hence more information should be gathered before expending a lot of money.

Data - We have skirted this problem on several occasions without really addressing it. I had felt that the standard crab data set (size, sex, shell condition, eggs, etc.), augmented by information on the condition of crab was sufficient. Others have mentioned tagging, gear information, general observation, etc. as being necessary. I had intended to append copies of our observer manual to this memo, but upon review, do not find them particularly useful. At this point, a pilot project should probably include the following as a minimum.

A. Direct objectives

1. Gear/Fishery description
 - a. mesh size
 - b. pot type and size
 - c. time between hauls
 - d. depth
2. Biological data
 - a. species composition
 - b. sex composition
 - c. size frequency
 - (a-c) the above are to be taken in combination.
 - d. condition of crabs (missing legs, cracked carapace, etc.)

B. Indirect objectives

1. Molting data
 - a. shell condition
 - b. occurrence of molting
2. Spawning - reproductive
 - a. clutch size
 - b. condition of eggs.

Obviously much more can be taken, but I suggest that the above would keep an observer busy if he sampled one pot in 5 - 10 depending on catch.

Sampling - Due to the voluntary nature of the proposed participation and the small number of people currently contemplated, I think we can defer discussion of sampling designs. I think an experimental framework as outlined above would be adequate at present. It would, of course, be nice if observations on

processing and non-processing vessels could be taken in about the same area.

Training - I suggest that one common training session be conducted for all persons involved.

CRAB OBSERVER COMMITTEE
Logistic Subgroup Report

The Logistic Subgroup met in Seattle on October 29, 1981. The purpose of the meeting was to identify the problems in organizing an observer program for the crab fishing fleet. The following were participants at the meeting:

Steve Davis, North Pacific Fishery Management Council
Bart Eaton, Fisherman, Council Member NPFMC
Dick Goldsmith, North Pacific Fishing Vessel Owners Assn.
Dick Pace, Universal Seafoods
Dennis Peterson, Fisherman
Bob Resoff, Alaska Crab Institute
Judy Willoughby, North Pacific Fishery Management Council
Bill Woods, Pan-Alaska Seafoods

Following introductions, the meeting began with a review of the following events which led to the idea of a crab observer program:

1. Results of 1981 NMFS Bering Sea Trawl Survey indicate a more severe decline in king and Tanner crab stocks than was earlier predicted.
2. The initial fishing community's response to the survey was not to believe the results and to question the validity of the survey (this response occurred prior to the opening of king crab fishing season).

3. The fishing community proposed a crab observer program to collect in-season crab data and a possible means to either support or refute the summer trawl surveys.
4. September 10, 1981 king crab season opened. It was soon apparent that the king crab harvest would conform to that predicted by the 1981 survey. King crab catches were very low with similar harvest expected with Tanner crab.
5. A renewed interest in a crab observer program to help compliment the summer trawl surveys and to fill deficiencies in the data base.

The Subgroup then discussed the objectives of the observer program. Although this is the task assigned to the Scientific Subgroup, we agreed on two general objectives: (1) To provide crab data not currently available by trawl surveys. We recognized that from fish tickets and dockside surveys, there exist in-season data on the crab being brought to port. What is lacking is data on crabs being discarded at sea (i.e. sex and size distribution, condition of discarded crab, and composition of catch). There is also a need for similar data from catcher/processor vessels. And, (2) The results from the program could be used as a means to provide better procedures for handling non-legal crabs. It was emphasized that the observers were not enforcement officers and that the collected data would not be used by enforcement agencies. The placement of observers on fishing vessels would be on a voluntary basis.

The question arose on the number of vessels that might be available to participate in the program beginning with the Tanner crab season

(February 15, 1982). Although actual names of vessels were not provided, the representatives of the fishing industry felt that there would be more vessels available than observers. That led to the question of how many observers were needed for the program. NMFS currently strives for 20% fleet coverage in its observer programs. Using the same figure, that would require coverage on 40 boats in order to provide statistically viable data for the fleet as a whole. An estimated cost of supporting an observer program for both king crab and Tanner crab fisheries would be approximately \$550,000 (see Attachment 1). However, fewer observers would be needed if the program were designed as a pilot project. Recruiting observers appeared to be a potential problem. The NMFS foreign observer program, utilizes fishery students recruited through the University of Washington. Fishery students make excellent observers since they are familiar with the science and train easily. They are also easily obtainable and less expensive than professional biologists. Since crab fishing occurs primarily during the Fall through Spring months, and due to the hostile weather common in Alaska waters during this period, recruitment of students may be difficult. A list of problems facing the development of an observer program was prepared and is provided as Attachment 2. Each problem will need to be addressed.

Some members of the subgroup felt that the data collected by observers would not be useful due to the many variables in the actual fishing by individual vessels. They thought that fishermen might fish differently, handle crab differently, fish slower, etc., with an observer on board than without one.

With the high costs involved, and the uncertainty of fishermen influencing the data collected, the idea of expanding the present State of Alaska dockside

survey was discussed. Re-modeling the interview form to provide more quantitative data might achieve many of the same objectives as an observer program. However, catcher/processor data would not be obtained with this alternative. The Subgroup suggests that if this alternative proves viable, the interviewer should be knowledgeable with the fishery and become a long-time participant in the program. Ideally, these interviewers would also be involved in the analysis and reporting of the data. It was felt that these interviewers would become familiar to the skippers of the fishing vessels who in turn would be more inclined to spend time with the interviewer. In addition, if the skippers were provided with a list of the kind of questions to be asked by the interviewer prior to their leaving for the grounds, the data supplied by the skipper would probably be more quantitative and accurate.

If the Council determines that an observer program is needed, then efforts should be made to begin a pilot program with the Tanner crab season.

(Attachment 1: ESTIMATED BUDGET)

(Attachment 2: LOGISTIC PROBLEMS)

BERING SEA SHIPBOARD OBSERVER PROGRAM

Line Item Allocation

<u>100 Permanent</u>	<u>100 Seasonal</u>	<u>200</u>	<u>300</u>	<u>400</u>	<u>500</u>	<u>Total</u>
45.8	350.0	123.0	10.5	14.9	0	544.2

General Description

In 1981 one hundred sixty-nine fishing vessels and eleven catcher/processors harvested Tanner crab in the Bering Sea from January through July. Currently, 212 fishing vessels and 11 catcher/processors are fishing for king crab in Area "Q" and "T" (Bering Sea). The Department of Fish and Game monitors the catch of crab utilizing dockside samplers who interview approximately 60 to 70 percent of the vessels. The current program has two weak points, which are that no samples are collected from catcher/processors and no biological information can be collected on sublegal crab or female crab from the vessels contacted at processor's docks.

A shipboard observer program would increase knowledge of fishing performance and especially it would insure catcher/processors adhered to regulations and reported their catches accurately.

The program would be quite expensive to operate depending on coverage of the existing fleet. The area is remote and commercial transportation and housing facilities would have to be utilized. Individuals would be trained and assigned vessels at Dutch Harbor. Individuals would be expected to stay aboard the vessel during its participation in the fishery.

Major Objectives

1. Collect data on sublegal and female crab.
 - a. Lengths
 - b. Weights
 - c. Shell condition
 - d. Number, etc.
2. Monitor catches and report same when placed aboard catcher/processors.

3. Keep accurate log of fishing procedures - sorting CPUE, Area and depth fished.

100 Personal Services

1. Permanent Personnel - Fishery Biologist II
 - a. Stationed at Dutch Harbor training officer and co-ordinator for observer program (new position) \$ 45,818

100 Personal Services

1. Tanner crab (February 15 - July 15).
 - a. *F.B.I - 14A - 5 man months @ 2,846 14,230
 - 18 F.B.I - 90 man months @ 2,846 256,140
 2. King crab (September 15 - November 1)
 - a. **F.B.I - 14A - 1.5 man months @ 2.846 4,269
 - 22 F.B.I - 33 man months @ 2,846 93,918
- Total \$350,058

200 Travel and Per Diem

Air transportation from Kodiak to Dutch Harbor and return to Kodiak for forty observers during the two fisheries.

<u>Personnel</u>	<u>Travel</u>	<u>Per Diem</u>	<u>Location</u>	<u>Costs</u>
(1) F.B.I	846.00	4 days @ 76.00 - 296.00	Kodiak/Dutch	\$ 1,142
(40) F.B.I				45,680

Board and room aboard vessels:

King crab fishery

1. 45 days @ 21/day 945
 - a. 22 F.B.I x 945 20,790

Tanner crab fishery

1. 150 days @ 21/day 3,150
 - a. 18 F.B.I x 3,150 56,700

Total \$123,000

* 10 percent coverage - 180 vessels - 18 positions.

** 10 percent coverage - 223 vessels - 22 positions.

300 Contracts

1. Communications	
a. Telephone	\$ 2,000
b. Telegram	500
c. Xerox	2,000
2. Aircraft Charter	
a. 10 hrs. twin engine @ 400/hr.	4,000
b. 10 hrs. single engine @ 200/hr.	<u>2,000</u>
	Total \$ 10,500

400 Commodities

1. Survival suits @ 250 each x 22	\$ 10,000
2. 22 calipers @ 100 each	2,200
3. 22 pairs rain gear @ 100 each	2,200
4. Misc. supplies	<u>5,000</u>
	Total \$ 14,400

500 Equipment

Total proposed budget for observer program covering the King and Tanner crab fishery = \$544,446 (10% coverage of fleet)

Total proposed budget for just:

King crab (10% coverage) = \$203,300
Tanner crab (10% coverage) = \$395,864

Tanner crab pilot project (6 observers only) = \$102,927

Assumes project will be continued through the entire fishing season (i.e. 5 months).

King crab pilot project (6 observers only) = \$43,161

Assumes project will be continued through the entire fishing season (i.e. 1.5 months).

ESTIMATED BUDGET FOR CRAB OBSERVER PROGRAM

King Crab Season Only

\$139,736	Salaries (22 observers plus 1 F.B.II)
25,124	Travel and Per diem
70,790	Room and Board on Vessels
5,250	Communications and Aircraft Charter
<u>12,400</u>	Commodities
\$203,300	

Tanner Crab Season Only

\$301,958	Salaries (18 observers and 1 F.B.II)
20,556	Travel and Per diem
56,700	Room and Board on Vessels
5,250	Communications and Aircraft Charter
<u>11,400</u>	Commodities
\$395,864	

Tanner Crab Pilot Project (6 observers) assuming 5 months

\$ 85,380	Salaries
6,852	Travel and Per diem
5,670	Room and Board on Vessels
1,575	Communications
<u>3,450</u>	Commodities
\$102,927	

King Crab Pilot Project (6 observers) assuming 1.5 months

\$ 25,614	Salaries
6,852	Travel and Per diem
5,670	Room and Board on Vessels
1,575	Contracts
<u>3,450</u>	Commodities
\$ 43,161	

CRAB OBSERVER PROGRAM

Logistical Problems

Transportation of observers

- to and from place of hire to Dutch Harbor

Lodging of observers while in port (usually prior to going on board or waiting for flight out).

Food while in port

Equipment -

- survival suits
- special clothing, gloves, boots, etc.
- measuring equipment (maybe already available from NMFS)

Salaries of observers

Insurance of observers

Onboard Ship

- Bunk space
- Deck space
- Food
- Duration of trips

Special training of observers

Data needs

Analysis of data - who will do it. Probably NMFS

Publication results

NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
PROGRAMMATIC BUDGET NARRATIVE
FY 1982

EVALUATION OF HALIBUT MORTALITY IN COMMERCIAL CRAB POTS

I. OBJECTIVE AND NEED

The North Pacific Fishery Management Council has management responsibilities for the king and Tanner crab fisheries in the Fishery Conservation Zone of Alaska. Also, a goal of the Council's Groundfish plans is to rebuild the halibut stocks. Incidental catch of halibut in commercial crab pots is known to occur, but there is limited information on the magnitude of the catch. This project will provide data on the incidental take of halibut by commercial crab pots.

II. STATEMENT OF WORK

An observer program will be developed based on optimal sampling of the king and Tanner crab fleets. Data will be collected on the incidence of capture and mortality of halibut in commercial crab pots. The data collected will be summarized and analyzed to give interception rates for the entire crab fleet by area and by crab species using harvest ticket and observer data. The estimated interception rate will be used to evaluate the magnitude of the incidental catch and the potential costs and savings regarding possible regulations to reduce it.

III. POSSIBLE CONTRACTOR

Alaska Department of Fish and Game has the expertise and equipment necessary to perform this project.

IV. PROJECT DURATION AND BUDGET

Two-year duration; \$50,000 requested (an additional \$50,000 is being requested from the International Pacific Halibut Commission).



NATURAL RESOURCES CONSULTANTS

4055 21st Avenue West • Seattle, Washington 98199, U.S.A. • [206] 285-3480

A STUDY PROPOSAL

December 1981

A REVIEW OF THE MANAGEMENT PROCESS, STRATEGIES AND PROCEDURES OF THE KING CRAB FISHERY

The king crab fishery is one of the most important fishing industries in Alaska, ranking second to salmon. Its ex vessel value in 1979 was 149 million dollars. The fishing, which is conducted in both State and Federal jurisdictions is currently managed by the State of Alaska, although efforts to evolve a Federal management plan under the NPFMC have been underway for several years. Statistical and biological information used to determine the status of the stocks and biological attributes of king crabs and their populations are compiled and analyzed by the Alaska Department of Fish and Game and the National Marine Fisheries Service. These data, along with recommendations provided by user groups, are used by the Alaska Board of Fisheries to establish management measures designed to perpetuate the resources and maintain economic stability in the industry. The same data sources and institutional support is likely to be provided to the Council, if an FMP is adopted for the king crab fishery.

The current management process relies, to a significant degree, on resource surveys conducted by NMFS or ADF&G analysis of catch data, test fishing, etc., to establish levels of crab. These data sources are synthesized by the agencies involved and passed on to the Alaska Board of Fisheries and NPFMC. Timing of the data outputs is frequently critical in terms of the data's utility regarding management decisions and the review capacity of the industry.

Historical data concerned with surveys and CPUE data have generally tracked quite well and scientists have been able, on the basis of pre-recruit information, to predict, in general, future trend patterns. The abundance of red king crab increased dramatically during the latter part of the past decade. A general decline in abundance due to smaller incoming year classes was forecast for the early 1980's and which became obvious this season. The decline was, however, somewhat larger than had been

envisioned. Trends in recruitment are not easily associated with spawning stock sizes, and although some density-dependent relationship may prevail, the influence of abiotic factors and/or ecological interactions regarding stock size needs further examination.

Density-independent factors may have significant impacts on abundance trends made from surveys and these in turn could influence harvest strategies and economic forecasts.

PROPOSAL

1. To examine in detail historical environmental factors and ecological trends within the Bering Sea and determine their relationship (if any) with abundance trends for the red king crab in the Bering Sea.
2. To examine theoretical versus observed abundance trends based on calculations from recruitment and natural and fishing mortality features in relationship to annual surveyed abundance estimates.
3. To review the current management strategies process in terms of conclusions reached in the above two studies taking into account survey methodology, data handling, and information outputs.
4. To review size and sex management versus yields, other biological goals and the concept of resource stability. This review will consider potential sorting mortality problems.

Expected outputs of the study will include:

- Analysis of environmental and ecological changes and their impact on crab abundance.
- Consideration of the reliability of surveys for forecasting population sizes in subsequent years.
- A consideration of use of environmental and ecological data in making management decisions.
- Analysis of regulatory management strategies related to above.

BUDGET

Professional services	\$14,400
Overhead	9,600
Computer support	4,000
Travel	1,500
Other	<u>500</u>
Total	\$30,000

POTENTIAL SUPPORTERS

North Pacific Fishing Vessel Owners Association
Bank of Alaska
Crab processors
State of Washington
Marketing Association
North Pacific Fishery Management Council

Cost per contributor: \$5,000

Timing: to be completed by June 30, 1982.

Note: Technical support - D.L. Alverson and A.T. Pruter

Can have a competitive cost.

Does not seem compete U.S. market.

1cc. Carter - small amounts - South Africa -
plot of power - U.S. commit.

~~John~~ ~~exper~~ exper - made.

implicit conclusions.

MEMORANDUM

State of Alaska

TO: Don Rosenberg, Chairman
SSC

DATE: December 7, 1981

FILE NO:

TELEPHONE NO: 486-4791

FROM: Jack Lechner, SSC Member

SUBJECT: Comments concerning the proposed Bering Sea Observer program.

Throughout the past twenty plus years the Alaska Department of Fish and Game has conducted observer programs aboard commercial fishing vessels.

Observer programs in recent years have been used primarily to monitor fisheries in which a non-target bi-catch occurs, when documentation of the volume of the bi-catch and resulting mortality verification is required to be estimated.

In more recent years population assessment programs have provided more reliable indicators to composition of the crab stocks, eliminating the necessity for commercial vessel observer programs. The logbook programs and fisherman interview program have supplemented population assessment data.

In crab fisheries lacking a population assessment program of either trawl or pot surveys, the continuance of observer programs have provided data to evaluate the prospects of future recruitment levels. The data derived from logbooks and fisherman interview programs was generally more indicative to overall composition of the stock than observer programs, when considering the magnitude of the recordable data base coverage.

During the years when observer trips were a more integral part of the Department's crab management program, the following areas were the major factors in which observer programs were conducted to record data for development of management strategy.

1. Shell condition:

During the development of the crab fisheries, fishing activities often encompassed the mating and molting period of the species harvested. Due to the desire to maximize production, fisheries occurred that handled mass volumes of softshell crab, in which significant mortality of non-commercial crab was documented by shipboard observations of commercial catches.

2. Fecundity data:

After peak harvest of the king crab stocks in the Kodiak area in the late 1960's, reports from fisherman indicated the increased occurrence of barren or partial clutches of eggs observed in the commercial catches of certain crab stocks.

In order to evaluate the reports, observer programs were developed to record the intensity of the occurrence by sampling the female population randomly through the extent of the commercial fishery.

3. Incidental catch:

Certain crab fisheries have exhibited catches of high rates of non-target crab species resulting in an unacceptable level of mortality of crab by handling.™ The occurrence of large numbers of softshell king crab in certain areas of the Kodiak dungeness fishery created a management problem in which the pot gear prohibited the removal of softshell crab without creating a high mortality rate.

4. Stored gear:

Observations of improperly stored crab gear has recorded significant crab stock waste. Although dungeness gear appeared to represent the most destructive gear, it was observed to be a problem in all crab gear left over a period of time in fishing condition.

Although the Department's observer programs were conducted primarily for the areas of concern, the trips allowed the collection of biological and statistical data to supplement the population sampling conducted by other data gathering programs.

Regulatory actions were adopted to eliminate most of the problems documented by shipboard sampling, which has reduced the need for observer trips, except for incidences of incidental catches of non-target species. Recent efforts have been directed at certain trawl fisheries and early spring dungeness crab fisheries that have had reports of high rates of king crab catches.

It might be interesting to note that observer trips to document reported newly developed incidental king crab catch in shrimp trawls and early season dungeness fisheries have recorded insignificant amounts of incidental king crab catches.

In the documented instances of incidental catch rates of non-target crab, handling of softshell crab and gear left in fishing condition on the fishing grounds, regulations have been developed, as seasons allowed during the non-critical period of the crabs life cycle, area and time closures and gear modification to allow crab escapage. Harvest level restrictions were initiated to maximize reproductive potential of the stocks, when reduced female fecundity was recorded.

The recent years have generally seen an overall management strategy that has established seasons that occur during periods of minimal damage due to handling, maximizing the escapage of undersize crab by mesh size, time area closures to protect vulnerable crab stocks and exploitation rates decreased that maintains normal fecundity level. The development of trawl and pot index surveys in all major crab fisheries has provided the data base to record the available stock composition and population level estimates.

Evaluation of Bering Sea Observer Program

The sudden reduction in the availability of both legal and sublegal male king crab in the southeastern Bering Sea red king crab stocks compared to the previous year trawl survey produced the obvious concern by the industry in respect to the accuracy of the 1981 trawl survey. The initial request to develop an observer program appeared primarily to insure that if commercial pot catches demonstrated crab abundance not represented by the 1981 trawl survey, that a conservative viewpoint would not be taken in the management or the fishery. Additional biological information and evaluation of fishing techniques were indicated as program benefits. Due to the short time before the start of the 1981 fishery it was logistically not feasible to initiate such a program for the 1981 season.

The reduced level of abundance of male king crab (both legal and sublegal) requires some explanation for the incompatible estimates of the 1980 to 1981 trawl survey. If this sudden reduction of availability was not an overestimation of the stock level in 1980, then other factors as predation, environmental conditions or man related mortalities would have to be the contributor. Since the reduction was more sex related, this factor further complicates the evaluation.

AREAS OF DETERMINATION BY OBSERVER PROGRAM

<u>OBJECTIVE</u>	<u>OBJECTIVE FEASIBILITY</u>
1. Verification of population index.	Duplication of NMFS trawl survey.
2. Environmental evaluations.	Trend information accomplished by NMFS trawl studies (temperature, etc.). Program duplication.
3. Sampling of commercial legal catch.	Duplication of dockside sampling program. 30,000 samples annually.
4. Shell condition.	Seasons established for optimum shell condition exist.
5. Incidental harvest.	More refined data base for volume of incidental non-target crab harvest. Present dockside interview system records this information in general terms. Interview form could be modified to increase information base.
6. Female fecundity.	Observer program would provide hard data to verify female fecundity data.
7. Handling mortality.	Obvious mortalities recorded, but actual mortality levels would continue to be unknown in respect to crab returned to water.

8. Gear evaluation. Program would produce verification of reducing incidental catches, sublegal and female crab, by observation of catch rate of differential mesh size and mortalities of various pot handling techniques could be assessed.
9. Verification of catcher/processor operations. Observers aboard catcher/processors could provide desired objectives of program, but sampling would not be random from population. Most significant factor would be compliance with regulations.

Of the proposed observer program objective, the following would appear to have the highest priorities:

1. Female fecundity - should the 1982 trawl survey indicate a reduced female population level, the degree of fecundity levels is an important data base to compare with the trawl survey results.
2. Estimate of handling mortality - recording of actual mortalities and potential mortalities of crab returned to water, such as leg loss, damaged shells, and floaters that are subject to bird predation.
3. Gear evaluation - recording of incidental catch rates of non-target species, sublegal and female crab of target species. Other important factors to evaluate would be: a. gear mesh size/sorting relationship; b. mortality rate versus pot handling technique.
4. Affect of long term pot storage - pre-season observer trips aboard vessels removing gear from long term storage may produce some information in relation to mortality of crab in stored gear.

For the up-coming Tanner crab season, all of the above objectives would provide additional information to evaluate affects upon the 1982 trawl survey estimates.

ALTERNATE METHOD OF OBTAINING DATA BASE

The Department of Fish and Game annually conducts a fisherman interview program in lieu of a logbook program. The 1981 interviews have been expanded to record additional information in respect to composition of catch. This data is currently being summarized.

For the 1982 season the interview form is being re-vamped to record information concerning the composition of catch that will be compatible for key punching. Mesh size information, incidental catch rates, estimation of mortality and gear handling techniques will also be recorded.

To assist this program a comparative logbook program could be provided by selected volunteer vessels.

Department of Fish and Game data forms and logbooks currently exist for the observer program, and a volunteer logbook program. Computer program exists to analyze the data with some assistance in funding of key punch personnel time.

General Conclusion

The accomplishments of an observer program or an increased fishermen interview program to make assumptions on the desired objectives of the program, is not optimistically expected to provide any conclusive answers for the resulting low 1981 abundance levels. All of these factors have been experienced in all crab fisheries for the past twenty years, with the primary controlling factors relating to population fluctuations being attributed to the following factors by the biologists associated with crab resources:

1. Natural population - level fluctuations.
2. Errors in population estimates.
3. Dramatic decrease in crab availability after an extremely high exploitation rate, when an assumed higher population level exists.

When intense fishing effort and increased exploitation rates occur in population assessment, estimates tend to reflect more dramatic fluctuation of anticipated crab availability, whether upwards or downwards.

The index estimate of the female and male population levels in the 1982 trawl survey may resolve more questions than programs being established to evaluate the less significant factors in population fluctuation.

"Mother Nature" or the exploitation of man in most fisheries has the major impact on population levels. "Mother Nature" you have little control and man's affect is a product generally from the desire to maximize the return from a resource to satisfy desired economic benefits for over capitalization.

LIST OF POTENTIAL FORMS FOR OBSERVER PROGRAM (Forms exist on waterproof paper.)

1. Waiver of Liability: Form utilized by ADF&G for current observer trips.
2. Standard Crab Logbook Program: Computer programs presently exist for compiling this data and supply of logbooks on hand.
3. Female Fecundity: Record length of king crab carapace and relative clutch size for every female, in every pot sampled.

4. King Crab Pot Fishing Data: Record length of king crab carapace and exoskeletal age of each male captured in every pot sampled.
5. Detailed Pot Station Summary: Record the number of males and females captured in each pot lifted.
6. Incidental Species Captured Form: Record the important incidental species captured.
7. Pilot House Skippers Form: Record of exact position of fishing of every pot sampled.
8. Fishermen's Confidential Interview Form:

Area "T" - (Bering Sea)

For the 1981 area "T" Bering Sea red king crab fishery, a total of 356 vessel interviews have been conducted. This represents 46 percent of the total landings and 80 - 90 percent of all the vessels fished.

Area "Q" - (Pribilofs)

This fishery has a recorded 122 vessel interviews and represents 39 percent of landings.

The interview forms are currently being key punched to summarize the vessel comments in respect to sorting of crab, catch composition and area of catch.

The present interview form is in the process of being revised to allow interview data to be recorded in a manner to expedite key punching. The draft of this revised form will be reviewed during the January shellfish workshop at Kodiak for utilization during the upcoming Tanner crab season.

WAIVER OF LIABILITY

To be completed and approved in advance

I, the undersigned, do hereby waive all claims for liability against the State of Alaska for injury or loss sustained by me in conjunction with the following:

- 1. Purpose _____
- 2. Travel aboard _____
- 3. Division concerned _____
- 4. Location _____
- 5. Project _____
- 6. Period covered - from _____ to _____

REMARKS _____

Signature Date

Agency/Organization

APPROVED:

Ronald O. Skoog
Commissioner

by: _____ Date
Regional Supervisor
Division of _____

INSTRUCTIONS

Complete in triplicate - forward directly to Regional Supervisor for approval. Regional Supervisor will distribute as follows:

- White Original - Headquarters (Division of Administration)
- Yellow Copy - Headquarters (Division concerned)
- Pink Copy - Field Office concerned

CRAB LOG

2

MO. 2	DAY 4	YEAR 6

VESSEL A. D. F. & G. NO. 11

MO. 2	DAY 4	YEAR 6

VESSEL A. D. F. & G. NO. 11

20	NO. OF CRABS 23	DAYS SOAK 25	DEPTH 28	AREA 31	POT TYPE 35	FILE NO. 17	POT NO. 20	NO. OF CRABS 23	DAYS SOAK 25	DEPTH 28	AREA 31	POT TYPE 35	COMMENTS REGARDING FEMALES, SMALL MALES, SOFT CRABS, HALIBUT, OTHER CRABS & GEAR.
						41							
						42							
						43							
						44							
						45							
						46							
						47							
						48							
						49							
						50							
						51							
						52							
						53							
						54							
						55							
						56							
						57							
						58							
						59							
						60							
						61							
						62							
						63							
						64							
						65							
						66							
						67							
						68							
						69							
						70							
						71							
						72							
						73							
						74							
						75							
						76							
						77							
						78							
						79							
						80							

DESCRIPTION OF CRAB FISHING GEAR

2

FILE NO.	POT NO. or IDENTIFICATION	POT SHAPE	POT DIMENSIONS	ATTITUDE OF TUNNEL EXIT			NO. OF TUNNELS PER POT
				VERTICAL	HORIZONTAL	OBLIQUE	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

SPECIES:

FEMALE FECUNDITY KING CRAB

3

Vessel

Recorder

Page 2 of 2

Carapace Length

Station String#	YEAR	DEPTH	POT #	MONTH	DAY	STAT. AREA	SUB AREA	BAY DIST.	POT ORDER
	5	10	25	34	36	38	64	66	68
									70

0 mated total

Station String#	YEAR	DEPTH	POT #	MONTH	DAY	STAT. AREA	SUB AREA	BAY DIST.	POT ORDER			
140	1	10	20	30	40	50	60	70	80	90	100	
141												
142												
143												
144												
145												
146												
147												
148												
149												
150												
151												
152												
153												
154												
155												
156												
157												
158												
159												
160												
161												
162												
163												
164												
165												
166												
167												
168												
169												
170												
171												
172												
173												
174												
175												
176												
177												
178												
179												
180												
181												
182												
183												
184												
185												
186												
187												
188												
189												

Portals

KING CRAB POT FISHING DATA

4

DATE _____ LOCATION _____ DEPTH _____

POT NO. _____ OBSERVERS _____

Day	NUMBER OF MALES			(mm) Length	NUMBER OF MALES			(mm) Length	NUMBER OF MALES			(mm) Length
	Shell age (months)				Shell age (months)				Shell age (months)			
	1-12	13-24	25-36		1-12	13-24	25-36		1-12	13-24	25-36	
51				101							151	
52				102							152	
53				103							153	
54				104							154	
55				105							155	
56				106							156	
57				107							157	
58				108							158	
59				109							159	
60				110							160	
61				111							161	
62				112							162	
63				113							163	
64				114							164	
65				115							165	
66				116							165	
67				117							167	
68				118							168	
69				119							169	
70				120							170	
71				121							171	
72				122							172	
73				123							173	
74				124							174	
75				125							175	
76				126							176	
77				127							177	
78				128							178	
79				129							179	
80				130							180	
81				131							181	
82				132							182	
83				133							183	
84				134							184	
85				135							185	
86				136							186	
87				137							187	
88				138							188	
89				139							189	
90				140							190	
91				141							191	
92				142							192	
93				143							193	
94				144							194	
95				145							195	
96				146							196	
97				147							197	
98				148							198	
99				149							199	
100				150							200	

YEAR MONTH DAY STAT. AREA SUB AREA VESSEL

DAILY CUMULATIVE SUMMARY
(Ocean Stations)

Recorder _____

Sequence

Station or String#	Pot #	FEMALES			MALES			SOAK TIME (hrs)	Totals	Station or String#	Pot #	FEMALES			MALES			SOAK TIME (hrs)	Total
		Juv.	Adult	New	Old	Very Old	Juv.					Adult	New	Old	Very Old				
5	34	49	52	55	58	61	73	Totals	5	34	49	52	55	58	61	73	Total		

1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	

TOTAL CUMULATIVE

5

Location _____

PILOT HOUSE "SKIPPERS" FORM (Bay)

Vessel _____

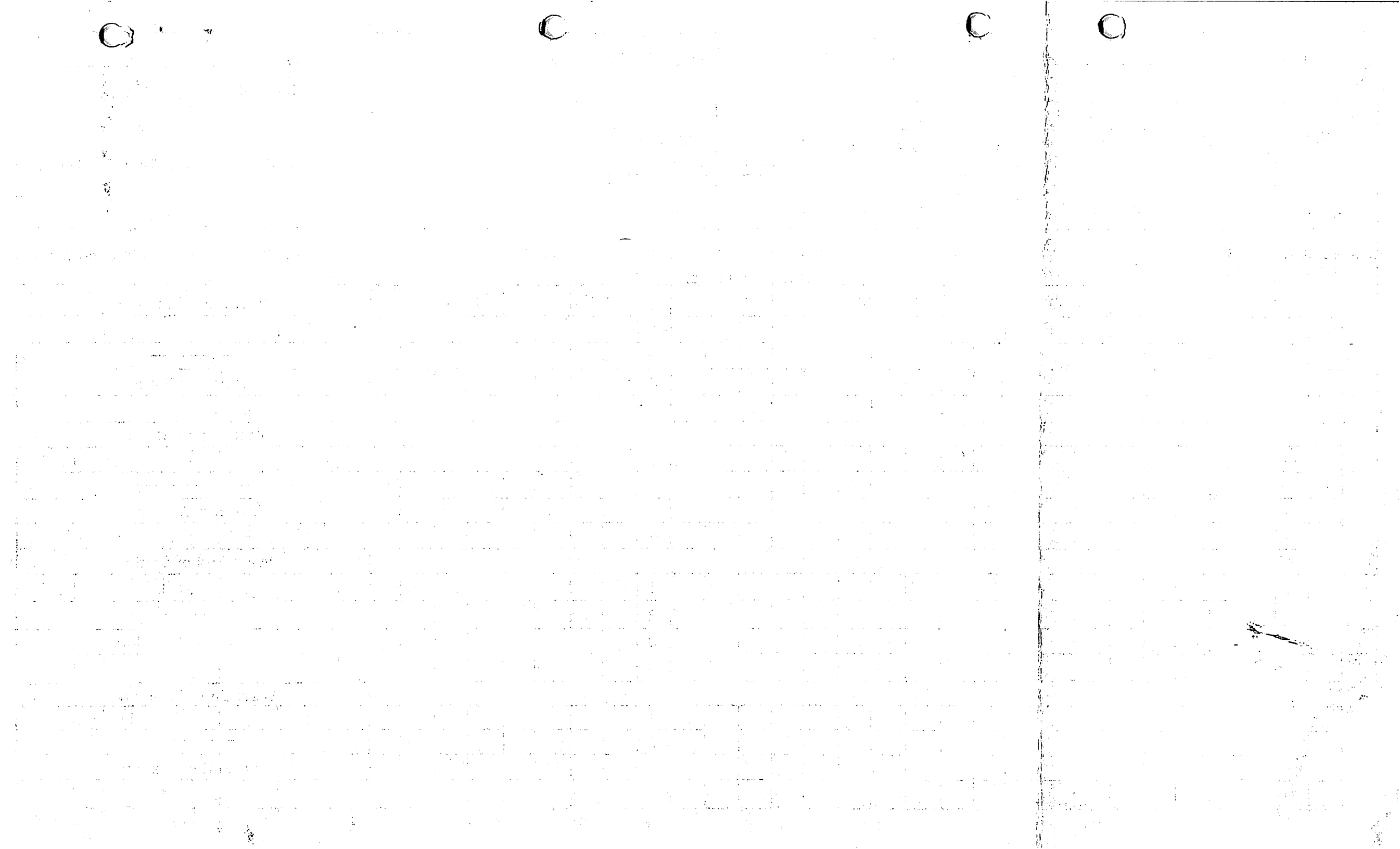
Recorder _____

Year	CONDITIONS DURING SOAK												
	WIND		SEAS (ft)	TIDAL DIFFERENCE	PRESSURE	RAIN-FOG SUN	LORAN or Long Lat						
	Vel.	Dir.											

POSITION AND DIRECTION OF SET

STATISTICAL AREA	SUB AREA	STATION #	SET GEAR			POT # (bouy)	DEPTH (fathoms)	POT ORDER	LIFT GEAR			LORAN Position of End Pots in each String									
			Month	Day	Military Time				Month	Day	Military Time	West End of Station									
								1													
								2													
								3													East End of Station
								4													
																					West End of Station
								1													
								2													
								3													East End of Station
								4													
																					West End of Station
								1													
								2													
								3													East End of Station
								4													

LH



BERING SEA SHIPBOARD OBSERVER PROGRAM

Line Item Allocation

<u>100 Permanent</u>	<u>100 Seasonal</u>	<u>200</u>	<u>300</u>	<u>400</u>	<u>500</u>	<u>Total</u>
45.8	350.0	123.0	10.5	23.0	0	552.3

General Description

In 1981 one hundred sixty-nine fishing vessels and eleven catcher/processors harvested Tanner crab in the Bering Sea from January through July. Currently, 212 fishing vessels and 11 catcher/processors are fishing for king crab in Area "Q" and "T" (Bering Sea). The Department of Fish and Game monitors the catch of crab utilizing dockside samplers who interview approximately 60 to 70 percent of the vessels. The current program has two weak points, which are that no samples are collected from catcher/processors and no biological information can be collected on sublegal crab or female crab from the vessels contacted at processors docks.

A shipboard observer program would increase knowledge of fishing performance and especially it would insure catcher/processors adhered to regulations and reported their catches accurately.

The program would be quite expensive to operate depending on coverage of the existing fleet. The area is remote and commercial transportation and housing facilities would have to be utilized. Individuals would be trained and assigned vessels at Dutch Harbor. Individuals would be expected to stay aboard the vessel during its participation in the fishery.

Major Objectives

- (1) Collect data on sublegal and female crab.
 - (a) Lengths
 - (b) Weights
 - (c) Shell condition
 - (d) Number, etc.
- (2) Monitor catches and report same when placed aboard catcher/processors.

(3) Keep accurate log of fishing procedures - sorting CPUE, Area and depth fished.

100 Personal Services

(A) Permanent Personnel - Fishery Biologist II

(1) Stationed at Dutch Harbor training officer and co-ordinator for observer program (new position) - \$ 45,818.

100 Personal Services

(A) Tanner crab (February 15 - July 15).

(1) *F.B.I - 14A - 5 man months @ 2,846	\$ 14,230.
18 F.B.I - 90 man months @ 2,846	\$256,140.
(2) **F.B.I - 14A - 1.5 man months @ 2,846	4,269.
22 F.B.I - 33 man months @ 2,846	<u>93,918.</u>
Total	\$350,058.

200 Travel and Per Diem

Air transportation from Kodiak to Dutch Harbor and return to Kodiak for forty observers during the two fisheries.

<u>Personnel</u>	<u>Travel</u>	<u>Per Diem</u>	<u>Location</u>	<u>Cost</u>
(1) F.B.I	846.00	4 days @76.00 - 296.00	Kodiak/Dutch	\$ 1,142
(40) F.B.I				45,680

Board and room aboard vessels:

King crab fishery

1) 45 days @21/day	945
a) 22 F.B.I x 945	20,790

Tanner crab fishery

1) 150 days @ 21/day	3,150
a) 18 F.B.I x 3,150	56,700

Total \$123,000

* 10 percent coverage - 180 vessels - 18 positions.

** 10 percent coverage - 223 vessels - 22 positions.

300 Contractuals

(1) Communications

(a) Telephone	\$ 2,000
(b) Telegram	500
(c) Xerox	2,000

(2) Aircraft Charter

(a) 10 hrs. twin engine @400/hr.	4,000
(b) 10 hrs. single engine @200/hr.	<u>2,000</u>

Total \$ 10,500

400 Commodities

(1) Survival suits @250 each x 40 \$ 10,000

(2) 40 calipers @ 100 each 4,000

(3) 40 pairs rain gear @ 100 each 4,000

(4) Misc. supplies 5,000

Total \$ 23,000

500 Equipment

Total 0