


MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director 

DATE: April 14, 1993

SUBJECT: Crab Management

ACTION REQUIRED

Review Alaska Board of Fisheries decisions and crab management in general.

BACKGROUND

Bering Sea Crab Management

In January 1993 the Council requested a presentation at the April meeting on king and Tanner crab research and science and general management of the crab resources in the BSAI. Subsequent to this request, Dr. Gordon Kruse presented a paper to the Board of Fisheries, titled "Biological Perspectives on Crab Management in Alaska," that provides a thorough review of crab management.

You received a copy of this report in a March 1993 Council mailing. Unfortunately, Dr. Kruse will not be available to present his report to the Council at this time. However, Ken Griffin, the new Crab FMP Coordinator from ADF&G, will be available to discuss information presented in this report.

Alaska Board of Fisheries February 1993 Meeting

In February 1993 the Alaska Board of Fisheries held its triennial meeting on statewide crab management and made several major recommendations for BSAI king and Tanner crab management, including: establishing a revised pot limit, changing season opening dates, and establishing superexclusive registration for the Norton Sound red king crab fishery. Attached as Item D-5(a) is a summary of this meeting from the Alaska Department of Fish and Game. Ken Griffin will present this report to the Council.

Attached as Item D-5(b) are two reports from the Pacific Northwest Industry Advisory Committee (PNCIAC). The first report is a summary of the Committee's April 6, 1993 meeting in which the group reviewed the recent Board of Fisheries decisions. The second report summarizes the group's recommendations to the Board of Fisheries regarding the proposals heard at the February Board meeting. Generally speaking, the PNCIAC expresses frustration regarding its effectiveness as an advisory body to the Board of Fisheries.

One decision made by the Board of Fisheries that may concern the Council is designating the Norton Sound king crab fishery a superexclusive registration area. This means that if a vessel chooses to fish the Norton Sound king crab fishery, it cannot fish for king crab in any other king crab registration

areas in Alaska. The Alaska Crab Coalition (ACC) has submitted a petition to the Board of Fisheries to repeal the superexclusive registration decision because the ACC believes the FMP does not give the Board authority to establish a registration area as superexclusive. If the Board of Fisheries rejects this petition, the crab FMP allows for the appeal to be reviewed by the Crab Interim Action Committee prior to being reviewed by the Secretary of Commerce. The ACC's petition is attached as Item D-5(c). As of this date, the Board has not issued its finding on its decision, therefore this issue will not proceed until a finding is issued and the Board acts on the ACC petition. Note that the Norton Sound fishery begins on August 1.



REVIEW OF THE ALASKA BOARD OF FISHERIES DECISIONS
BERING SEA/ALEUTIAN ISLANDS CRAB MANAGEMENT
BY
ALASKA DEPARTMENT OF FISH AND GAME
FOR THE
NORTH PACIFIC FISHERIES MANAGEMENT COUNCIL

APRIL 21, 1993

The Alaska Board of Fisheries meet in Anchorage from February 2 - 10 to take public testimony, hear staff reports and review proposed regulatory changes to the Bering Sea and Aleutian Islands king and Tanner crab fisheries. Proposed changes included: fishing seasons, gear modification, registration areas, district registration pot limits, and changes to the Crab Observer Manual.

During their deliberations, the board adopted a comprehensive management plan entailing the complexities and interactions of multi-species management in the Bering Sea/Aleutian Islands. A great deal of time was spent by the board considering bycatch issues and their effects on the stocks in the Bristol Bay king and Tanner crab fisheries. Observer information from the 1992 Bristol Bay red king crab fishery shows an average catch per pot of 5.2 legal, 11.2 sublegal, and 11.7 female, red king crab and 4.2 legal

C. bairdi Tanner crab. The bycatch of female and sublegal red king crab and bairdi Tanner crab in the Bristol Bay king crab fishery was addressed in several ways: 1) Opening the Bristol Bay red king crab season and the Bering Sea bairdi Tanner crab season simultaneously. 2) Allowing the retention of both species during the red king crab fishery. 3) Closing the area east of 163° to a further take of bairdi Tanner crab after the red king crab season, and 4) Changing the escape panel mesh requirement in the fishery from 7 3/4 inches to 9 (nine) inches.

For the Bering Sea Tanner crab fishery, bycatch of king crab and female and sublegal Tanner crab, was address by: 1) Moving the fishery west of 163°, off the major king crab grounds, and 2) Requiring a minimum of a three (3) inch tunnel eye height in the pots.

The board also addressed the problems that managers are encountering with the large effort levels experienced in all the Bering Sea fisheries by: 1) Re-establishing pots limits for the Bristol Bay and Bering Sea king and Tanner crab fisheries, and 2) Establishing a super-exclusive registration area for the Norton Sound red king crab fishery. Unlike the pot limits adopted by the

board in 1992, where all vessels participating in a fishery were allowed to fish up to the legal limit, the new regulation allows larger vessels, those over 125 foot in keel length, to fish a greater number of pots. For fisheries that have small preseason harvest guidelines, such as the Pribilof Island blue king crab fishery which has not been opened for the past two seasons due to the large anticipated fishing effort, the pot limit was reduced considerably, as was the pot limits for the Saint Matthew and Norton Sound king crab fisheries.

In established the Norton Sound section as a super-exclusive registration area, vessels that fish for king crab in this area, may not fish for king crab in any other king crab registration area during the registration year, (June 28-June 27). The board heard testimony from area residents that they were prepared to fish and had attempted to fish during the summer fishery, but due to the large vessel effort the season had lasted only a few days making this short of a fishery impossible for locals to compete. Under the new designation, both resident and nonresident fishermen would still be able to participate in the summer fishery, but participants will not be able to fish king crab in other areas.

To assist managers with fisheries that have experienced derby type seasons, like the Saint Matthew blue king crab fishery, the board voted, not only to reduce the pot limit, but to hold the fishery concurrent to the Pribilof district blue king crab season. By conducting both seasons simultaneously, fishing effort would be distributed between the two areas. With the preregistration requirements for the issuance of buoy stickers, the managers will be able to determine effort levels prior to the opening of the areas, thus providing an orderly fishery.

The board heard from the staff that pot limits were not presently needed to manage the golden king crab fisheries in the Dutch Harbor and Adak areas. Most vessels are not presently equipped to fish golden king crab, therefore, effort levels are low. Fishing effort in the Dutch Harbor golden king crab fishery declines when more productive and higher value fisheries in other areas open. The Adak golden king crab fishery has lasted in excess of 288 days for the past seven (7) years, and has experienced a decline in vessel effort as the price and demand for golden king crab has decreased. The board did adopt new regulations allowing golden king crab in the Adak area to be taken only in longline gear for the following reasons: 1) Due the nature of the fishery occurring in deep waters in excess of 100 fathoms and in the passes of the Aleutian Islands

that experience enormous tides and currents, pots attached to ground lines are the only practical means of harvesting the brown king crab resource. 2) The brown king crab fishery in the Bering Sea/Aleutian Islands has evolved from a single pot fishery to the longline fishery of today, and 3) The retrieval of lost longline pots has been perfected by the fleet, vastly reducing the gear loss experienced in this fishery.

The board also adopted regulations requiring Tanner crab vessels to register for each district of Area J, (Westward), allowing the department to track fishing effort in each.

The board reaffirmed the biodegradable twine requirement at 30 thread, 100% cotton twine, but will allow the introduction of galvanic timed release devices. Galvanic releases must corrode within 30 days to meet the biodegradable regulation currently in affect.

During their deliberations, the board discussed, in length, the feasibility of conducting debriefings of crab shellfish observers in Anchorage and other locations. The staff informed the board that neither the funds nor the staff were available at this time to initiate this program without reallocating both from existing or other programs. After listening to management and observer staff comments concerning the problems that would be encountered with remote debriefing sites, (other than Dutch Harbor), and the staffing and budget problems of the department, the board determined that the implementation of other debriefing sites was not practical at this time, but should be considered by the department when the budget allowed.

Other changes to the Crab Observer Manual were primarily house keeping modifications meant to clarify problems encountered since the board last looked at the program. Most new regulations pertaining to the program centered around the observers qualifications, conflict of interest standards, certification, and performance standards.

During public testimony, the board acknowledged the formation of the Observer Oversight Committee established in the draft North Pacific Fisheries Research Plan. Since this committee would provide advice on the general provisions of the observer program and fee portions of the Research Plan to the Council, Board, the Commissioner of ADF&G, and the Regional Director of NMFS, the board agreed that this committee would be an asset to the existing state program.

Pot limits for Kodiak Tanner Crab first went into effect in the 1991 Tanner season. Prior to 1991 the department frequently had to announce closures of fisheries prior to having any landings or fishery performance information. For the past three years with a 75 pot limit in effect the fishery was managed inseason.

An example of this is in the eastside section fishery. In 1990 a total of 64 vessels landed 1 million pound in a 4 day fishery. There were a total of 8500 pots on the grounds. In 1991 there were approximately 3700 pots on the grounds fished by 49 vessels. The harvest was 800,000 pounds landed in 14 days of fishing.

The following year in 1992 the eastside was fished by 79 vessels with a total of 5100 pots. In this 10 day fishery the harvest was 2 million pounds.

Overall the condition of the stocks around Kodiak Island have continued to decline. If a pot limit were not in place it is very likely that a season would not have occurred for the past three years.

Pot limits in Kodiak have enabled the department to evaluate fishery performance inseason and manage a fishery based on fishery performance.

Total pots fished in Kodiak:

1989	17,100
1990	26,229
1991	9,560
1992	10,300
1993	10,000

Table 4. Catch per unit effort (CPUE) of commercially important species during the 1992 Bristol Bay red king crab fishery including total sample catch and estimated total catches in the fishery.

Species	Total pot ^a sample catch	Catch per unit effort	Estimated total ^b fishery catch
<u>Red king</u>			
legal male	1,520	5.2	1,070,472
sub-legal male	3,235	11.2	2,305,632
female	3,203	11.7	2,408,562
<u>C. Bairdi</u>			
legal male	1,213	4.2	864,614
sub-legal male	832	2.9	596,994
female	107	.4	82,344
<u>C. Opilio</u>			
legal male	18	.1	20,586
sub-legal male	0	-	-
female	0	-	-
<u>Pacific cod^c</u>	121	.4	82,344
<u>Yellowfin sole</u>	216	.7	144,102
<u>Halibut</u>	7	.1<	4,986

^aTotal pot contents derived from 289 random samples taken on catcher-processors during the fishery.

^bEstimated catch derived from pot sample CPUE x 205,860 total reported pot pulls during the fishery.

^cAll fish species mixed size and sex.

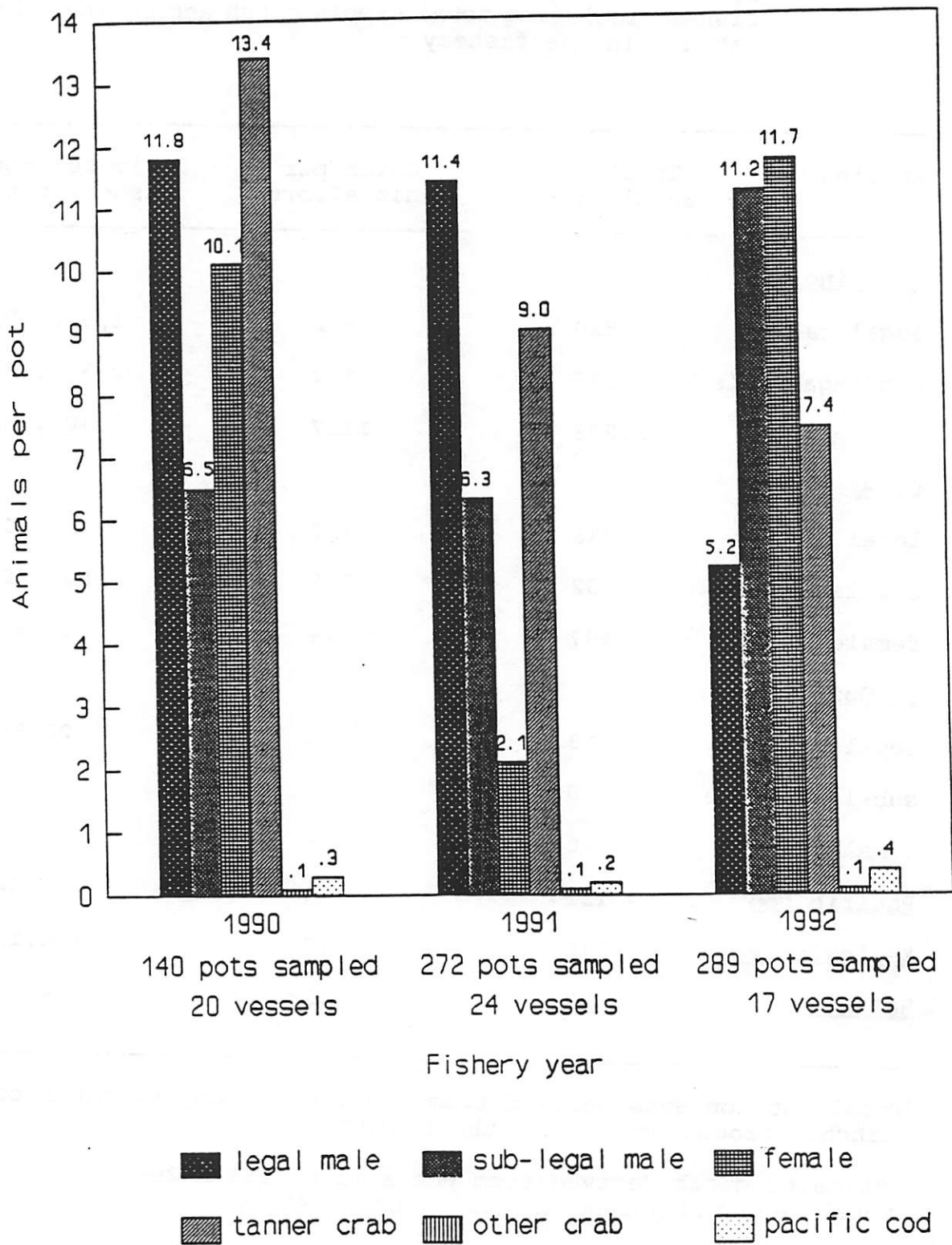


Figure 2

Bristol Bay red king crab fishery catch per unit effort in 1990, 1991 and 1992.

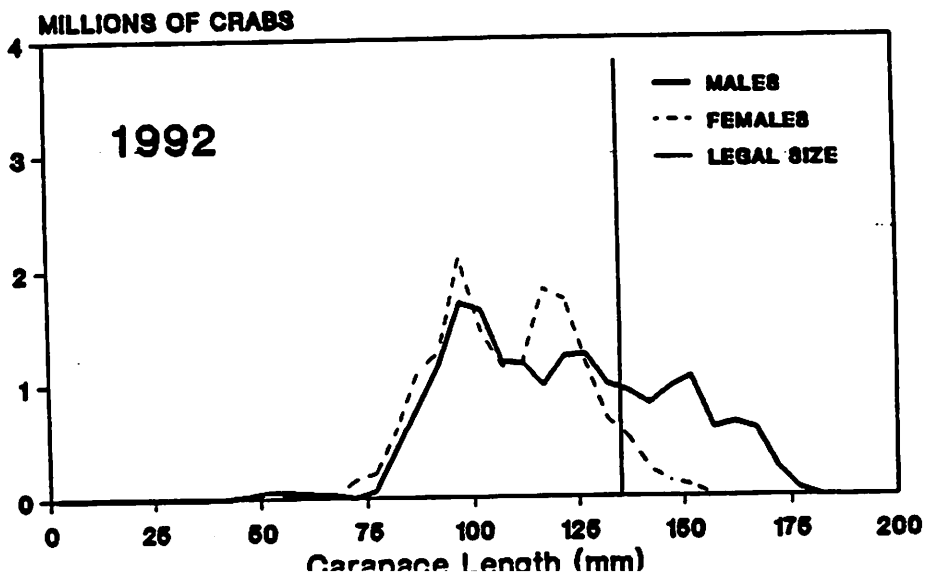
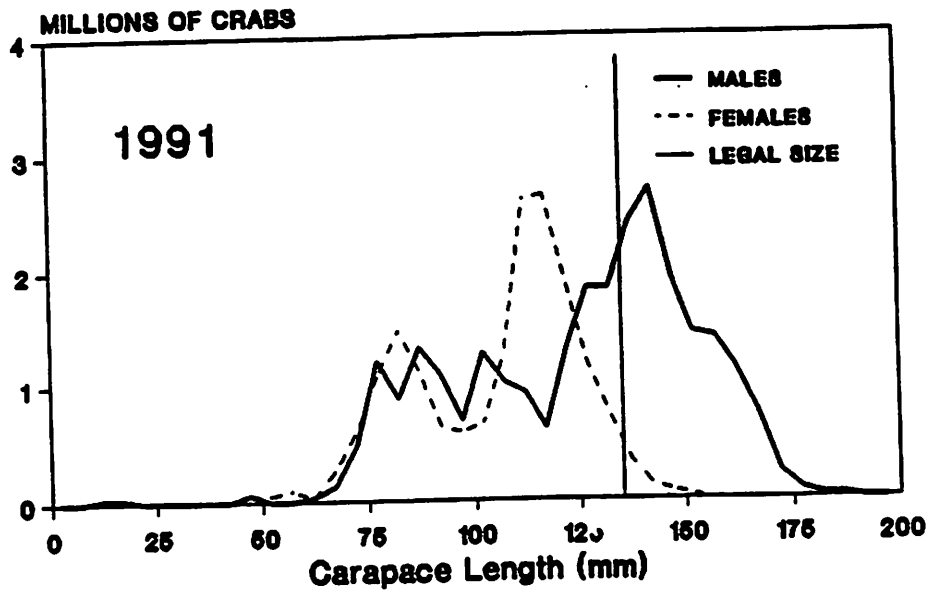
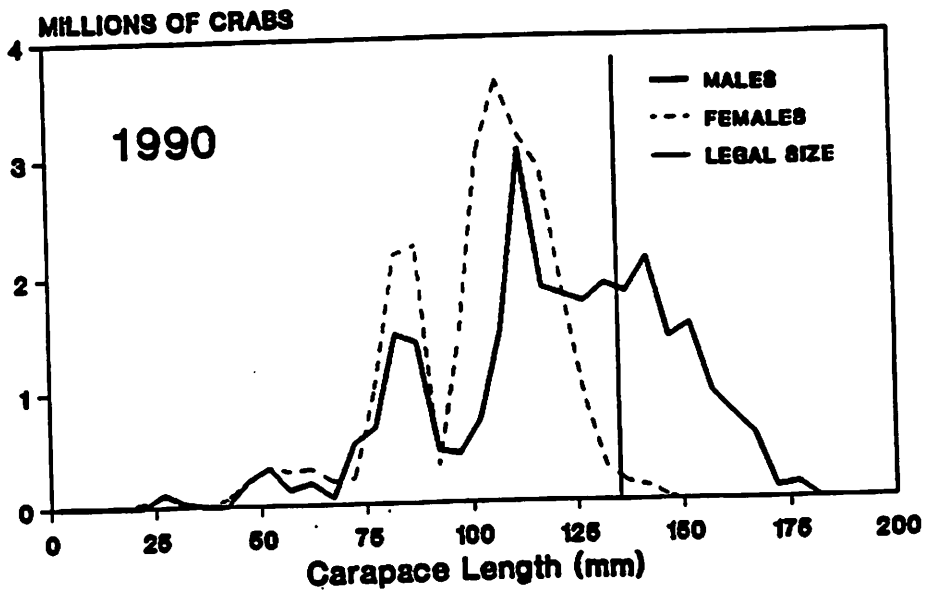
BERING SEA KING AND TANNER CRAB POT LIMITS

BY

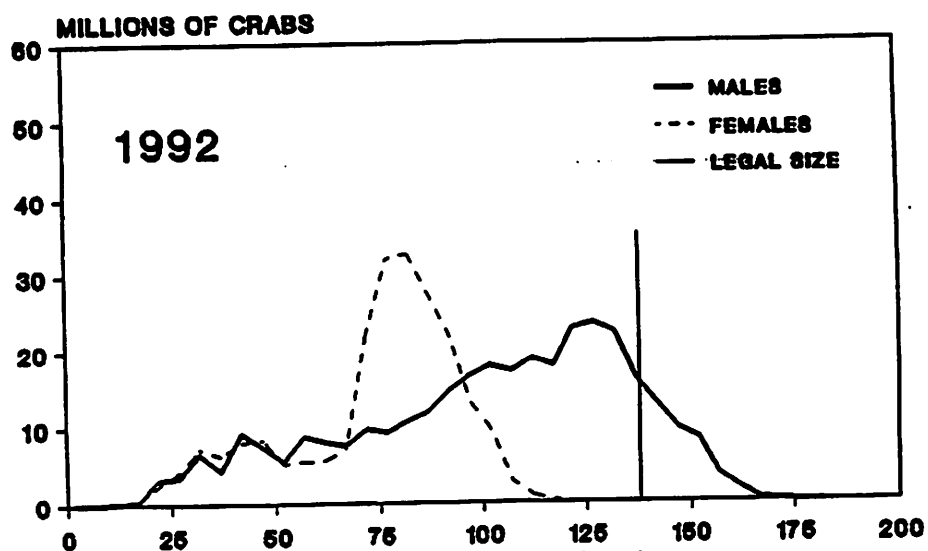
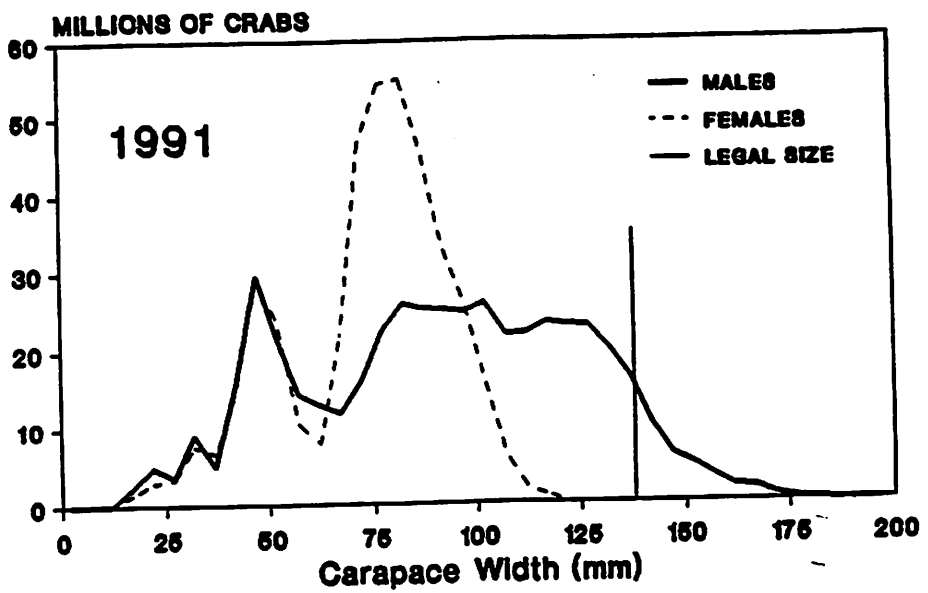
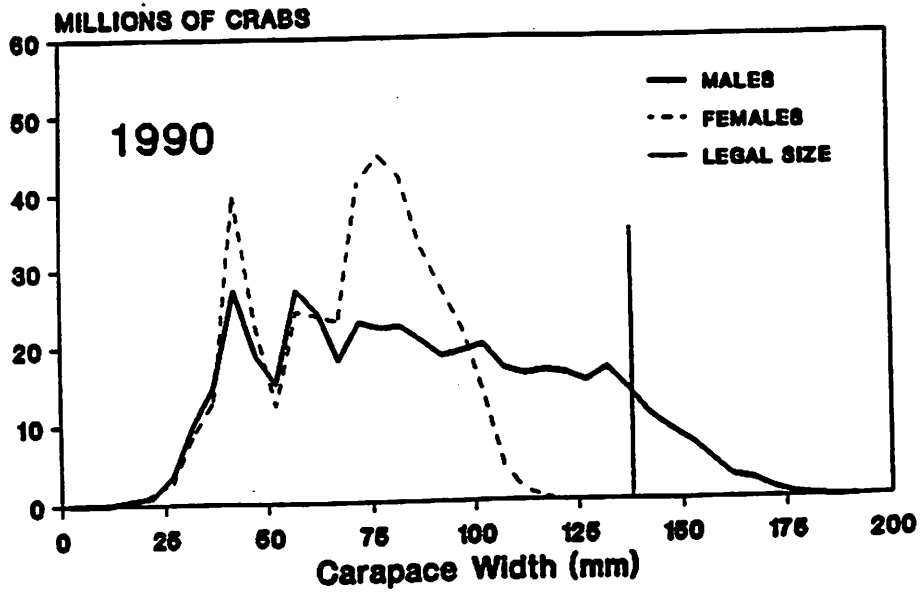
REGISTRATION AREA

<u>AREA</u>	<u>SIZE</u>	<u>VESSEL</u> <u>POT LIMIT</u>
Bristol Bay	< 125 ft	200
	> 125 ft	250
Bering Sea Tanner crab	< 125 ft	200
	> 125 ft	250
Saint Matthew	< 125 ft	60
	> 125 ft	75
Pribilof	< 125 ft	40
	> 125 ft	50
Norton Sound	< 125 ft	40
	> 125 ft	50
Saint Lawrence	< 125 ft	40
	> 125 ft	50

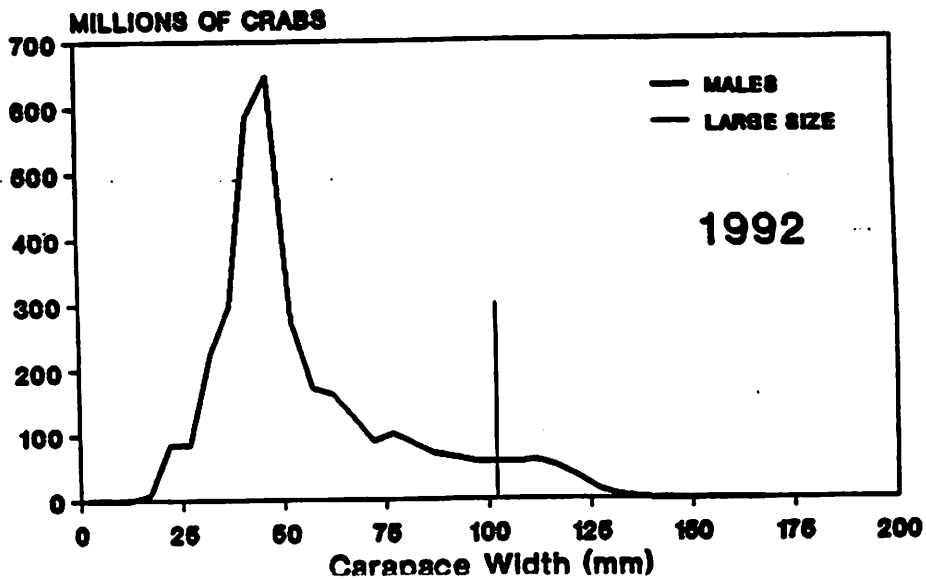
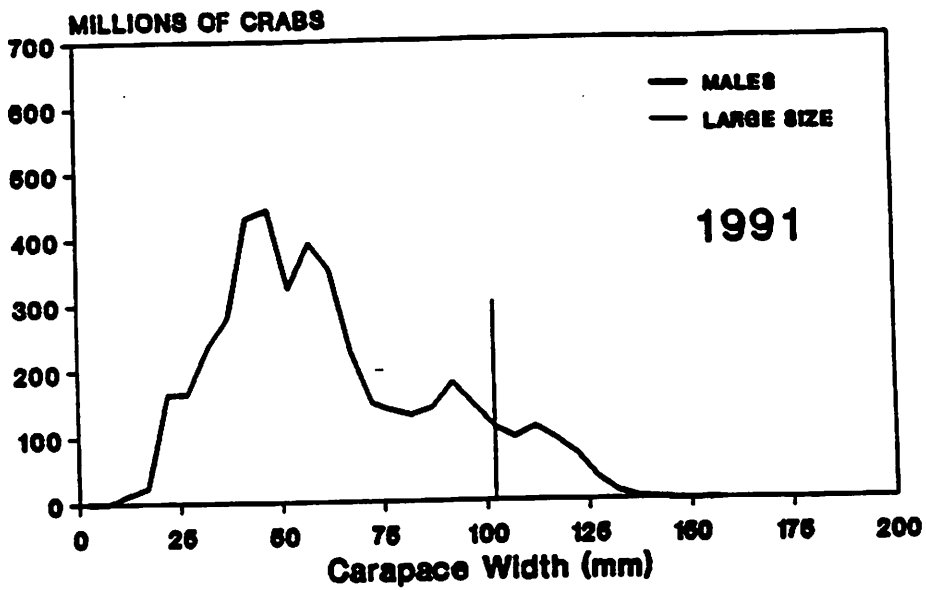
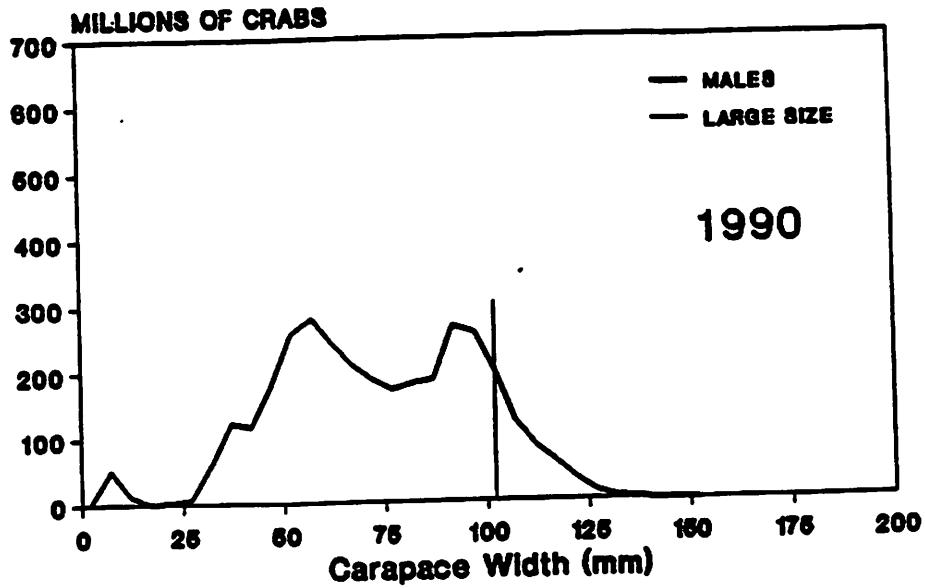
Red King Crab Length Frequency



C. bairdi Width Frequency



C. opillo Width Frequency



BIOLOGICAL PERSPECTIVES ON CRAB MANAGEMENT IN ALASKA:
AN ORAL REPORT TO THE ALASKA BOARD OF FISHERIES

By
Gordon H. Kruse

Regional Information Report¹ No. 5J93-02
Alaska Department of Fish & Game
Division of Commercial Fisheries
P.O. Box 25526
Juneau, Alaska 99802-5526

January 31, 1993

¹The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. . . These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

In the first of these, red and blue king crabs have been plotted together, but bear in mind that red king crabs constitute the majority of these landings [slide 2]. Note for example, that the Kodiak red king crab fishery built to peak landings in the mid-1960s, declined significantly in the late 1960s, and then more or less stabilized at much lower levels until the 1980s when the fishery crashed. The fishery has been closed since the 1983-1984 season due to extremely depressed stock abundance.

I'd like to give an overview of the history of landings for these six species. I'll be showing five slides [slides 2-6]. In each case, I'd like to emphasize the trends in landings. Please note that the units of the catches vary in each slide.

HISTORY OF FISHERIES

There are six primary species of crabs in Alaska that contribute to commercial landings [slide 1]. There are three species of king crabs: red (*Paralithodes camtschaticus*), blue (*P. platypus*) and golden king crab, (*Lithodes aegispinus*, otherwise locally known as "brown" king crab). We have two species of the genus *Chionoecetes*: Tanner crab (*C. bairdi*, otherwise referred to as "bairdi") and the snow crab (*C. opilio*, otherwise referred to as "opilio"). You will sometimes hear the terms *bairdi* Tanner crab and *opilio* Tanner crab, but scientists prefer the "recognized" common names of Tanner crab and snow crab. Our sixth major commercial species is the Dungeness crab (*Cancer magister*).

CRAB SPECIES

The presentation is based on a scientific manuscript accepted for publication in the *Proceedings of the International Symposium on Management of Exploited Fish Populations* (Kruse 1992). This Regional Information Report constitutes a much less technical version of that scientific manuscript. In essence, it is meant to serve as a written transcript of the oral presentation delivered during the Alaska Board of Fisheries at its meeting in Anchorage during February 2-10, 1993. Copies of the presentation slides appear in the back of this report.

We thought that we would begin the Board meeting with an overview of biology and management of crabs in Alaska. This talk is similar to a presentation that I have given at a couple of recent scientific meetings. One meeting was the *International Symposium on Management Strategies for Exploited Fish Populations* in Anchorage during October 21-24, 1992, and the other was the annual meeting of the Alaska Chapter of the American Fisheries Society in Valdez, Alaska, during November 16-19, 1992.

FORWARD

Partly in response to declining landings in the Kodiak fishery in the late 1960s, the domestic fishery for red king crabs in Bristol Bay developed. Landings from this fishery built steadily through the 1970s and peaked at 60,000 tonnes (130 million pounds) in 1980. Then, catches declined very rapidly, and this fishery was closed for one year in 1983 due to low abundance. In recent years this fishery has been conducted, but catches have been maintained at relatively low levels.

Most of the fisheries for other stocks of red and blue king crabs were maintained over approximately a 20 year period before they, too, crashed. Most of these fisheries remained closed due to very low stock abundance.

The declines of fisheries for red and blue king crabs, in part, stemmed the growth of markets and fisheries for Tanner crabs [slide 3]. In most areas of the state, landings built through the mid- to late 1970s. Fisheries for these Tanner crab stocks experienced declining landings from the late 1970s through the 1980s. Many of these fisheries produce low landings today, and some are closed due to depressed stocks. One major exception to this is the Tanner crab fishery in the Bering Sea, which peaked at 30,000 tonnes (66 million pounds) in the late 1970s, declined with the other Tanner crab stocks, but rebounded toward the end of the 1980s.

Dungeness crab fisheries offer much more contrast to patterns in landings for king and Tanner crabs [slide 4]. Note, for example, that fisheries for Dungeness crabs in Southeast Alaska, Yakutat, and Kodiak have experienced pronounced cycles in abundance over time. Generally speaking, these stocks have remained rather healthy for more than 3 decades. However, landings have always been rather low in all other areas of the state. In some areas (e.g., lower Cook Inlet and most of Prince William Sound), fisheries have been closed due to depressed stocks. So, we have a rather wide range in abundance and landing trends in fisheries for Dungeness crabs as compared to king and Tanner crabs.

There are two crab species that are now producing significant landings. The first of these is the golden king crab [slide 5]. Fisheries for golden king crabs developed with the demise of fisheries for other king crab species. Recall that all fisheries for red and blue king crabs crashed in the early 1980s: this marked the beginning of the golden king crab fisheries. Thus, fisheries on golden king crabs have a very short harvest history.

The species currently producing the greatest landings is the snow crab [slide 6]. In part, this fishery grew in response to the decline of fisheries for Tanner crab. The snow crab fishery reached 74,000 tonnes (162 million pounds) by 1990, and grew further to 150,000 tonnes (328 million pounds) in 1991. This is the single largest crab fishery in Alaska and in the world today.

CRAB MANAGEMENT

Alaskan crab management can be divided into four types of strategies [slide 7]. There are those fisheries that we manage by exploitation rate. For such fisheries, we survey stock abundance, and generate a guideline harvest level (catch "quota") based on an exploitation rate policy. Another strategy that we use is fishery performance. Typically, in this case we do not have an abundance survey, but often we have other information on stock status from the catch data such as size distributions or even catch per unit effort as a measure of relative abundance. These might be fisheries that we manage with guideline harvest ranges that are based on fishery performance.

The other two types are 2-S or 3-S, where the S's refer to size, sex, and season, respectively. A 3-S fishery harvests males only above a certain minimum legal size during specified fishing seasons. In the case of 2-S management, there is no biologically-based prohibitions on fishing seasons.

I would like to give a few examples of fisheries that fit into these categories [slide 8]. Note that most of the red and blue king crabs fisheries are managed by exploitation rate strategies. Many fisheries for Tanner and snow crabs are managed in this way, as well.

Some of the red king and Tanner crab fisheries and a few golden king crab fisheries are managed by fishery performance. A few king and Tanner crab fisheries and some Dungeness crab fisheries are managed by a 3-S strategy. Most Dungeness and golden king crab fisheries are conducted during the molting and mating periods. Thus, they are regulated by 2-S management.

I would like to point out that, while we have four basic strategies, there are three common threads or cornerstones to our management programs for crabs in Alaska. These are the size, sex and season regulations [slide 9]. Even in the case of exploitation rate management or fishery performance, size-sex-season are used. Certainly, there are a variety of other measures that we use (e.g., legal gear, observers, thresholds), and I do not want to downplay their importance.

There is a rather long history of usage for size, sex and season regulations [slide 10]. For example, in the Kodiak red king crab fishery, sex restrictions that prohibited female harvest were in place since the start of that fishery in 1938. Size limits were first instituted in 1949: that is, males only above some minimum size can be taken legally. Since the 1960s, managers began using fishing seasons. In particular, fishing was prohibited during the "biological sensitive periods" that include molting and mating.

I would also like to point out that most crab research studies, i.e., investigations into biology and life history, have been done since the 1960s. So, it is rather ironic that we happen to have a situation in which the cornerstones (size-sex-season) to our management programs have been established prior to the conduct of most of the relevant research. Certainly, research has had effects on regulatory changes over time, but the cornerstones to crab management have remained virtually unchanged since their inception.

PURPOSE

With those observations in mind, I ask the following question: "How would we design crab management today, if we had all the benefits of this 30 years of crab research, without the impediments of being entrenched in these management frameworks [slide 11]?" In other words, if we had started from scratch, what kind of management program would we have built?

The goal of my talk is first to try to bring together some of the key biology and life history features of these crab species. And secondly, based on this synthesis, I then suggest some new directions and perspectives on fishery management [slide 12].

CRAB CLASSIFICATION

There is no need to go into all of the details of crab classification here. But, it is worth noting that not all crabs are created alike. There are two, basic "types" of crabs [slide 13]. There are brachyurans which are the "true" crabs. These include Tanner, snow and Dungeness crabs and these are grouped with other species such as the blue crab of the east coast.

On the contrary, the king crabs are anomurans and are grouped with other species such as the hermit crab. I will show later that this is a lot more than just semantics, and that there are some very fundamentally different biological and life history features that go along with classification into these two groups. Further, these features have some profound implications on fishery management.

BIOGEOGRAPHY

One aspect worth considering is biogeography [slide 14]. It is a basic principle of biogeography that animals tend to be most abundant in portions of their range that have optimal habitats. This has an important implication on fisheries. It follows that fisheries that occur on stocks that reside near the geographic limits of a range of a species tend not to sustain high harvest levels.

As you might expect, there are a number of Alaskan crab stocks that live near the geographic limits of the range of the species [slide 15]. These include Norton Sound red king crabs at the northern limits of the range for this species. Blue king crabs reside at the southern end of their range in Southeast Alaska. Dungeness crabs in Prince William Sound, lower Cook Inlet, and along the Alaska Peninsula and Aleutian Islands occur at the extreme northern and western limits of the range for that species. I will point out implications of these distributions later in my report.

r AND K SELECTION

There is an area of biology that has some general implications to fishery management. To discuss these, I first need to define r and K selection [slide 16]. Ecologists tend to think of species residing along a spectrum. The two ends to this spectrum are occupied by r-selected species and K-selected species. The r species tend to be those that are very opportunistic. They don't live very long, they reach small sizes only, they reproduce once, and they grow very rapidly. Good examples of r-selected species are most terrestrial insects.

On the other hand, we tend to think of K-selected species as being more competitive. These species tend to live longer lives, they achieve large sizes, they reproduce multiple times and often have complex reproductive strategies, and they develop slowly. Good examples of K-selected species are most terrestrial mammals, including humans.

There are a number of attributes of r- and K-selected species that have relevance to fisheries [slide 17]. Age at which animals mature, for example, tends to be young for r-selected species. These species also tend to have low maximum ages, high annual mortality rates, and high egg production or "fecundity." On the contrary, K-selected species tend to have the opposite attributes.

I considered these four features with respect to red king, Tanner, and Dungeness crabs in Alaska [slide 18]. Age of maturity is rather similar (6-7 years of age) for red king and Tanner crabs, but Dungeness crabs tend to mature younger -- around age 3. Maximum age ranges from no more than 8 years for Dungeness crabs to more than 20 for the red king crab. Red king and Tanner crabs experience similar, moderate levels of annual mortality, which perhaps averages around 26% per year. There is a wide range in estimates of annual natural mortality rates for Dungeness crabs, but the average mortality rate of Dungeness crabs is greater than those of red king or Tanner crabs. Red king and Tanner crabs similarly produce up to half a million eggs, whereas Dungeness crabs produce up to 2.5 million eggs.

These attributes were considered in terms of r and K selection [slide 19]. I would place red king crab at the K end of the spectrum, Dungeness crab at the r end of the spectrum, and Tanner crabs somewhere in the middle. While I have not explicitly considered blue and golden king crabs nor snow crabs here, I would say the other king crab species would probably reside toward the K end of the spectrum with red king crabs, and snow crabs would fall somewhere in the middle with Tanner crabs.

It is important to realize that these r and K determinations are all very relative. Red king crabs are not nearly as K selected as, say, the Pacific Ocean perch that live to very old ages. Likewise, the Dungeness crab is not nearly as r selected as, say, the Atlantic blue crab that live to ages 2-4 only.

There are some general implications of r and K selection on fisheries [slide 20]. Generally, r-selected species tend to be very tolerant of very high fishing mortality, and yield per recruit (i.e., pounds per crab corrected for survival) tends to be maximized at a young age. Fisheries on these stocks tend to be productive, and stocks often recover quickly from overharvest.

The opposite is true for K-selected species. These tend to tolerate only low levels of fishing mortality, and yield per recruit tends to be maximized at older ages. Last, these stocks are much more vulnerable to overfishing and they recover slowly.

REPRODUCTION

Crab biologists consider three different measures of maturity for males [slide 21]. There is a *physiological maturity* which is the size at which they first begin to produce spermatophores. *Morphometric maturity* occurs at the size that a large chela (claw) is developed which may play an important role in reproduction. *Functional maturity* occurs at the size at which males first begin to participate in reproduction in the natural environment.

There are some reproductive benefits of large size [slide 22]. We know, for example, that functional maturity is always larger than physiological or morphometric maturity. We do not necessarily understand why this is, but the point is that it is the large males that tend to be most significant in reproduction. So, there is some advantage bestowed to large males, because they don't necessarily reproduce once they begin to produce sperm nor when they first develop a large claw.

In some species, females may require large males for reproduction. These large females may simply go unmated if there aren't large males available. Large males may mate with multiple females, whereas the small males may not be able to do so effectively. In addition, small males may have difficulty fertilizing a female's

full egg clutch.

How many opportunities do males have to mate? I already pointed out that functional maturity is larger than morphological maturity. Also, I want to point out that, in the past, it has been the Board's desire to set the legal size limit at 1-2 molts above size of maturity. One problem is that these have generally been based on morphological maturity. However, if we consider maturity to be functional maturity, then we find that, for red king crabs, legal size is nearly the same as size of maturity [slide 23]. So, a functionally mature red king crab off Kodiak does not have any opportunities to mate prior to becoming vulnerable to fishing. On the other hand, for Tanner and Dungeness crabs there is a "safe window" within which males become functionally mature and yet still have to molt once more before they become of legal size.

So, how many mating seasons are afforded to these crabs before they become harvestable size? There are none for red king crabs, because functionally mature crabs are already of legal size. But, additionally, red king crabs molt annually up to legal size. On the other hand, once Tanner and Dungeness crabs become mature, they tend to skip-molt or miss a year or more before molting again to legal size. So, males of these two species might have an extra year as mature, sublegal crabs before being recruited to the fishery, and they may have some added breeding chances compared to red king crabs.

There is another reproductive feature that is traceable to crab classification. This feature is sperm storage. We find that female brachyurans (e.g., Tanner and Dungeness crabs) possess abdominal receptacles that allow them to store sperm. Thus, males can inseminate them, and the females can save that sperm for use in subsequent egg extrusions to fertilize eggs up to two years later. On the other hand, with respect to anomurans (e.g., king crabs), males must be physically present when the female extrudes eggs in order for fertilization to take place. So, sperm storage capacity seems to be another advantage bestowed to the brachyurans compared to the anomurans.

GENETIC SELECTION

Another aspect deserving of attention is genetic selection [slide 24]. Recall that we have size limits for males, and in some cases we have rather high harvest rates on those large males. These two features are the ingredients for genetic selection to occur. When we use a size limit, we have the potential to selectively remove the fastest growing crabs from the population. When we have a high harvest rate, we increase the rate of selection. Obviously, crabs that grow faster (larger growth increments or higher molting probabilities) reach legal size sooner, and so they will be vulnerable to more years of fishing pressure.

It turns out that growth has a genetic component, so we can actually genetically select against fast growth and for slow growth. Additionally, growth tends to be linked to other features, such as fecundity and maturity. The main point is that fisheries with high harvest rates and size limits can actually select for population characteristics that lead to low productivity through time. That is, we can actually change the long-term productivity of our crab populations through genetic selection.

CAPTURE AND HANDLING EFFECTS

Capture and handling effects are important considerations in crab fisheries [slide 25]. I'm not going to go into this in any great detail, but the topic deserves serious attention. Again, recall that we have size limits and sex restrictions. Yet, our pot gear tends to capture crabs of various sizes of both sexes. These animals interact in the pots, and the pots get retrieved to the surface aboard the vessel. The females and sublegal males get sorted on deck and tossed overboard. This sequence of events can create a variety of lethal and sublethal effects that may influence the productivity of our fisheries. I term *catching mortality* as those deaths that occur within the pots prior to retrieval, *ghost fishing mortality* are deaths that occur in lost pots, and *handling mortality* are deaths that occur due to stress or injuries incurred during the sorting/discarding process. Sublethal effects include limb loss, reduced feeding rates, reduced growth, and loss of vision. So, it could well be that size and sex restrictions are causing some adverse effects on our crab stocks.

RECOMMENDATIONS

With that brief overview, I offer some recommendations. The first of these is that management should probably be most conservative for king crab fisheries and could be most liberal for fisheries on Dungeness crabs [slide 26]. To a large extent, this is based on our review of *r* and *K* selection. That is, king crabs, being most *K* selected, are probably least likely to tolerate high harvest rates. Whereas, Dungeness crabs, being most *r* selected, can probably better tolerate higher rates of exploitation. Recall the persistent cycles in Dungeness crab landings [slide 4]. Such cycles suggest some resilience of these stocks to overharvest.

Yet, management should probably be somewhat more conservative for Dungeness crab fisheries in Alaska than for Dungeness crab fisheries along the Pacific northwest coast. This is due to geographic variation in those key life history parameters. For example, Alaskan Dungeness crabs mature later, live longer, and probably have lower annual natural mortality rates than their counterparts to the south. So, they might tend to be somewhat more *K*-selected and more vulnerable to overfishing than stocks of

Dungeness crab residing along the Pacific northwest.

Management should be most conservative for fisheries on stocks of crabs that are at or near the geographic limits of the species' range. These include Norton Sound red king crabs (northern limits), blue king crabs in Southeast Alaska (southern limits), and Dungeness crabs in Prince William Sound, lower Cook Inlet, and along the Alaska Peninsula and Aleutian Islands (northern and western limits).

We should re-evaluate size limits [slide 27]. To do so, I argue that we need to consider size of functional maturity not morphological or physiological maturity. As I pointed out earlier, in the past it's been the Board's desire that legal size limit shall be 1-2 molts above size of maturity. But, because size of maturity has often been based on morphology, we have not necessarily provided a 1-2 molt buffer to those males that actually participate in reproduction.

Growth increment and molting probability are also important in considering size limits. How much does a crab grow each year, and does it grow every year? How much time does a crab spend as a mature crab before it molts to legal size? As we've seen with the Dungeness and Tanner crabs, species that begin to skip molt just prior to attaining legal size may have additional mating opportunities beyond those afforded to the king crabs.

Sperm storage appears to bestow reproductive advantages. This capability is one of the features that separates the brachyurans which have it and the anomurans which don't. We should consider the benefits of large body size, and the very real possibility that it is the largest males that are the most valuable to reproduction. Also, genetic selection needs to be considered when we re-evaluate size limits.

We should consider the merits of a female harvest. To do so, we should evaluate what effects our single-sex fisheries are having on sex ratio, and the implications of altered size distributions of spawning stocks. What happens to the largest mature females during fisheries for large males? Can they find mates?

Gear modifications should be made to reduce the catch of non-legal crabs so that we can minimize capture and handling effects [slide 28]. There are a number of options, and the Board will be hearing about some of these things a bit later in the meeting. As an alternative, we might even consider a very different management approach: abandon size and sex limits altogether, and institute a "keep what you catch" policy. I certainly would not advocate this for fisheries managed by 2-S or 3-S strategies. But, in cases where we have good abundance estimates, this may be a possibility worth considering. It may be a way to virtually eliminate capture/handling effects, and reduce genetic selection. If an

exploitation rate policy is maintained, we could actually increase the abundance of large males thus better preserving the natural size structure and sex ratio of the population. Certainly, such a change in management strategy would need to be very carefully weighed. Not only are there biological considerations, but economic factors (e.g., market effects) are very important.

Just as we have done for the king, Tanner and snow crabs, we should seriously consider seasonal closures for Dungeness crab fisheries during the molting and mating periods. This is a very sensitive period in the life history of Dungeness crabs when they are most vulnerable to handling mortality and cannibalism in pots.

Lastly, as we begin to reconsider some of the bases for our management of crabs, research needs to play a very integral part in these changes. Handling effects and genetics should be further investigated. Also, there are some very important features that regulate stock productivity that we really don't know much about, including annual mortality and growth. It is rather distressing that the two species (snow crab and golden king crab) that currently sustain some of our most significant fisheries are the same species that we know the very least about. Can we avert crashes of these stocks?

At present, we're working on some of these areas of crab research. So, we hope to be able to come forward with some concrete proposals for management changes in the not-so-distant future. We want to seriously consider fishery management alternatives, because of the long history of crab fishery collapses with past strategies and because we want to promote the healthiest fisheries possible for many years to come.

LITERATURE CITED

- Kruse, G.H. 1992. Biological perspectives on crab management in Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Professional Paper 071, Juneau.

BIOLOGICAL PERSPECTIVES ON CRAB MANAGEMENT IN ALASKA



**COPIES OF
PRESENTATION SLIDES**

Gordon H. Kruse

Alaska Department of Fish and Game
Juneau, Alaska U.S.A.

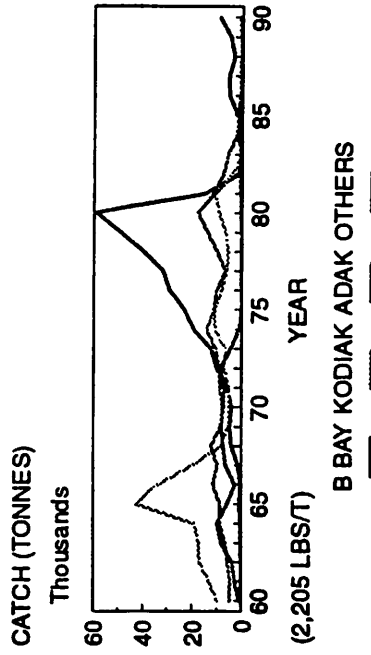
1

MAJOR COMMERCIAL SPECIES

- Red King Crab (PARALITHODES CAMTSCHATICUS)
- Blue King Crab (PARALITHODES PLATYPUS)
- Golden King Crab (LITHODES AEGUISPINUS)
- Tanner Crab (CHIONOCEETES BAIRDII)
- Snow Crab (CHIONOCEETES OPILIO)
- Dungeness Crab (CANCER MAGISTER)

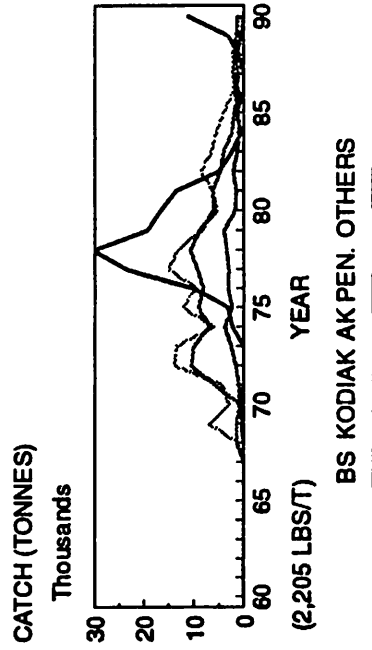
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RED & BLUE KING CRABS



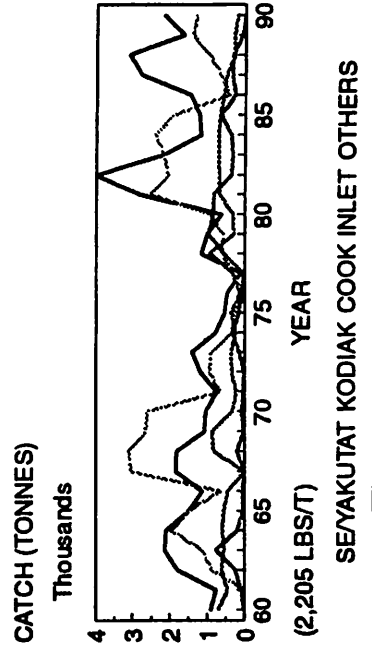
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TANNER CRAB



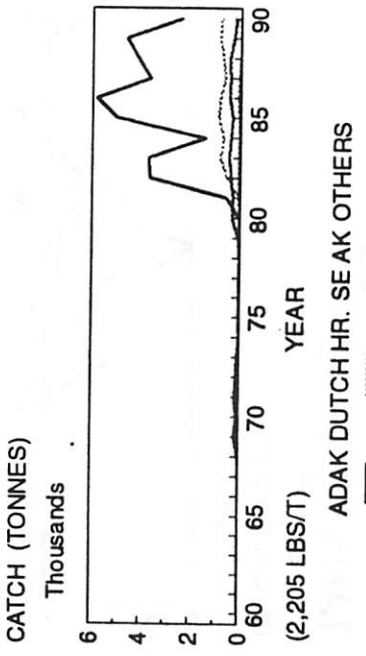
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DUNGENESS CRAB



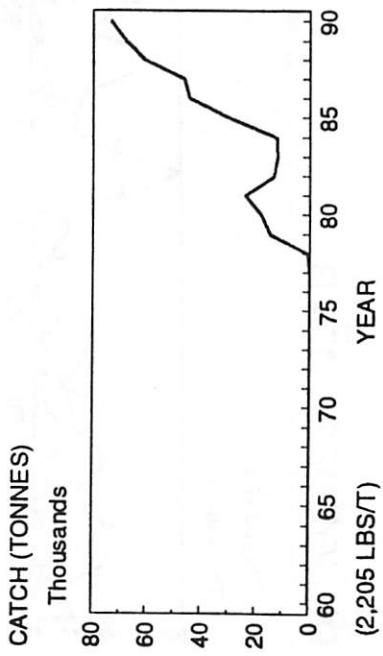
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GOLDEN KING CRAB



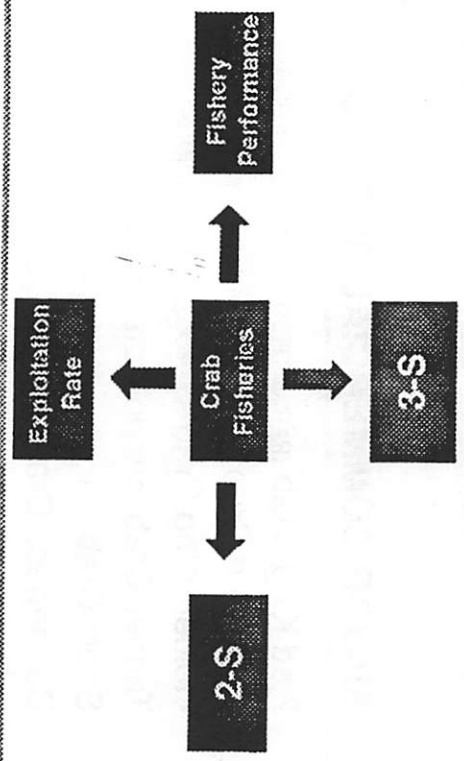
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SNOW CRAB



7

CRAB MANAGEMENT STRATEGIES



8

CRAB MANAGEMENT STRATEGIES

EXPLOIT RATE:	3-S:
Many Red King Crabs	Few Red King Crabs
Many Blue King Crabs	Few Tanner Crabs
Many Tanner Crabs	Some Dungeness Crabs
All Snow Crabs	
FISH PERFORMANCE:	2-S:
Some Red King Crabs	Most Dungeness Crabs
Some Tanner Crabs	Most Golden King Crabs
Few Golden King Crabs	

9

MANAGEMENT MEASURES



OTHERS: LEGAL GEAR, OBSERVERS, POT LIMITS,
GUIDELINE HARVEST LEVELS, THRESHOLDS, ETC.

10

MANAGEMENT PRECEDENCE

Kodiak Red King Crab Fishery:

- ◆ 1938 - Sex Restrictions
- ◆ 1949 - Size Limits
- ◆ 1960s - Fishing Seasons

11

?

QUESTION:

How would we design crab management, if we had the benefits of 30 years of crab research without the impediment of entrenched management frameworks?

12



GOAL



1. Synthesize Key Biology and Life History Features of Alaskan Crabs



2. Suggest New Directions and Perspectives on Fishery Management

CRAB CLASSIFICATIONBRACHYURANS:

Tanner Crab

Snow Crab

Dungeness Crab

Blue Crab

ANOMURANS:

Red King Crab

Blue King Crab

Golden King Crab

Hermit Crab

BIOGEOGRAPHYPRINCIPLE:

Animals are most abundant in portions of their range with optimal habitats.

RELEVANCE TO FISHERIES:

Fisheries on stocks near the geographic limits of a species tend not to sustain high harvests.

SELECTED RANGE LIMITSRED KING CRAB:

Norton Sound

BLUE KING CRAB:

Southeast Alaska

DUNGENESS CRAB:

Prince William Sound, lower Cook Inlet, Alaska
Peninsula, Aleutian Islands

r AND K SELECTION

* r SELECTED SPECIES -

* OPPORTUNISTIC LIFESTYLES (SHORT LIVES, SMALL SIZE, ONE-TIME REPRODUCTION, RAPID DEVELOPMENT

* E.G., INSECTS

* K SELECTED SPECIES -

* COMPETITIVE LIFESTYLES (LONGER LIVES, LARGE SIZE, MULTIPLE REPRODUCTIONS, SLOWER DEVELOPMENT)

* E.G., MAMMALS

17

ATTRIBUTES OF r AND K SPECIES

	<u>r</u>	<u>K</u>
AGE OF MATURITY	Low	Hi
MAXIMUM AGE	Low	Hi
ANNUAL MORTALITY	Hi	Low
EGG PRODUCTION	Hi	Low

18

BIOLOGY & LIFE HISTORY TRAITS

	<u>RKC</u>	<u>IC</u>	<u>DC</u>
AGE OF MATURITY	Old (7)	Old (6-7)	Med (3)
MAXIMUM AGE	V Old (>20)	Old (12-15)	Med (8)
ANNUAL MORTALITY	Med (26%)	Med (26%)	Hi (18-92%)
EGG PROD. (MILLIONS)	Med (0.004-0.5)	Med (0.005-0.4)	Hi (0.7-2.5)

19

SPECTRUM OF r & K SELECTION

<u>K</u>	<u>r</u>
Red King Crab	Tanner Crab
	Dungeness Crab

20

r & K IMPLICATIONS

<u>r Selected:</u>	<u>K Selected:</u>
Tolerate high F	Tolerate low F
Max. Y/R @ young age	Max. Y/R @ old age
Productive fisheries	Vulnerable to overfishing
Rapid stock recovery	Slow stock recovery

WHAT IS MATURITY?

- * PHYSIOLOGICAL MATURITY -
 - > SPERM PRODUCTION
- * MORPHOMETRIC MATURITY -
 - > LARGE CHELA (CLAW)
- * FUNCTIONAL MATURITY -
 - MATING PARTICIPATION

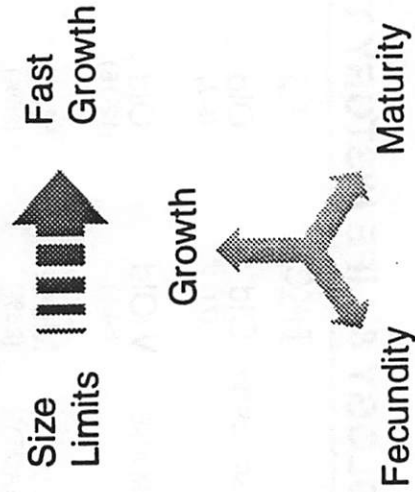
REPRODUCTIVE BENEFITS OF LARGE SIZE

- * Size of functional maturity larger than sizes of physiological or morphometric maturity.
- * Large females may require large males.
- * Large males may mate with multiple females.

MATING CHANCES BETWEEN MATURITY & RECRUITMENT

	<u>RKC</u>	<u>IC</u>	<u>DC</u>
Moits to Legal	0	1	1
Mating Seasons	0	2	2
Sperm Storage	NO	YES	YES

GENETIC SELECTION



CAPTURE & HANDLING EFFECTS

LETHAL

Catching Mortality

Ghost Fishing

Handling Mortality

SUBLETHAL

Leg Loss

Reduced Feeding

Reduced Growth

Loss of Visual Acuity

RECOMMENDATIONS

- * Management: conservative for king crabs and liberal for Dungeness crabs.
- * Management: more conservative for Dungeness crab stocks in AK than stocks in WA, OR & CA.
- * Management: conservative for NS red king crab, SE AK blue king crab, and Dungeness crab in PWS, LCI, AP & AI.

RECOMMENDATIONS

- * Size limits should be re-evaluated for:
 - > Size of functional maturity
 - > Growth increment & molt frequency
 - Sperm storage capability
 - > Benefits of large body size
 - > Genetic selection
- * Consider female harvest
 - > Sex ratio
 - > Size of mating pairs

RECOMMENDATIONS

- * Gear modifications to minimize catch of non-legal crabs or drop size/sex limits and institute "keep what you catch" policy.
- * Create seasonal closures for Dungeness crab fisheries during molting and mating.
- * Research on important unknowns: M, growth, handling effects, genetics, etc.

PACIFIC NORTHWEST CRAB INDUSTRY ADVISORY COMMITTEE
P.O. Box 97019
Redmond, Washington 98073-9719
Tele: 206 881 8181 Fax: 206 882 1660

April 12, 1993

Rick Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99510

RE: ALASKA BOARD OF FISHERIES DECISIONS AND BS/AI CRAB FMP

Dear Rick:

The PNCIAC held a meeting on April 6th, to review recent Alaska Board of Fisheries decisions on Bering Sea crab fisheries and to review the 1993 Bering Sea tanner crab fisheries. During the course of this meeting, the committee raised a number of concerns and developed the recommendations and requests as follows below.

1. The committee members expressed frustration regarding its effectiveness as an advisory body to the Alaska Board of Fisheries. The committee felt that its recommendations to the Board of Fisheries for the recently concluded shellfish meeting were not appropriately considered as contemplated by the BS/AI Crab FMP. For the record, the committee notes that it has an advisory role to not only the State of Alaska (like other State advisory committees), but also to the North Pacific Fishery Management Council on relevant crab matters.

2. The committee also noted that in the case of the recent shellfish meeting, they were not provided with adequate information by ADF&G in regards to the issues of pot limits and the shellfish observer program. This frustrated the committee in trying to fulfill its role as an industry advisory body under the guidelines of the Bering Sea/Aleutian Islands Crab FMP.

The committee notes for the record a memorandum of December 3, 1992 to Larry Nicholson, Westward Regional Director, ADF&G requesting relevant information on pot limits, superexclusive registration and the observer program for the January 5, 1993 meeting of the Pacific Northwest Crab Industry Advisory Committee. (enclosure)

2

The committee also notes a letter of January 13, 1993, to Clarence Pautzke, Executive Director, NPFMC expressing the frustration of the PNCIAC with a lack of information on vessel sizes and comparative catches and a general lack of guidance from ADF&G and NMFS at the January 5, 1993 meeting in preparation for the February 2, 1993 meeting of the Alaska Board of Fisheries. (enclosure)

3. In regards to the Board of Fisheries decision designating the Norton Sound king crab fishery a superexclusive registration area, the committee requests that the Council instruct the NMFS Regional Director to provide a legal opinion on the consistency of this action with the Crab FMP and the MFCMA, as soon as possible. The Norton Sound season is scheduled for August first.

4. Concerning the decision to open the Pribilof Islands and St. Matthews Island king crab fisheries on the same date September 15th and to close both areas on the date the first one is to close, the committee recognizes that this decision creates de facto superexclusive registration areas and this could preclude optimum yield for one or another of the fisheries and an apparent violation of the Crab FMP and the MFCMA. The committee requests that the Council also instruct the NMFS Regional Director for legal clarification on this action in a timely manner.

5. Regarding the ADF&G Shellfish Observer Program, the committee notes that the Board of Fisheries made extensive changes to the program through revisions to the Observer Manual.

The committee requests that the NPFMC convene a meeting of its Observer Oversight Committee in the near future for the purpose of reviewing the revised shellfish observer manual for consistency with the Crab FMP, the MFCMA and other applicable federal statutes.

6. As a result of the committee's discussion of an industry petition for reopening the opilio fishery in a Northwestern portion of the Bering Sea, the PNCIAC requests that the Council instruct ADF&G to make use of, in addition to survey data, in season catch and observer data and to make comparisons with other analyses and information available within NMFS. Additionally, this information should be incorporated into in season management of the Bering Sea crab fisheries. In season data and revised analyses and other relevant information should also be made available to the PNCIAC, the NPFMC and interested persons from industry in a timely manner during the season.

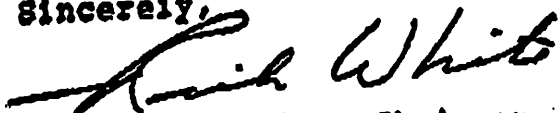
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The PNCIAC also noted for the record its concern that over the past year an obvious deterioration in the dialogue between ADF&G and the NMFS has developed, particularly in the exchange of in season crab catch data.

A reduction in the dialogue between the managing agencies can only lead to misunderstandings, communication problems with industry and an overall deterioration in the fisheries management process.

The Pacific Northwest Crab Industry Advisory Committee hopes the NPFMC will address its concerns in an expeditious manner.

Sincerely,



Richard C. White, Chairman
Pacific Northwest Crab Industry Advisory Committee

cc: Tom Elias, Chairman, Alaska Board of Fisheries
Carl Rosier, Commissioner, ADF&G
Bob Turner, Director, WDF
Steve Pennoyer, Regional Director, NMFS, AKR
Nancy Foster, Acting Assistant for Fisheries, NMFS

PACIFIC NORTHWEST CRAB INDUSTRY ADVISORY COMMITTEE

Chairman, Richard C. White
 P.O. Box 97019, Redmond, WA 98073-9719
 Tele: 206 881 8181; Fax: 206 882 1660

TELECOPIER COVER LETTER: RETURN FAX NO. 206 547 0130

PLEASE DELIVER THE FOLLOWING PAGES:

TO: Larry Nicholson, Westward Director
 FROM: Arni Thomson, Secretary, PNCLAC *Arni Thomson*
 DATE: 12/3/92

TOTAL NUMBER OF PAGES (including cover page): 1

MESSAGE/COMMENTS:

1. Next meeting of PNCLAC scheduled for January 5th, NMFS, Bldg. 4, Room 2079, Sand Point Way, Seattle, WA. Time: 8:30 am - 4:30 pm.

2. Issues for which PNCLAC needs information and ADF&G recommendations:

Revised pot limits, ADF&G proposals

Tanner crab size limits and identification, ADF&G (and DPS) recommendations

Exclusive and superexclusive registration proposals in the BSAI, ADF&G recommendations

Observer program presentation and recommendations

14 day pre and post season prohibition on use of groundfish pots in crab registration areas of BSAI, amendment needed to allow for immediate crossover into cod pot fishery in the event of split season for opilio i.e. waiver of both 14 day periods in the district that is closed, the Eastern district east of 173 degrees. Need for emergency rule.

Should you encounter any problems during this transmission, please contact the PACIFIC NORTHWEST CRAB INDUSTRY ADVISORY COMMITTEE at 206 547 7560, Arni Thomson, Secretary.

OUR TELECOPIER DIRECT LINE IS: 206 547 0130.

OPERATOR: AT

cc: E. Krygier, K. Griffin

PACIFIC NORTHWEST CRAB INDUSTRY ADVISORY COMMITTEE

Richard C. White, Chairman
P.O. Box 97019, Redmond, WA 98073-9719
Tele: 206 881 8181/Fax: 206 882 1660

DATE: January 13, 1993

TO: Clarence Pautzke, Executive Director
NPFMC

FROM: Richard C. White, Chairman
Pacific Northwest Crab Industry Advisory
Committee

RE: RESPONSE TO NPFMC REQUEST FOR RECOMMENDATIONS ON
BERING SEA POT LIMITS AND THE OPILIO OY

POT LIMITS:
The PNCIAC spent several hours discussing the issue of pot limits at its January 5th, 1993 meeting in Seattle.

The committee and the industry present were frustrated in their attempts by a lack of information on vessel sizes and comparative catches and also by a general lack of guidance from the Alaska Dept. of Fish & Game and the National Marine Fisheries Service on the types of solutions that would pass legal review.

However, with limited information available to them, the PNCIAC did move ahead with developing a framework proposal in response to your request and for the Board of Fisheries to consider in its deliberations.

Prior to developing this proposal, the committee discussed setting up vessel category lengths as a framework for pot limits, as they were inclined to feel that this would be the preferred alternative the Board of Fisheries would be likely to pursue. However, there was insufficient information available to them on vessel sizes, which would have enabled identifying some natural breaking points for vessel classes.

They were also concerned that setting up vessel classes could also be very controversial, especially with vessels that fall slightly under the next vessel class size. This could be viewed as discriminatory and it could result in further legal appeals.

2

Therefore the PNCIAC moved ahead with the following recommendations:

1. Establish a formula for pot limits in the Bering Sea fisheries based on a maximum of 2.5 pots per linear foot of vessel length, as measured by length overall and a minimum of 1 pot per linear foot, length overall. The motion covers only those fisheries to which the pot limits were recently overturned by the Secretary of Commerce.

2. The pot limits are to be linked to a sliding scale of guideline harvest levels. The same formula is to be used for all the crab species and a minimum of no less than 1 pot per linear foot of vessel length is recommended.

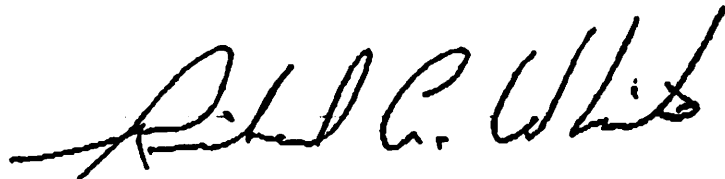
less than 5 million #---1 pot/foot of length overall
5 million # to 7.5 m#---1.5 pots/foot of length overall
7.5 million # to 10m#---2 pots/foot of length overall
10 million # and over--2.5 pots/foot of length overall

Further discussion about pot limits, in response to the NPFMC's question #4, led to consensus on the PNCIAC that the BSAI Crab FMP not be amended to allow for discriminatory regulations for any vessel size classes.

OPILIO OY:

After a brief discussion and hearing from Jerry Reeves what options were being discussed by the plan team, the PNCIAC adopted a motion recommending the NPFMC develop an amendment to the crab FMP to framework the opilio OY, to allow for setting an annual GHU according to the annual survey and population estimates and disregard the cap.

The minutes of the PNCIAC meetings of December 2nd and January 5, 1993 are provided for the NPFMC administrative record.



AGENDA D-5(c)
APRIL 1993

LAW OFFICES OF
FAULKNER, BANFIELD, DOOGAN & HOLMES
A PROFESSIONAL CORPORATION

MAR 30 1993

302 GOLD STREET
JUNEAU, ALASKA 99801-1197
(907) 586-2210

TELECOPIER: (907) 586-8090

PLEASE REPLY TO JUNEAU OFFICE

BRUCE B. WEYHRAUCH

March 26, 1993

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ANCHORAGE, ALASKA 99501-3510
(907) 274-0666
TELECOPIER: (907) 277-4657

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FIRST INTERSTATE CENTER
999 THIRD AVENUE, SUITE 2600
SEATTLE, WASHINGTON 98104-4001
(206) 292-8008
TELECOPIER: (206) 340-0289

CERTIFIED MAIL, RETURN RECEIPT REQUESTED

Mr. Laird A. Jones
Director
Division of Boards
Alaska Department of Fish
and Game
P. O. Box 25526
Juneau, Alaska 99802-5526

Re: **Request that the Board Repeal Adoption of a
Superexclusive Area for the Norton Sound King
Crab Fishery
Our File No. 2363-8726**

Dear Mr. Jones:

On behalf of the Alaska Crab Coalition, we petition the Alaska Board of Fisheries ("Board") to reconsider and repeal Proposal 312, the regulation adopted by the Board on February 8, 1993 establishing a king crab superexclusive area in Norton Sound. Section 9.3 of the Fishery Management Plan for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands (Jan. 24, 1989) (North Pacific Fisheries Management Council) ("Crab FMP") governs this appeal.¹ In addition, pursuant to AS 44.62.220 and 5 AAC 96.625, we petition the Board to repeal its action adopting Proposal 312.

We petition the Board to repeal Proposal 312 because the superexclusive area adopted by the Board is not authorized by the Crab FMP, the Magnuson Fishery Conservation and

¹ We note that Proposal 312 has not yet been signed by the Alaska Lt. Governor. Attachment 1. Therefore the regulation proposed in Proposal 312 as adopted by the Board is technically not yet a regulation as indicated by section 9.3 of the Crab FMP.

Mr. Laird A. Jones
March 26, 1993
Page 2

Management Act ("Magnuson Act"), and because Proposal 312 violates other federal and state laws. We ask that the Board take this petition up immediately.

PROPOSAL 312 IS INCONSISTENT WITH THE CRAB FMP

The Crab FMP allows king crab registration areas within management units only to be designated as either exclusive or nonexclusive. Crab FMP at page 8-27.² There is no provision in the Crab FMP for adopting a superexclusive area for crab. The Crab FMP would have to be amended to adopt a superexclusive area before the Board can legitimately adopt a superexclusive area in Norton Sound. Consequently, the Board's action in adopting Proposal 312 is unauthorized by, and inconsistent with, the Crab FMP. Therefore, the Board's action in adopting Proposal 312 is invalid.

The Crab FMP defines "Registration (statistical) area" as:

According to the State regulations, a statistical area consists of a registration area comprising all the waters within the statistical area which are territorial waters of Alaska; and an adjacent seaward biological influence zone, comprised of all the waters within the statistical area which are not part of the registration area. Also, according to 5 AAC 34.010 and 5 AAC 35.010, king and Tanner crab regulations applicable to a registration area shall be applicable also in its adjacent seaward biological influence zone. For this FMP, the term registration area shall encompass the statistical area.

Crab FMP at page 4-4.

This definition does not include the term "superexclusive area" as part of an exclusive or nonexclusive registration area. Establishing a registration area is a framework-type measure that "the State can change following criteria set out in the FMP . . ." Crab FMP at page 8-1. "[I]mplementation of other management measures not described in the FMP must be consistent with the FMP, the Magnuson Act, and other applicable Federal law, and may occur only after consultation with the Council." *Id.* (emphasis added).

² The Crab FMP adopts existing State registration areas in the Bering Sea/Aleutian Island fishery management unit. See Crab FMP at page 8-25. The Crab FMP does not incorporate a superexclusive registration area in Norton Sound.

Mr. Laird A. Jones
March 26, 1993
Page 3

The Board had an opportunity to consult with the NPFMC before adopting the Norton Sound superexclusive area, but did not. The Board could have followed the advice of the Pacific Northwest Crab Industry Advisory Committee (PNCIAC) as an advisory body for obtaining input and analysis of Proposal 312.³ The Board did not.

On December 2, 1992, the PNCIAC opposed the formation of a superexclusive area.⁴ The advisory committee found that Proposal 312 conflicted with the NPFMC's attempts to develop a comprehensive rationalization program for federal fisheries. The crab advisory committee also found that a superexclusive area would change catch histories and prejudice the analysis in the comprehensive management of crab fisheries.

The Crab FMP gives examples of situations in which the designation of an exclusive registration area may be appropriate. See Crab FMP at 8-31. The Crab FMP does not provide these examples as situations in which designation of a superexclusive area may be appropriate. The reason is because the Crab FMP allows designation of an exclusive registration area, but not a superexclusive area.

There is simply no authority in the Crab FMP for the Board to conclude that a superexclusive registration area is authorized as a category of exclusive registration areas. If the Crab FMP had envisioned a superexclusive area as a frameworked category that could be adopted by the Board, then the Council, when it adopted the Crab FMP, would have discussed, and authorized, the formation of a superexclusive area in the Plan.⁵ The Board's adoption of the superexclusive area in Norton Sound is therefore not authorized by, and is inconsistent with, the Crab FMP.

³ The Crab FMP established the PNCIAC to serve the State in a consultative role on preseason and in-season management measures, just like all other existing State of Alaska Fish and Game Advisory Committees. See Crab FMP at page 2-7. See AS 16.05.260 (establishing advisory committees); 5 AAC 96 (functions and operations of local fish and game advisory committees).

⁴ See Attachment 2 at page 4 (Minutes of the Dec. 2, 1992 PNCIAC meeting). While the PNCIAC advice addressed the formation of a superexclusive area in Bristol Bay, the analysis used by the PNCIAC would apply equally to Norton Sound. See also NPFMC and Alaska Fisheries Science Center, North Pacific Groundfish and Crab: A Review of Management Options for Comprehensive Rationalization (Oct. 20, 1992).

⁵ Because the Crab FMP has designated certain actions that can be taken, all omissions should be understood as exclusions. See *Croft v. Pan Alaska Trucking, Inc.*, 820 P.2d 1064, 1066 (Alaska 1991); 2A Norman J. Singer, Sutherland Statutory Construction § 47.23 (1992).

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Even if the Board may adopt a superexclusive area for crab in Norton Sound under the Crab FMP, the procedure used by the Board in adopting Proposal 312 is flawed and therefore invalid. The Crab FMP provides that

any designation of an area as exclusive must be supported by a written finding by the State that considers all the following factors to the extent information is available:

1. The extent to which the designation will facilitate proper management of the fishery.
2. The extent to which such designation will help provide vessels with a reasonable opportunity to participate in the fishery.
3. The extent to which such designation will help to avoid sudden economic dislocation. Established processing facilities and fishing fleets within a registration area may provide economic stability for the labor force and affected communities and may be destroyed or adversely affected by an in-season influx of mobile processing plants and additional fishing power.
4. The extent to which the designation will encourage efficient use of vessels and gear.
5. The extent to which the economic benefits conferred by the designation will be offset by economic costs and inefficiencies.
6. The extent to which other management measures could yield the results desired from the designation.

Id. at 8-30.

No written findings accompany the Board's action. There is no indication that any of the factors set forth at 8-30 of the Crab FMP have been considered. The Board had information

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available to it before it adopted Proposal 312,⁶ but that information does not include the proper analysis of the necessary factors.

There is no information in the 1992 Norton Sound Shellfish Report on a superexclusive area in Norton Sound. The 1992 Norton Sound Shellfish Report does not discuss how a superexclusive area in Norton Sound will provide vessels with a reasonable fishing opportunity. Nor does the Report discuss the costs and benefits of the decision, give any economic analysis of, or provide alternative management measures to, a superexclusive area.

On the other hand, there is information analyzing a superexclusive Proposal in other fisheries that could have been used by the Board before adopting Proposal 312.⁷ Since there was information to the Board that the Board did not use before adopting Proposal 312, it did not consider the necessary factors "to the extent information is available."

PROPOSAL 312 IS INCONSISTENT WITH ALASKA LAW

The Board's adoption of Proposal 312 does not address legitimate conservation or allocation interests. Instead, the establishment of a superexclusive area would only benefit a few fishermen. Since the record is completely silent about what the State's conservation and allocation purposes were in establishing the superexclusive area, the Board's action should be repealed and rejected.

To be a valid regulation, the regulation adopting a superexclusive area in the Norton Sound area must be consistent with and reasonably necessary to carry out the statutory purposes of the Board. State v. Hebert, 743 P.2d 392, 395 (Alaska App. 1987). The regulation also must be reasonable and not arbitrary. Id. See Meier v. State, 739 P.2d 172, 173 (Alaska 1987); Kelly v. Zamarello, 486 P.2d 906, 911 (Alaska 1971). There is nothing in the record that indicates that the Board's decision adopting Proposal 312 meets these standards. If the Board adopted Proposal 312 for conservation or development purposes, See AS 16.05.251(a)(2),

⁶ See Charles Lean & Fred Bue, 1992 Norton Sound District Shellfish Report to the Alaska Board of Fisheries (Jan. 1993) (Regional Information Report No. 3A93-01) ("1992 Norton Sound Shellfish Report"). Attachment 3.

⁷ See University of Alaska, Draft Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis For the Exclusive Area Registration Proposal in the Bering Sea/Aleutian Islands and the Gulf of Alaska (Nov. 4, 1992) (Pages 1-1 and 1-4). Attachment 4.

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these standards must be met.

There is authority for adopting superexclusive areas for the herring fishery in State of Alaska waters. State v. Hebert, 803 P.2d 863 (Alaska 1990). But that authority does not give the Board authority to adopt superexclusive areas for crab. This is because, first, herring is an nearshore fishery not managed by the NPFMC, but by the State. Crab fisheries are under the management of the federal government and subject to management provisions in the Crab FMP. Second, Magnuson Act provisions are not implicated in the management of herring fisheries addressed by the Board in Hebert. Magnuson Act provisions are implicated in Norton Sound king crab fisheries.

Further, if the Board's decision reflects an allocation decision that seeks to divide the crab resources in Norton Sound between competing subgroups of commercial fishermen, the Board may only do so after adopting criteria for the allocation of the crab resource using such criteria as the fisheries' history, number of participants, economic importance, and alternative fisheries. AS 16.05.251(e). There is no indication that the Board did so when it adopted Proposal 312.

A superexclusive area in the Norton Sound king crab fishery impedes fishermen's open access to, and common use of, the king crab fishery there. See Alaska Constitution, Art. VIII. The proposed regulation will require vessels to choose whether they wish to fish in or out of the superexclusive area. If a vessel chooses to crab in the Norton Sound superexclusive area, the vessel will be precluded from crabbing in Bristol Bay, Adak, and St. Matthews Island areas. See Crab FMP at page 8-27-28. This will result in a potentially significant impact on the vessels that have historically operated in Norton Sound and elsewhere.⁸ This amounts to an allocation of crab that must meet statutory and regulatory requirements. See AS 16.05.251(e) and 5 AAC 39.205. The Board violated these provisions when it adopted Proposal 312.

PROPOSAL 312 IS INCONSISTENT WITH THE MAGNUSON ACT

To be consistent with the Magnuson Act, the Board's decision to create a superexclusive area in Norton Sound "shall" be consistent with each of the seven national standards set forth in 16 U.S.C. § 1851(a). Violation of any one of the national standards makes Proposal 312 invalid. The superexclusive area in Norton Sound violates at least four of the national standards

⁸ The number of vessels crabbing in Norton Sound in 1992 was 27. This number ranges between 0 and 36 between 1977 to 1992. Attachment 3 at page 9, Table 1.

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under the Magnuson Act.

National standard two provides that "[c]onservation and management measures shall be based upon the best scientific information available." Id. § 1851(a)(2). The Board, under this standard, is to at least use the information that is available when making a decision.

There was information available to the Board on the available opportunities for crabbing, possible economic dislocations resulting from various management measures, efficiencies of gear use, and economics of the fisheries.⁹ The Board did not use or consider this information when it made its decision to adopt Proposal 312.

The federal crab advisory committee found that Proposal 312 conflicted with the NPFMC's attempts to develop a comprehensive rationalization program for federal fisheries.¹⁰ The crab advisory committee also found that a superexclusive area would change catch histories and prejudice the analysis in the comprehensive management of crab fisheries. The Board did not consider PNCIAC's advice.

There is no information in the record that the Board used data and analysis from the NPFMC's comprehensive rationalization program when it adopted Proposal 312. The Council's Comprehensive Rationalization program has excellent information available that the Board should have considered and analyzed before adopting Proposal 312. Since the Board did not base its decision to adopt Proposal 312 on the best scientific information available, the Board's decision creating a superexclusive area in Norton Sound violates the Magnuson Act's national standard two and is therefore inconsistent with the Magnuson Act.

National standard three provides that "[t]o the extent practicable, an individual stock of

⁹ For example, some of the studies that address these issues include D. Larson, Conservation, Allocation, and Enforcement Aspects of the Use of Pot Limits and Exclusive Areas in the Western Alaska Tanner Crab Fisheries: A Report to the Alaska Board of Fisheries and the North Pacific Fishery Management Council (1984); Matulich, Hanson, & Mittelhammer, A Bioeconomic Simulation of the Alaskan King Crab Industry (Washington State University, Unpublished Report) (1987); Katz & Bledsoe, Alaska Shellfish Regulations: Present Impacts on Fishery Participants, 106 Transactions of the American Fisheries Society 505-29 (1977); Otto, Management and Assessment of Eastern Bering Sea King Crab Stocks (1986); Otto, Management of Alaskan King Crab Stocks in Relation to the Possible Effects of Past Policies (Proceedings of the International King Crab Symposium, University of Alaska) (Alaska Sea Grant Report No. 85-12) (1985), at 447-81. See also Comprehensive Rationalization Plan, supra note 4.

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fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." Id. § 1851(a)(3). The superexclusive area in the Norton Sound area violates this standard because the king crab stock is being divided up and managed separately within each superexclusive area. Standard three is therefore defeated.

National standard four provides:

Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Id. § 1851(a)(4). Standard four incorporates prohibitions on state regulations that discriminate against citizens of another state. See Hicklin v. Orbeck, 437 U.S. 518 (1978). Proposal 312, in effect, discriminates against nonresidents of Alaska in favor of Norton Sound residents.

There has been no showing of a necessity to allocate the crab fishing privileges in Norton Sound. The manner in which Proposal 312 will be carried out will be such that an excessive share of the king crab resource will go to Norton Sound residents. This discriminates against nonresidents of Alaska. This is not "fair and equitable to all United States fishermen". National standard four of the Magnuson Act is therefore violated.

The Board's adoption of Proposal 312 is also not reasonably calculated to promote conservation. The practical effect of Proposal 312 is to keep vessels that are from outside the State and typically fish in many areas adjacent to the State, from crabbing anywhere else in State waters if they crab in Norton Sound. Simply allocating the Norton Sound king crab to local residents, at the expense of nonresidents, is not promoting conservation. There is no information that the Board is promoting conservation; instead the action preserves crab for resident crabbers and keeps nonresident fishermen out of the area. There is no evidence that this action is reasonably calculated to promote conservation.

In addition, through adoption of Proposal 312, the Board is not allowing the Norton Sound king crab fishery to be carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of the privilege of fishing for king crab in the Norton Sound area. Indeed, by establishing a superexclusive area in Norton Sound, area residents who register for the king crab fishery in the Norton Sound area obtain an exclusive

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privilege to crab there. This too violates standard four of the Magnuson Act.

National standard five provides that "[c]onservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose." *Id.* § 1851(a)(5). Since there is no information in the record to support the Board's adoption of Proposal 312 as a conservation or development regulation, the Board's action is meant to bestow an economic benefit on a few crab fishermen in the Norton Sound area. Sound, reasonable conservation purposes do not support the Board's decision.

The Board had no information that it would promote efficient utilization of the king crab resource. Reserving the king crab resource for local residents promotes an economic allocation for the benefit of a few and does not promote efficiency in the use of the fishery resource. The action by the Board in adopting Proposal 312 is simply an economic allocation of the Norton Sound king crab resource to resident fishermen. The Proposal's purpose appears to be solely an economic allocation. Thus, the Board's action violates standard five.

PROPOSAL 312 IS INCONSISTENT WITH OTHER FEDERAL LAW

The superexclusive area in the Norton Sound area treats similarly situated fishermen differently. Proposal 312 favors local residents of Norton Sound over crab fishermen living in other parts of the state and in other states. The record does not support a rational basis for the superexclusive area in Norton Sound. Therefore the Proposal 312 violates the commerce, privileges and immunities, and equal protection clauses of the United States Constitution. The Proposal discriminates against nonresidents of the State in favor of local residents. The proposal burdens interstate commerce and is not outweighed by putative local benefits. In addition, the Board did not consider whether the goal sought by adopting the superexclusive area in the Norton Sound area (i.e. local economic benefits) could be promoted as well with a lesser impact on interstate activities. Thus, Proposal 312 should be repealed on this basis.

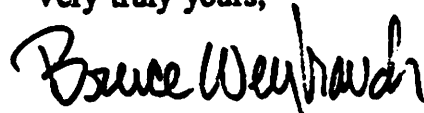
CONCLUSION

In summary, we request that the Board repeal Proposal 312, which adopted a superexclusive area in Norton Sound. The Board's action adopting Proposal 312 violates the Crab FMP, the Magnuson Act, and other federal and State laws. If the Board denies this petition, we request a detailed, written explanation of the Board's denial pursuant to AS

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16.05.251(c) and AS 44.62.230 and copies of any reports, studies, or documents that were provided to the Board or are part of the Board's record of decision when it adopted Proposal 312. If you have any questions, please do not hesitate to contact me.

Very truly yours,

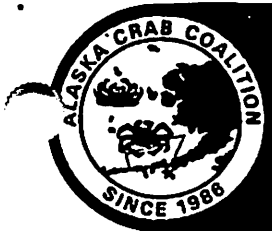


Bruce B. Weyhrauch

Enclosures

cc: NOAA, Office of General Counsel, Alaska
✓Rick Lauber, Chair, North Pacific Fisheries Management Council
Crab Interim Action Committee
Nancy Foster, Deputy Assistant Administrator, National Marine Fisheries Service
Pacific Northwest Crab Industry Advisory Committee

BBW:db:Jones.2lt



ALASKA CRAB COALITION

3901 Leary Way (Bldg.) N.W., Suite #6 • Seattle, WA 98107 • (206) 547-7560 • FAX (206) 547-0130

DATE: March 8, 1993 (DIRECT BY TELECOPIER)

TO: Mr. Carl Rosier, Commissioner
Alaska Dept. of Fish & Game
P.O. Box 2-3000
Juneau, Alaska 99801

FROM: Bruce Joyce, President *Bruce Joyce*
Alaska Crab Coalition

RE: PETITION TO CLOSE THE BAIRDI CRAB FISHERY IN
THE BERING SEA AREA EFFECTIVE MARCH 15TH, FOR
CONSERVATION REASONS RELATED TO HIGH DISCARD
RATES OF OPILIO AND RED KING CRABS

On March 4th, ADF&G announced the closure of the opilio crab fishery in the Bering Sea effective March 15th. However, the bairdi fishery is to remain open until March 31st. As reported earlier in the season, there are approximately 230 boats targeting on opilio crab. To date almost 30 million pounds of bairdi crab have been taken, the bulk of the catch having been harvested in the directed bairdi fishery prior to the January 15th opening of the opilio crab fishery.

After review and discussion of this situation, the ACC Board of Directors feel that the bairdi harvest to date is at the sustainable yield level and that additional harvests could impact future years recruitment into the fishery.

In addition, the Board members support the closure due to concerns over the high discard rates of both opilio and king crab that will occur after the closure of the opilio crab fishery, during the 15 day directed bairdi only fishery. Continuation of the fishery would result in severe "hammering," as the crab fishermen call it, of the opilio and king crabs. The extent of the discards is documented in the ADF&G staff reports for the November, December directed bairdi fishery, a close approximation of what will occur in the last two weeks of March. These staff reports were presented at the February Board of Fisheries Shellfish meeting.

Given the declining stocks of opilio and ADF&G and NMFS scientists serious reservations about an opening for the Bristol Bay king crab fishery and the 200,000 king crabs taken as bycatch in the 1993 bottom trawl rock sole fishery, an extension of the bairdi fishery is not warranted.



ALASKA CRAB COALITION

3901 Leary Way (Bldg.) N.W., Suite #6 • Seattle, WA 98107 • (206) 547-7560 • FAX (206) 547-0130

DATE: October 5, 1992

TO: Mr. Carl Rosier, Commissioner
Alaska Department of Fish & Game
P.O. Box 3-2000
Juneau, Alaska 99802

FROM: Arni Thomson, Executive Director *Arni Thomson*

RE: RECOMMENDATIONS FOR 1992-1993 KING, BAIRDI AND
OPIILIO CRAB SEASONS

The Alaska Crab Coalition wishes to make the following recommendations for the upcoming king and bairdi crab seasons, as emergency measures, to address recently published information (September 4, 1992, ADF&G, attachment) indicating large declines in most age classes of male and female king crabs in the Bristol Bay area. The ACC views this announcement as a clear sign that a resource emergency is developing in the case of Southeastern Bering Sea king crab stocks that warrants emergency actions.

The ACC recommendations are intended to address the potential, but unquantified, mortality of the pot lifts to undersize and female king crabs discarded in the fishing operations. Statistical information, by fishery, regarding pot lifts is a matter of record in the ADF&G Westward Shellfish Reports. Although mortalities associated with pot lifts, particularly to king crab, have not been scientifically quantified, there is widespread and growing concern amongst crab fishermen, that there is some level of mortality and that emergency action should be taken to reduce that level of mortality, whatever it might be.

The ACC recommendations have been developed after lengthy discussions with fishermen and processing company representatives.

ACC members recognize that emergency action at this time could make the difference between having a king crab season a year from now, in the fall of 1993, or no season at all.

RECOMMENDATIONS FOR BRISTOL BAY KING AND BAIRDI FISHERIES:
1. Combine the opening dates of king and bairdi crab seasons in Bristol Bay and set the date sometime between

November 21st, 1992 and January 5th, 1993. This measure is recommended for this season only. The delay in the season opening date will reduce overall fishing time and pot lifts, in the Bristol Bay king crab area, by three weeks, while allowing the optimum harvest of bairdi crab. The November 21st date coincides closely with the 1990 and 1991 opening dates of bairdi and allows for better meat yield of bairdi.

2. This recommendation calls for status quo in terms of reopening of the bairdi fishery (only), in Bristol Bay and the eastern Bering Sea tanner crab subdistrict, 7 days after the close of the combined king and bairdi season.

ADDITIONAL RECOMMENDATION FOR JANUARY 1993 OPILIO FISHERY:

It has been brought to the attention of ACC members by ADF&G representatives that serious consideration is being given to opening the Western subdistrict only, at the start of the opilio crab fishery on January 15th.

The ACC wishes to recommend that ADF&G proceed in the usual manner with the fishery, opening both the Eastern and Western subdistricts on January 15th. This will enable the fleet to target on the Eastern district opilio and bairdi stocks together at the beginning of the year, spreads the effort out over the Eastern district and greatly reduces the pressure on the Bristol Bay area.

Starting the opilio season in the Western district will favor the larger boats, as the area offers no protection and the weather is routinely boisterous during the early winter months. The Western district opening will also disrupt the business plans of a number of small and medium size boats that plan to target on bairdi crab in the Eastern district in January. There are very few bairdi in the Western district, which is clearly evident in the 1992 survey.

RECOMMENDATION FOR GEAR MODIFICATION, BAIRDI AND OPILIO FISHERIES:

Recommend that ADF&G and the Board of Fisheries review the current regulation, Gear for Tanner Crab, 5 AAC 35.050, subparagraph (f), page 81 in regards to reducing the tunnel opening height from 5 inches to 4 inches in tanner crab pots.

Presently, industry is using a variety of devices in crab pots that essentially are "king crab excluder devices." They are commonly known as "tanner boards" and they are installed to restrict the larger king crab tunnel opening to comply with the 5 inch tanner opening. Review of the regulation needs to focus on these devices being "rigid" for a uniform 4 inch height across the width of the tunnel.

CONSERVATION RATIONALE FOR COMMISSIONER'S ACTION: FROM
"SELECTED POLICIES OF THE BOARD OF FISHERIES, POLICY ON KING
AND TANNER CRAB RESOURCE MANAGEMENT: GOALS AND BENEFITS
(Commercial Shellfish Regulations, 1992, pages 18-20.)

POLICIES:

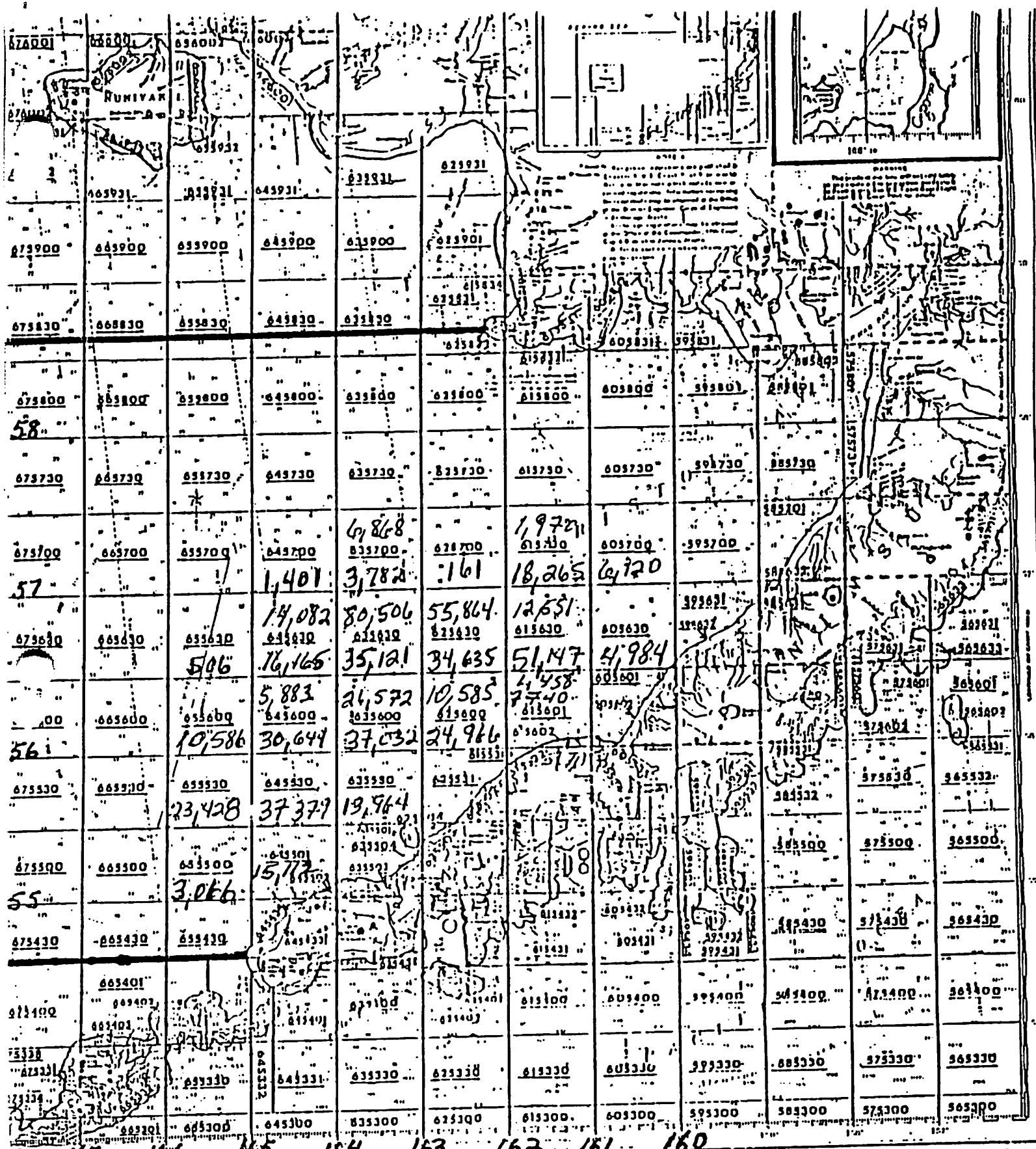
1. "Maintain crab stocks comprised of various size and age classes of mature animals in order to maintain the long term reproductive viability of the stock and reduce industrial dependency on annual recruitment, which is extremely variable. Benefits of this policy are most apparent when weak recruitment occurs. As population abundance and structure change with declining recruitment, harvests should be reduced."

4. "Minimize handling and unnecessary mortality of non-legal crabs and other non-target animals. Capture and handling of females, sublegal males, and animals of other species results in a loss of reproductive ability and biomass that may be detrimental to a stock."

5. "Maintain an adequate brood stock to rebuild king and tanner crab populations when they are depressed. Maintenance of an adequate brood stock takes precedence over short term economic considerations."....

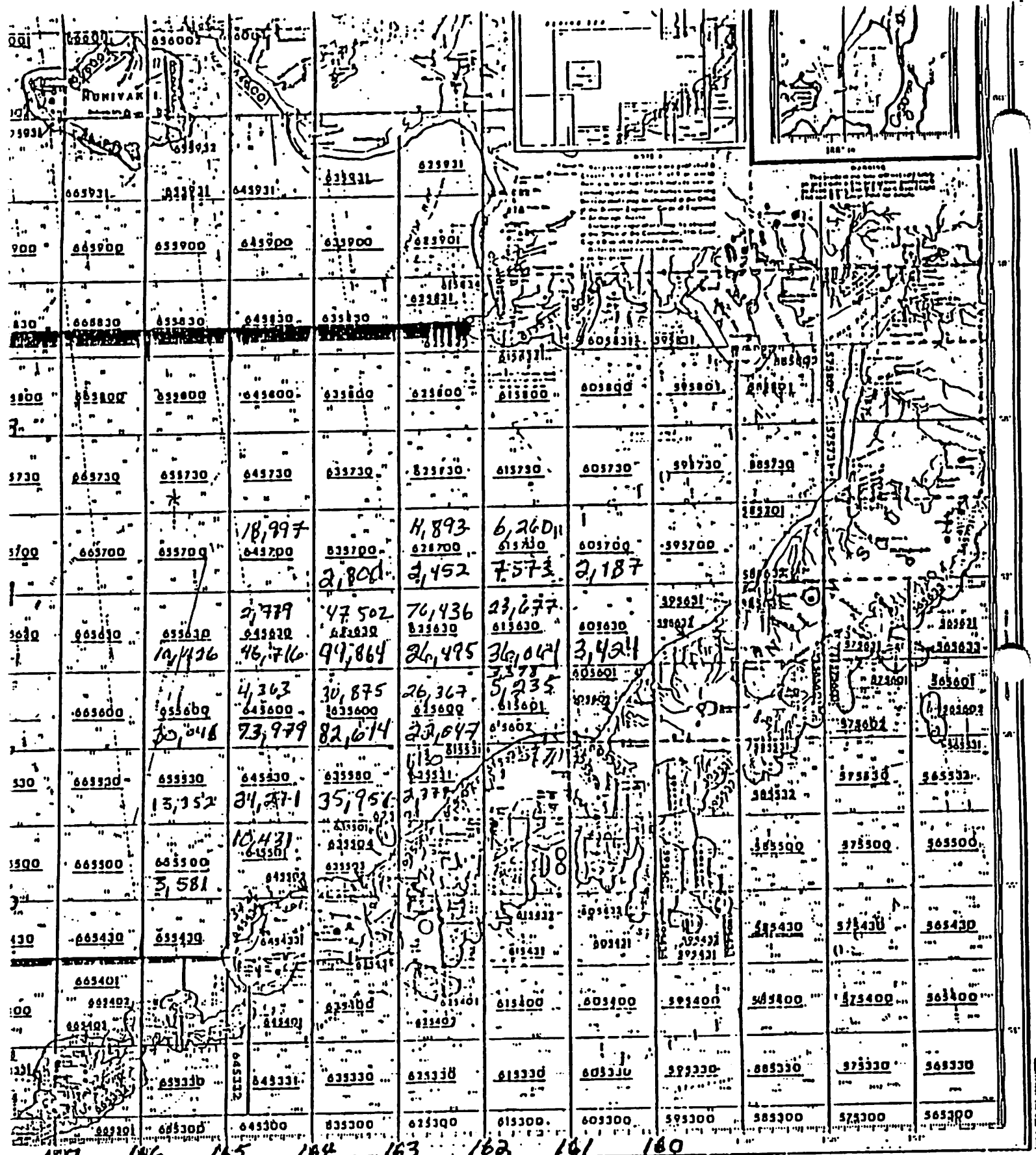
cc: Larry Nicholson, Director, Westward Division

attachments (3)



BRISTOL BAY AREA T, KING & BAIRDI CRAB POT LIFTS BY STATISTICAL AREAS
 Chart key: king crab lift totals in top of squares, bairdi in lower part of squares.
 king crab, fall 1991; bairdi, fall 1991, winter 1992
 (ADF&G estimated catch of bairdi in stat areas east of 166: 19.5 million#)

BRISTOL BAY AREA T, KING & BAIRDI CRAB POT LIFTS BY STATISTICAL AREAS
 Chart key: king crab lift totals in top of squares, bairdi in lower part of squares.
 king crab, fall 1991; bairdi, fall 1991, winter 1992
 (ADF&G estimated catch of bairdi in stat areas east of 166: 19.5 million#)



BRISTOL BAY AREA T, KING & BAIRDI CRAB POT LIFTS BY STATISTICAL AREAS
 Chart key: king crab lift totals in top of squares, bairdi in lower part of squares.
 king crab, fall 1990; bairdi, fall 1990, winter 1991
 (ADF & G estimated catch of bairdi in stat areas east of 166: 31.9 million#)

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

WALTER J. HICKEL, GOVERNOR

P.O. BOX 3-2000
JUNEAU, ALASKA 99802-2000
PHONE: (907) 465-4100

October 22, 1992

Mr. Arni Thompson
Executive Director
Alaska Crab Coalition
3901 Leary Way NW, Suite 6
Seattle, WA 98107

Dear Arni:

Thank you for your recent correspondence expressing your concerns about the 1992-93 Bering Sea crab fisheries. Department staff and I have reviewed your recommendations for the upcoming king and Tanner crab seasons, as well as your recommendation for gear modification in the Tanner and snow crab fisheries. Based on the results of the review, I could not grant your request.

The first issue is that of declining numbers of male and female red king crab of all age classes and what resource managers can do to alleviate the decline. ACC's recommendations address the issue of mortality inflicted on red king crab through capture in pots and subsequent handling of females and sublegal sized males. The department recognizes that handling mortality occurs during the prosecution of both target and nontarget fisheries for red king crab in Bristol Bay. You are correct in stating that the magnitude of this mortality is unquantified. Total mortality of red king crab from one year to the next can be estimated, however, due to the nature of survey techniques confidence in the estimates vary. It is correspondingly much more difficult to separate total mortality into fishing mortality, bycatch mortality and natural mortality. In this instance, if bycatch mortality represents a large portion of the total mortality, the estimate is easier to make. Unfortunately the few studies conducted to date do not lend themselves to answering the magnitude of this mortality. The department has reviewed statistical information regarding pot lifts in the Bering Sea C. bairdi fisheries versus the population of Bristol Bay red king crab through time. Because reliable estimates of mortality between years do not exist, it is difficult to speculate on the magnitude of bycatch mortality.

The literature on handling mortality of crab in Alaska is limited to several studies conducted on Dungeness crab. Dr. Gordon Kruse, with ADF&G Headquarters in Juneau, in conjunction with Dr. Tom Shirley of the Juneau Center for Fisheries and Ocean Sciences University of Alaska Juneau are cooperating on a multi-year study on red king crab mortality associated with catch and handling. In

addition, NMFS, in cooperation with ADF&G, has initiated a pilot study on catch and handling mortality of red king crab that may help us "scientifically quantify" this mortality.

The ACC recommends combining the opening dates of the 1992-93 red king and Tanner crab seasons in Bristol Bay sometime during the November 21-January 5 time period. You have estimated that this season change would reduce overall fishing time by three weeks. This however may not be the case. Although the seasons would be delayed by three weeks, fishermen may not take their traditional Christmas break, thus negating the season change. The savings in number of pot lifts may not be large either. This proposal has the targeted Tanner fishery following the combined king and Tanner crab fishery. Although Tanner crab could be retained during the early season, the catch would probably be composed mostly of red king crab as the fleet would target the more valuable species.

✓ If the fleet landed 25 percent Tanner crab, that would equate to about one million crabs. At last season's catch rate of 10 legal crabs per pot this could reduce the directed Tanner fishery by 100,000 pot lifts. This would be 6 percent of the pot lifts anticipated for the upcoming season. In order to reduce red king crab bycatch during the Tanner fishery, we probably would have to consider area closures where the concentrations of king crab are highest. This would result in significant foregone Tanner production.

Recommendation 2 deals with opening of the eastern and western subdistricts of the snow crab fishery. At this time the department will not effect any change in the opening dates of the subdistricts for this fishery. This recommendation has potential reallocation concerns between large and small vessels, thus requiring Board of Fisheries' review and approval. Regulatory proposal 310 dealing with this issue will be reviewed by the board in February of 1993.

Recommendation 3 deals with reducing the tunnel opening on crab pots from 5 to 4 inches during the Tanner and snow crab fisheries to reduce red king crab bycatch. The department is generally in favor of this measure although we have no data to suggest the magnitude of the reduced bycatch. This recommendation will also be discussed at the February Board of Fisheries meeting in conjunction with proposals 315, 316 and 317.

In summary, I appreciate the list of recommended crab fisheries management changes your organization has submitted. Unfortunately, most of these recommendations would result in either reallocating the resource or result in unknown conservation benefits. As mentioned earlier these issues will be appropriately addressed by the Board of Fisheries in February.

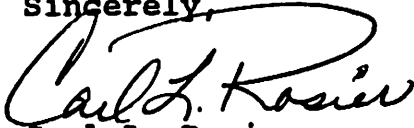
Mr. Arni Thompson

-3-

October 22, 1992

Thanks again for your recommendations, please contact me if you have additional questions.

Sincerely,

A handwritten signature in cursive script that reads "Carl L. Rosier". The signature is written in dark ink and is positioned above the printed name and title.

Carl L. Rosier
Commissioner

cc: Bob Clasby
Larry Nicholson



ALASKA CRAB COALITION

3901 Leary Way (Bldg.) N.W., Suite #6 • Seattle, WA 98107 • (206) 547-7560 • FAX (206) 547-0130

ACC NEWS BULLETIN February 10, 1993

The Alaska Board of Fisheries has been in session in Anchorage, Alaska since February 2nd, reviewing and deliberating on crab fisheries management issues, including change of season opening dates and pot gear limits. Below follows a summary of decisions made at this meeting and an ADF&G press release regarding the split season for opilio crab.

Our thanks to the ACC boat owners and associate members who spent several days at the meetings and helped us prevent radical changes in bairdi and opilio season dates and the king and tanner crab pot limits.

POT LIMITS:

Revised pot limits have been structured to comply with the federal guidelines in the Bering Sea/Aleutian Islands King and Tanner Crab FMP. The single fixed limit has been superceded by a two tiered proportional pot limit system based on vessel length overall.

We assume the pot limit will not be in effect until the opening of the fall king and tanner crab seasons.

Two vessel categories have been established consistent with the NPFMC moratorium restrictions on lengthening vessels to no more than 125 feet length overall. A key reason for using the 125 foot separation point is that it will remove the incentive to lengthen vessels in order to gain more pots. The moratorium still awaits final approval by the Secretary of Commerce, hopefully by mid 1993, according to the NPFMC.

1. Vessels up to and including 125 feet length overall.
2. Vessels greater than 125 feet length overall.

Maximum limits were then set for fisheries starting with the upper limit for vessels greater than 125 feet length overall. A reduction level of 80% of the upper limit was then established to be set for vessels up to and including 125 feet length overall. This was done to comply with the FMP guidelines.

BRISTOL BAY AREA T RED KING CRAB, BERING SEA BAIRDI AND
OPILIO FISHERIES:

250 pots for boats greater than 125 feet length overall

200 pots for boats up to and including 125 feet length
overall

ST. MATTHEWS ISLAND BLUE KING CRAB FISHERY:

75 pots for boats greater than 125 feet length overall

60 pots for boats up to and including 125 feet length
overall

PRIBILOFS BLUE KING CRAB, NORTON SOUND AND ST LAWRENCE
ISLAND RED KING FISHERIES:

50 pots for boats greater than 125 feet length overall

40 pots for boats up to and including 125 feet length
overall

ADAK RED AND BROWN KING CRAB FISHERIES:

No pot limits.

The Adak brown crab fishery will become a longline pot
fishery only, beginning on November first, 1993.

MESH RESTRICTIONS FOR AT LEAST ONE-THIRD OF ONE VERTICAL
SURFACE OF A CRAB POT:

Change in stretched mesh requirement for Areas Q & T from
7 3/4 inch to 9 inch stretched mesh. Effective fall 1994
or 1995 king crab seasons (unclear at this time).

No change for Areas O, and R.

COMBINED BRISTOL BAY/BERING SEA KING AND BAIRDI SEASON,
NOVEMBER FIRST, 1993:

1. Status quo on season opening date for Bristol Bay king
crab, November first, provided the NMFS summer trawl survey
indicates a harvestable surplus is available. However,
legal size bairdi can be retained with king crab until the
king crab quota is taken. Bairdi temporarily closes at the
same time as king crab.

2. Gear must then be moved to storage, ^{WEST} east of 163 degrees.

BAIRDI SEASON OPENING DATE:

1. The bairdi fishery then reopens 10 days after closure of
king crab, in the area from 163 degrees to 173 degrees west.

2. The tunnel height opening for tanner pots has been reduced from 5 inches to 3 inches and tanner boards must be "rigid."

COMBINED BAIRDI/OPILIO SEASON OPENING DATE:

1. Opilio crab season opens January 15th in the eastern and western subdistricts of the Bering Sea.

2. Catcher vessels are required to have tank inspections before retaining opilio crabs. Catcher processor vessels with observers on board are exempt from the tank inspection requirement, but their observers must come in to Dutch Harbor for opilio season debriefing.

ST. MATTHEWS ISLAND AND PRIBILOF ISLANDS BLUE AND RED KING CRAB FISHERIES SEASON OPENING DATE CHANGED TO SEPTEMBER 15.

Both of these fisheries will open on September 15th. The closure date of the first fishery establishes the closure date of the other fishery, to prevent fleets from changing areas during the season and creating enforcement problems. Bear in mind there are two different size limits for the areas.

NORTON SOUND RED KING CRAB FISHERY MADE SUPEREXCLUSIVE REGISTRATION AREA:

Norton Sound has been made a superexclusive registration area, which means if a vessel chooses to fish this area it cannot fish any other king crab registration area in the State of Alaska.

The Norton Sound Economic Development Corporation, a CDQ group recipient submitted a proposal on February 6, 1993 requesting the designation. Local fishermen with 30 foot herring skiffs apparently intend to begin harvesting king crab in August in large numbers.

Findings in the proposal state that NSEDC's partner in the pollock CDQ fishery, Glacier Fish Company, has agreed to assist in distribution of king crab caught and delivered locally within the Norton Sound registration section.

14 DAY POST SEASON PROHIBITION ON USE OF GROUND FISH POTS AFTER CLOSURE OF A KING OR TANNER CRAB DISTRICT HAS BEEN REVISED TO DELETE THE 14 DAY PROHIBITION:

ADF&G apparently plans to implement the regulation by Emergency Order, so this can go into effect at the closure of the Eastern subdistrict opilio fishery.

The regulation has been revised to permit crab boats to store gear with doors open and no bait containers at the close of a subdistrict. Boats can then offload crab,

invalidate tank inspections, activate groundfish permits and otherwise establish compliance with groundfish regulations, ie. federal logbooks, observer program and halibut excluder devices for crab pots, then return to the fishing grounds and engage in groundfish operations.

THE DEFINITIONS OF KING AND TANNER CRAB POTS HAVE BEEN MODIFIED IN REGARDS TO PERIMETER MEASUREMENT OF THE RIGID TUNNEL EYE OPENINGS:

The current statewide regulation calling for tunnel eye opening perimeters larger than 30 inches, has been changed to 36 inches. This makes the State of Alaska regulation consistent with the federal regulation for a groundfish pot (equipped with halibut excluder devices so openings are no larger than 9 inches in width or height). This simplifies compliance in State and federal waters.

GALVANIC TIMED RELEASES (GTR'S) APPROVED AS ALTERNATIVE TO #30 COTTON TWINE IN ESCAPE MECHANISMS FOR CRAB POTS.

Arni Thomson, Executive Director

