AGENDA C-2
NOVEMBER 1998

MEMORANDUM

TO: Council, SSC, and AP

FROM: Clarence G. Pautzke
Executive Director

DATE: November 8, 1998

SUBJECT: Marine Mammal Issues

ACTION REQUIRED

Receive report from NMFS on Section 7 consultation on Steller sea lion/fisheries interactions and consider potential management measures.

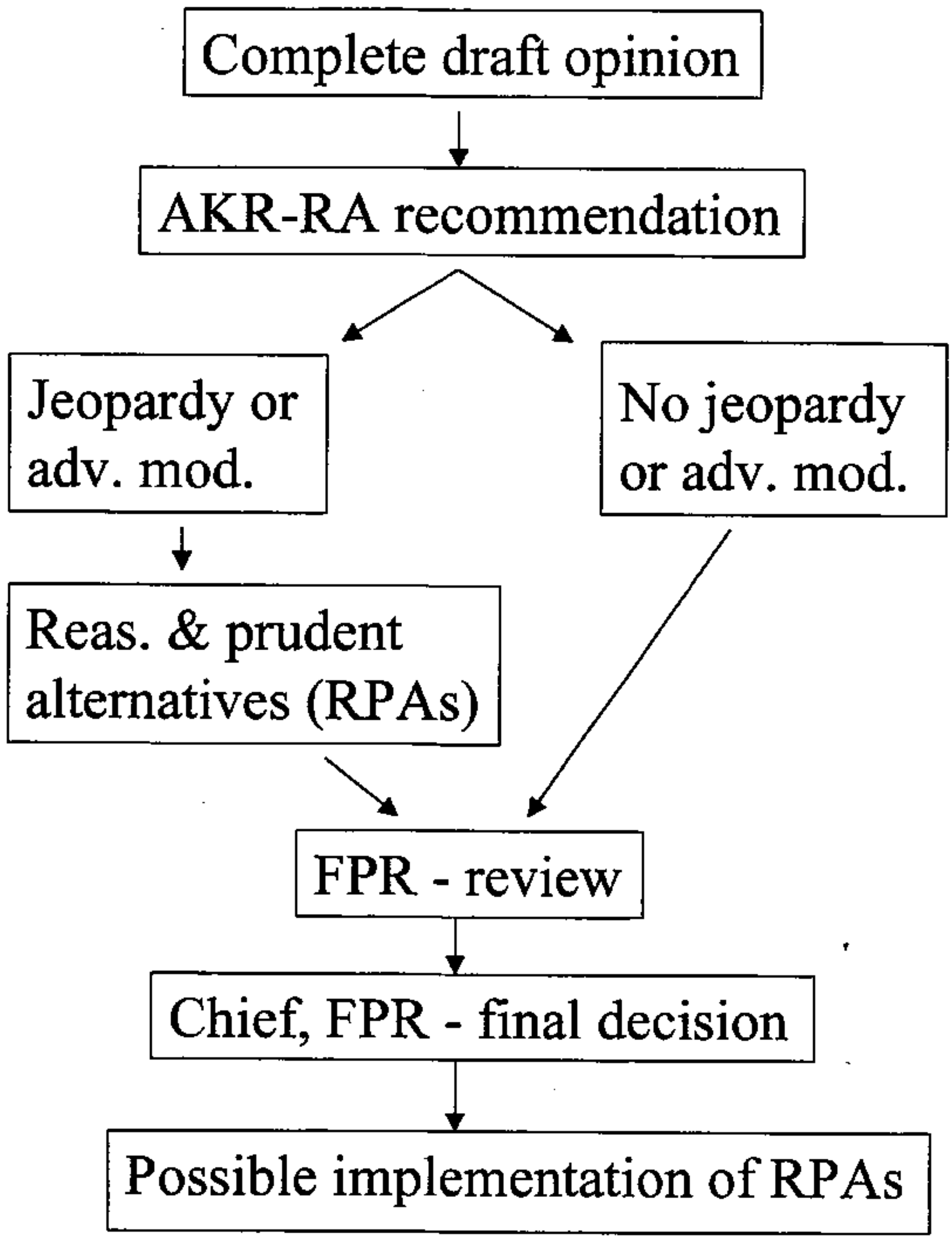
BACKGROUND

In October we were requested by NMFS to place this issue on the November agenda, to discuss possible management actions necessary to address Steller sea lion–fisheries interactions. At this time NMFS has not yet made a determination of 'jeopardy', nor have they forwarded any definitive measures for Council consideration. We do have a draft summary of the biological opinion (Section 7 consultation), which was mailed to you last week. In that mailing there were also three other papers regarding sea lion/pollock issues (Trites, Alverson, and Boyd). While NMFS has not forwarded specific measures for consideration, information distributed at the public workshops in October did contain some example measures being considered (Item C-2(a)). For your reference, we have also compiled a summary of previous Council actions that relate to sea lion/ecosystem protection under Item C-2(b).

As requested by the Council in October, information from the I/O3 analysis regarding CVOA fishing patterns and sea lion issues (Chapters 5 and 6 from that document) is included as a C-2 Supplemental item. Also recall that four of the proposals from the annual groundfish cycle (#s 15, 22, 23, and 24) were noted by the Council for consideration within the overall suite of alternatives to be considered. These are included as a C-2 Supplemental item. Comments to NMFS from the October public workshops are also contained as a C-2 Supplemental item. Comments to the Council on this issue are under Item C-2(c).

The Council could discuss these issues and provide guidance to NMFS at this time. Emergency Rule guidance is included under Item C-2(d).

Process


Complete draft opinion
AKR-RA recommendation
Jeopardy or adv. mod.
No jeopardy or adv. mod.
Reas. & prudent alternatives (RPAs)
FPR - review
Chief, FPR - final decision
Possible implementation of RPAs

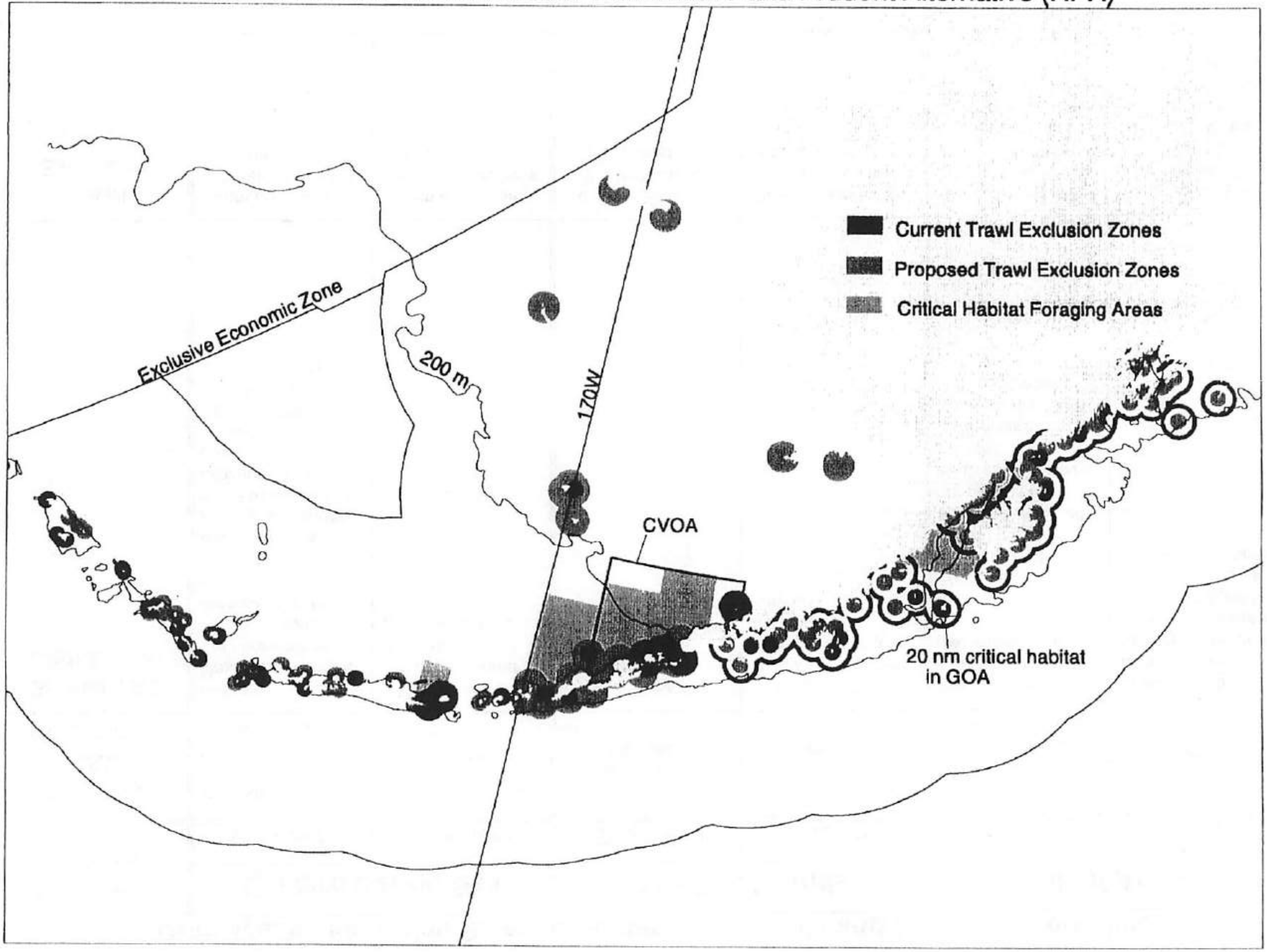
Current Pollock Fisheries Management

<table>
<tr><th>Management Actions</th><th>Eastern Bering Sea</th><th>Aleutian Islands</th><th>Gulf of Alaska</th></tr>
<tr><td>Temporal TAC Distribution</td><td><u>2 Seasons</u>
A-Season: Jan 20 45%
B-Season: Sep 1 55%</td><td>None</td><td><u>3 Seasons</u>
Jan 20 25%
Jul 1 35%
Sep 1 40%</td></tr>
<tr><td>Spatial TAC Distribution</td><td>None</td><td>None</td><td><u>4 Areas</u>
610
620
630
E. Gulf</td></tr>
<tr><td>Trawl Exclusion Zones</td><td colspan="3">
<table>
<tr><th>Size</th><th>Duration</th><th>Site Type</th><th>Number</th><th>Location</th></tr>
<tr><td>10 nm</td><td>Annual</td><td>Rookeries</td><td>35</td><td>W of 150° W</td></tr>
<tr><td>20 nm</td><td>A-season</td><td>Rookeries</td><td>6</td><td>E. Aleutian Is.</td></tr>
</table>
</td></tr>
</table>

Draft Alaska Fisheries Science Center Reasonable and Prudent Alternative

Management Actions	Eastern Bering Sea		Aleutian Islands		Gulf of Alaska	
	Short-term	*Long-term*	*Short-term*	*Long-term*	*Short-term*	*Long-term*
Temporal TAC Distribution	Trimester: A (Jan 20): 35% B (Jul 1): 15% C (Sep 1): 50%	Same	No New Seasonal Allocation	No New Seasonal Allocation	Trimester: A (Jan 20): 35% B (Jul 1): 15% C (Sep 1): 50%	Same
Spatial TAC Distribution	***A-Season:*** Maximum of 50% of TAC from critical habitat foraging area and CVOA **(AREA)** ***B&C Seasons:*** Most recent survey is the basis for TAC allocation to 3 areas: (1) **AREA**; (2) E of 170W outside **AREA**; and (3) W of 170W.	A, B, and C season TACs distributed to 3 areas on the basis of surveys	No New Spatial Allocations	TAC distributed inside and outside of critical habitat on the basis of surveys	In addition to TAC allocation by management area: ***A-Season:*** Maximum of 50% of TAC from combined critical habitat foraging area and within 20 nm of sites with >200 sea lions ever counted ***B&C Seasons:*** No more than 33% of the aggregate B&C season TAC from combined critical habitat foraging area and within 20 nm of sites with >200 sea lions ever counted	In addition to TAC allocation by management area, A, B, and C season TACs distributed inside and outside of critical habitat on the basis of surveys
Trawl Exclusion Zones	20 nm around sites with >200 sea lions ever counted	20 nm around sites with >200 sea lions ever counted	10 nm around sites with >200 sea lions ever counted	10 nm around sites with >200 sea lions ever counted	10 nm around sites with >200 sea lions ever counted from 144°-164°W, and 20 nm around sites with >200 sea lions ever counted from 164°-170°W	10 nm around sites with >200 sea lions ever counted from 144°-164°W, and 20 nm around sites with >200 sea lions ever counted from 164°-170°W

Draft Alaska Fisheries Science Center Reasonable and Prudent Alternative (RPA)



Previous Council/NMFS Actions Relative to Sea Lion Concerns

The Council and NMFS have taken a number of actions to protect Seller sea lions from fishery interactions. As discussed in the Section 7 Draft Biological Opinion, these interactions can occur through competition, disturbance, and direct and incidental mortality.

<u>No shooting</u>: This measure was enacted concurrent with listing of the Seller sea lions as threatened under the ESA on December 4, 1990. Shooting at or within 100 yards of Seller sea lions was prohibited.

<u>Limits on incidental kills</u>: When Stellers were listed as threatened, the number of Stellers that could be killed incidental to commercial fishing was reduced from 1,350 to 675 animals. Note that in recent years, mortality of the western stock of Seller's due to commercial fishing has averaged about 35 animals per year, of which 14 per year were taken in Alaska groundfish fisheries.

<u>No entry buffer zones</u>: Three mile no-entry zones were also established at the time of listing in 1990. No vessels are allowed to operate within 3 miles of principal rookeries east of 141° W longitude. Limits on approach by land (½ mile around the rookeries) were also instituted to minimize disturbance and reduce opportunities for individuals to intentionally shoot the animals.

<u>No-trawl zones</u>: In 1992, 37 trawl closure areas were implemented under BSAI Amendment 20 and GOA Amendment 25. These zones were established to reduce disturbance of feeding Seller sea lions around rookeries. Trawling is prohibited year-round within 10 nautical miles of these rookeries, extended to 20 miles around six rookeries during the pollock A- season.

<u>Seasonal apportionment of TACs</u>: Fisheries have been both seasonally and spatially allocated to reduce potential impacts of localized depletion of prey. In 1991, Amendment 14 banned roe stripping of pollock, and apportioned the Bering Sea pollock TAC into a winter fishery (A-season) and a late summer fishery (B-season). In June 1998, the Council adopted a regulatory amendment to seasonally apportion Atka mackerel in the Aleutian Islands that should become effective in 1999. GOA pollock fisheries have been apportioned by tri-mester and by more discrete management areas for several years.

<u>Spatial apportionment of TACs</u>: Beginning in 1994, with the passage of Amendment 28, the Atka mackerel TAC was apportioned among AI subareas to prevent localized depletion. In June 1998, the Council adopted a regulation to reduce fishing for Atka mackerel near rookeries to further reduce potential for localized depletion of Atka mackerel within critical habitat areas.

<u>Precautionary harvest limits on Seller sea lion prey</u>: Catch specifications for some groundfish stocks have incorporated safeguards for Seller sea lions. Concerns for sea lions have resulted in explicit conservative rates for pollock and Atka mackerel. In 1993, the GOA pollock stock assessment incorporated risk estimation into the stock assessment. The conservative 1994 pollock ABC was based in part on avoiding potential harm to sea lions. Catch specifications have traditionally been conservative for the Atka mackerel stock. The Council adopted the SSC's suggested "phase-in" approach to increasing Atka mackerel ABC's in the early 1990's, when new data suggested a higher biomass. From 1993 through 1996, TAC's were set below ABC for the AI TAC. The 1998 mackerel ABC was based on a very conservative rate ($F_{52\%}$).

<u>Prohibition on directed fishing on forage fish</u>: In 1997, the Council adopted an amendment that prohibits directed fishing for forage fish, which are prey for groundfish, seabirds, and marine mammals. Under this amendment, protection is provided for forage fish species such as capelin, sand lance, myctophids, and a host of other forage species.

THEFT RATES OF MODEL YEAR 1995 PASSENGER MOTOR VEHICLES STOLEN IN CALENDAR YEAR 1995—Continued

	Manufacturer	Make/model (line)	Thefts 1995	Production (mfgr's) 1995	1995 (per 1,000 vehicles produced) theft rate
205	ROLLS-ROYCE	SIL SPIRIT/SPUR/MULS	0	132	0.0000
206	ROLLS-ROYCE	TURBO R	0	19	0.0000
207	VOLKSWAGEN	EUROVAN	0	1,814	0.0000
208	VOLVO	LIMOUSINE	0	6	0.0000

Issued on: August 18, 1997.

L. Robert Shelton,

Associate Administrator for Safety Performance Standards.

[FR Doc. 97-22263 Filed 8-20-97; 8:45 am]

BILLING CODE 4910-59-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Chapter VI

[Docket No. 970728184-7184-01; I.D. 060997C]

Policy Guidelines for the Use of Emergency Rules

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Policy guidelines for the use of emergency rules.

SUMMARY: NMFS is issuing revised guidelines for the Regional Fishery Management Councils (Councils) in determining whether the use of an emergency rule is justified under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The guidelines were also developed to provide the NMFS Regional Administrators guidance in the development and approval of regulations to address events or problems that require immediate action. These revisions make the guidelines consistent with the requirements of section 305(c) of the Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act.

DATES: Effective August 21, 1997.

FOR FURTHER INFORMATION CONTACT: Paula N. Evans, NMFS, 301/713-2341.

SUPPLEMENTARY INFORMATION:

Background

On February 5, 1992, NMFS issued policy guidelines for the use of emergency rules that were published in the **Federal Register** on January 6, 1992 (57 FR 375). These guidelines were consistent with the requirements of section 305(c) of the Magnuson Fishery Conservation and Management Act. On October 11, 1996, President Clinton signed into law the Sustainable Fisheries Act (Public Law 104-297), which made numerous amendments to the Magnuson-Stevens Act. The amendments significantly changed the process under which fishery management plans (FMPs), FMP amendments, and most regulations are reviewed and implemented. Because of these changes, NMFS is revising the policy guidelines for the preparation and approval of emergency regulations. Another change to section 305(c), concerning interim measures to reduce overfishing, will be addressed in revisions to the national standards guidelines.

Rationale for Emergency Action

Section 305(c) of the Magnuson-Stevens Act provides for taking emergency action with regard to any fishery, but does not define the circumstances that would justify such emergency action. Section 305(c) provides that:

1. The Secretary of Commerce (Secretary) may promulgate emergency regulations to address an emergency if the Secretary finds that an emergency exists, without regard to whether a fishery management plan exists for that fishery;

2. The Secretary shall promulgate emergency regulations to address the emergency if the Council, by a unanimous vote of the voting members, requests the Secretary to take such action;

3. The Secretary may promulgate emergency regulations to address the emergency if the Council, by less than a unanimous vote of its voting members, requests the Secretary to take such action; and

4. The Secretary may promulgate emergency regulations that respond to a public health emergency or an oil spill. Such emergency regulations may remain in effect until the circumstances that created the emergency no longer exist, provided that the public has had an opportunity to comment on the regulation after it has been published, and in the case of a public health emergency, the Secretary of Health and Human Services concurs with the Secretary's action.

Policy

The NOAA Office of General Counsel has defined the phrase "unanimous vote," in paragraphs 2 and 3 above, to mean the unanimous vote of a quorum of the voting members of the Council only. An abstention has no effect on the unanimity of the quorum vote. The only legal prerequisite for use of the Secretary's emergency authority is that an emergency must exist. Congress intended that emergency authority be available to address conservation, biological, economic, social, and health emergencies. In addition, emergency regulations may make direct allocations among user groups, if strong justification and the administrative record demonstrate that, absent emergency regulations, substantial harm will occur to one or more segments of the fishing industry. Controversial actions with serious economic effects, except under extraordinary circumstances, should be done through normal notice-and-comment rulemaking.

The preparation or approval of management actions under the emergency provisions of section 305(c) of the Magnuson-Stevens Act should be limited to extremely urgent, special circumstances where substantial harm to or disruption of the resource, fishery, or community would be caused in the time it would take to follow standard rulemaking procedures. An emergency action may not be based on administrative inaction to solve a long-recognized problem. In order to approve an emergency rule, the Secretary must have an administrative record justifying emergency regulatory action and demonstrating its compliance with the national standards. In addition, the preamble to the emergency rule should indicate what measures could be taken or what alternative measures will be considered to effect a permanent solution to the problem addressed by the emergency rule.

The process of implementing emergency regulations limits substantially the public participation in rulemaking that Congress intended under the Magnuson-Stevens Act and the Administrative Procedure Act. The Councils and the Secretary must, whenever possible, afford the full scope of public participation in rulemaking. In addition, an emergency rule may delay the review of non-emergency rules, because the emergency rule takes precedence. Clearly, an emergency action should not be a routine event.

Guidelines

NMFS provides the following guidelines for the Councils to use in determining whether an emergency exists:

Emergency Criteria

For the purpose of section 305(c) of the Magnuson-Stevens Act, the phrase "an emergency exists involving any fishery" is defined as a situation that:

(1) Results from recent, unforeseen events or recently discovered circumstances; and

(2) Presents serious conservation or management problems in the fishery; and

(3) Can be addressed through emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and deliberative consideration of the impacts on participants to the same extent as would be expected under the normal rulemaking process.

Emergency Justification

If the time it would take to complete notice-and-comment rulemaking would result in substantial damage or loss to a living marine resource, habitat, fishery, industry participants or communities, or substantial adverse effect to the public health, emergency action might be justified under one or more of the following situations:

(1) Ecological—(A) to prevent overfishing as defined in an FMP, or as defined by the Secretary in the absence of an FMP, or (B) to prevent other serious damage to the fishery resource or habitat; or

(2) Economic—to prevent significant direct economic loss or to preserve a significant economic opportunity that otherwise might be foregone; or

(3) Social—to prevent significant community impacts or conflict between user groups; or

(4) Public health—to prevent significant adverse effects to health of participants in a fishery or to the consumers of seafood products.

Dated: August 14, 1997.

Gary C. Matlock,

Acting Assistant Administrator for Fisheries, National Marine Fisheries Service.

[FR Doc. 97–22094 Filed 8–20–97; 8:45 am]

BILLING CODE 3510–22–F

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 285

[Docket No. 970702161–7197–02; I.D. 041097C]

RIN 0648–AJ93

Atlantic Highly Migratory Species Fisheries; Import Restrictions

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS amends the regulations governing the Atlantic highly migratory species fisheries to prohibit importation of Atlantic bluefin tuna (ABT) and its products in any form harvested by vessels of Panama, Honduras, and Belize. The amendments are necessary to implement International Commission for the Conservation of Atlantic Tunas (ICCAT) recommendations designed to help achieve the conservation and management objectives for ABT fisheries.

DATES: Effective August 20, 1997. Restrictions on Honduras and Belize are applicable August 20, 1997; restrictions on Panama are applicable January 1, 1998.

ADDRESSES: Copies of the supporting documentation are available from Rebecca Lent, Chief, Highly Migratory Species Management Division, Office of Sustainable Fisheries (F/SF1), NMFS, 1315 East-West Highway, Silver Spring, MD 20910–3282.

FOR FURTHER INFORMATION CONTACT: Chris Rogers or Jill Stevenson, 301–713–2347.

SUPPLEMENTARY INFORMATION: The Atlantic tuna fisheries are managed under the authority of the Atlantic Tunas Convention Act (ATCA). Section 971d(c)(1) of the ATCA authorizes the Secretary of Commerce (Secretary) to issue regulations as may be necessary to carry out the recommendations of the ICCAT. The authority to issue regulations has been delegated from the Secretary to the Assistant Administrator for Fisheries, NOAA (AA).

Background information about the need to implement trade restrictions and the related ICCAT recommendation was provided in the preamble to the proposed rule (62 FR 38246, July 17, 1997) and is not repeated here. These regulatory changes will further NMFS' management objectives for the Atlantic tuna fisheries.

Proposed Import Restrictions

In order to conserve and manage North Atlantic bluefin tuna, ICCAT adopted two recommendations at its 1996 meeting requiring its Contracting Parties to take the appropriate measures to prohibit the import of ABT and its products in any form from Belize, Honduras, and Panama. The first recommendation was that its Contracting Parties take appropriate steps to prohibit the import of ABT and its products in any form harvested by vessels of Belize and Honduras as soon as possible following the entry into force of the ICCAT recommendation. Accordingly, the prohibition with respect to these countries is effective August 20, 1997. The second recommendation was that the Contracting Parties take appropriate steps to prohibit such imports harvested by vessels of Panama effective January 1, 1998. This would allow Panama an opportunity to present documentary evidence to ICCAT, at its 1997 meeting or before, that Panama has brought its fishing practices for ABT into consistency with ICCAT conservation and management measures. Accordingly, the prohibition with respect to Panama will become effective January 1, 1998.

Under current regulations, all ABT shipments imported into the United States are required to be accompanied by a Bluefin Statistical Document (BSD). Under this final rule, United States Customs officials, using the BSD, will deny entry into the customs territory of the United States of shipments of ABT harvested by vessels of Panama, Honduras, and Belize and exported after the effective dates of the trade restrictions. Entry will not be denied for any shipment in transit prior to the effective date of trade restrictions.

Upon determination by ICCAT that Panama, Honduras, and/or Belize has brought its fishing practices into consistency with ICCAT conservation and management measures, NMFS will publish a final rule in the **Federal Register** that will remove import restrictions for the relevant party. In

AGENDA C-2(c)
NOVEMBER 1998

RECEIVED
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N.P.F.M.C

Allan Hokanson
3331 Balika Ln.
Kodiak, AK. 99615

November 1, 1998

North Pacific Fisheries Management Council

Distinguished members of the council,

I have been fishing for 32 years and have been captain on a trawler out of Kodiak since 1983. I also hold a degree in Oceanography, Master of inspected vessels up to 500 tons and Master of Fishing vessels to 1600 tons.

I would like to comment on the "Draft Biological Opinion" by Tim Ragen on October 22, 1998.

Everyone has an opinion and Mr. Ragen is certainly entitled to his. However in the information I have available, I cannot find any facts or data to support this opinion. The future of the pollock fishery is one that will seriously impact thousands of people from fishermen to store owners. A decision of this magnitude cannot be taken lightly and must be backed up with substantial facts.

The assumption has been made here that Pollock is the preferred food on the Steller sea lion. If this is true I would like to address the following questions

- **As a fisherman I seek out to highest concentrations of Pollock. Wouldn't a Sea lion that prefers pollock do the same? If so, why is it that trawlers almost never see a sea lion as documented by the Marine Mammals Log and observer reports? On the other hand, Salmon fishermen (sometimes fishing only a mile or two away) report seeing sea lions taking salmon almost every day.**

- **In the 1960's the sea lion population around Kodiak was strong. Crab and shrimp were also strong but there was almost no cod and pollock. What were the sea lions eating then?**

- **We have had 10 and 20 mile trawl exclusion zones for several years now. Have the sea lions rebounded as a result?**

Over the years, Kodiak has seen vast changes in the ecosystem off it's shores. Going from a major crab and shrimp producer to a major bottom fish producer. Did the trawlers bring in the fish so they would have something to do? Of course not? The simple fact is the environment is constantly changing and it affects every living thing there. Is it assumed that the sea lion population can go through such an extensive change in the ecosystem without an affect?

The proposed changes to the pollock fishery is nothing more than an experiment. Not a new experiment, but an expansion of one that has thus far failed to produce the desired results. I fear that the cost of this experiment, if perused, will be counted in human lives. The lives of those living in the fishing communities like Kodiak.

I don't know why the sea lion population is continuing to decline, but I have seen killer whales attack sea lions. I have also seen sea lions refuse a pollock when a cod was available. My hope is that these questions and many others could be answered before such drastic steps are taken that affect the lives of so many people.

Thank-you

Allan Hokanson

ALASKA CRAB COALITION

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

RECEIVED
NOV - 3 1998
N.P.F.M.C

DATE: November 3, 1998

TO: Rick Lauber, Chairman
NPFMC
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501

FROM: Arni Thomson, Executive Director

RE: AGENDA ITEM C-2, STELLAR SEA LIONS AND THE CVOA AS CRITICAL HABITAT FOR BAIRDI TANNER CRAB, AN OVERFISHED STOCK AS DEFINED UNDER AMENDMENT 7 TO THE BSAI KING AND TANNER CRAB FMP

At the time the NPFMC is reviewing protectionist measures for stellar sea lions, that could likely restrict the trawl catch of pollock and other species in the CVOA, the Alaska Crab Coalition would like to remind the Council of the overfished status of c. bairdi tanner crab in the Eastern Bering Sea and the Council and ADF&G's intent to initiate a rebuilding program for c. bairdi.

ACC boat owners have recently brought it to our attention that the CVOA has been a traditonal habitat for bairdi crab (as well as king crab). Although it has not been an area of substantial harvests of bairdi crab, it has been an area of high concentrations of females and juveniles. The recent period of decline of c. bairdi stocks coincides with the adoption of Amendment 18 to BSAI Groundfish FMP, adopted on June 1, 1992. This amendment initiated the inshore/offshore pollock allocation program, and included the creation of the CVOA, a preferential access area for shorebased trawlers. The eastern portion of the CVOA, that extends from 165 degrees N. latitude, east to 163 N. latitude closely approximates the boundaries of the original "pot sanctuary," closed year-round to all trawling during the period 1967 to 1984.

Suffice it to say at this time, that the CVOA and the waters offshore of the north side of the Alaska Peninsula, Unimak, Akutan and Unalaska islands are important habitat for numerous marine resources, not only king and tanner crab, but also juvenile halibut. There is a long history of regulation of industrial trawl fisheries in this area, dating back to the early 1960s.

The ACC wishes to submit for the administrative record ,two papers that document the development of the bycatch management measures involving the CVOA.

- A Brief History of Bycatch Management Measures for Eastern Bering Sea Groundfish Fisheries, David Witherell and Clarence Pautzke, Marine Fisheries Review, 59(4), 1997.

- Comment on Crab Closures in Bristol Bay, Amendment 41, BSAI Groundfish FMP; Historical Reference Points, The Southeast Bering Sea King Crab Pot Sanctuary, Arni Thomson, Alaska Crab Coalition, April 9, 1998

Attachments: 2

A Brief History of Bycatch Management Measures for Eastern Bering Sea Groundfish Fisheries

DAVID WITHERELL and CLARENCE PAUTZKE

Introduction

Bycatch management measures instituted for groundfish fisheries of the eastern Bering Sea have focused on reducing the incidental capture and injury of species traditionally harvested by other fisheries. These species include king crab, *Paralithodes* and *Lithodes* spp.; Tanner crab, *Chionoecetes* spp.; Pacific herring, *Clupea harengus pallasi*; Pacific halibut, *Hippoglossus stenolepis*; and Pacific salmon and steelhead trout, *Oncorhynchus* spp. Collectively, these species are called "prohibited species," as they cannot be retained as bycatch in groundfish fisheries and must be discarded with a minimum of injury.

Regulations promulgated in the 1940's and 1950's prohibited taking and retaining these species except by specific gear types. The concept of prohibited species was incorporated into regulations implemented following passage of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) in 1976, first for controlling foreign fisheries within the U.S. Exclusive Economic Zone, and then for the development of domestic fisheries thereafter. The North Pacific Fishery Management Council (NPFMC) and the National Marine Fisheries Service (NMFS) have enacted many management measures to allocate, control, and reduce the incidental take of prohibited species in groundfish fisheries. This paper provides a historical review of these measures and analysis of their effectiveness.

The authors are with the North Pacific Fishery Management Council Staff, 605 West 4th Avenue, Suite 306, Anchorage, AK 99501. Views or opinions expressed or implied are those of the authors and do not necessarily reflect the position of the Council or the National Marine Fisheries Service, NOAA.

Pre-Magnuson Act Era

Prior to enactment of the MFCMA in 1976, fishery management measures in the eastern Bering Sea were implemented through public laws and international agreements. The early regulations applied only to the U.S. 3-mile territorial sea and were administered by the Bureau of Commercial Fisheries through 1959. Thereafter, they were administered by the Alaska Department of Fish and Game when Alaska gained statehood. Prior to 1950, salmon constituted the primary fishery in the Bering Sea; Pacific halibut, sablefish, *Anoplopoma fimbria*; rockfish, *Sebastes* spp.; flatfish, *Pleuronectes* and *Hippoglossoides* spp.; and king crab fisheries developed in the late 1950's. As these fisheries developed, regulations were promulgated to prohibit the harvest of certain species by particular gear types (Table 1). This set the stage for bycatch and allocation disputes among fishermen using the different gear types. These disputes continue to the present day.

The International Convention for High Seas Fisheries of 1959 was the governing treaty for fisheries outside the U.S. territorial sea. It entered into force in June 1953. The Convention established the International North Pacific Fisheries Commission to provide scientific information and recommendations on conservation measures to ensure maximum sustained productivity of fish resources. One of the Convention's new regulatory measures was a provision that Japan (the only foreign fleet active in the eastern Bering Sea at the time) was prohibited from fishing halibut in certain areas and from trawling in the Bristol Bay Pot Sanctuary to minimize interaction with the red king crab, *Paralithodes camtshaticus*, pot fishery (Fig. 1). A more comprehensive review of early fishery management in the North Pacific is provided by Fredin[1].

In 1966, the U.S. congress established a 9-mile contiguous fishery zone adjacent to the 3-mile territorial sea. Bilateral agreements with Japan and the U.S.S.R. were first initiated in 1967, and made biannually thereafter (Fredin[1]). Provisions of the agreements included continuation and expansion of the Bristol Bay Pot Sanctuary, and an array of area closures to prevent foreign fisheries from targeting on Pacific halibut or having gear interactions with domestic fisheries. The 1975 bilateral agreements established the Winter Halibut Savings Area (Fig. 1) in which trawling was prohibited by all vessels from December through March, and a large zone between long. 170° W and 175° W closed to trawling by Japanese vessels. The Pacific halibut stock had declined throughout the 1960's, and the intent of these closures was to reduce bycatch and rebuild the Pacific halibut resource.

Regulated Foreign Fisheries, 1976–84

Passage of the MSFCMA in 1976 ushered in a whole new era of fishery management in the North Pacific. Un-

[1] Fredin, R. A. 1987. History of regulation of Alaska groundfish fisheries. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Northwest Alaska Fish. Cent. Proc. Rep. 87-07, 63 p.

der this Act, the United States declared exclusive management authority over all fish resources out to 200 n.mi., and

Table 1. — Time line of management measures to control bycatch of prohibited species in the groundfish fisheries of the Bering Sea and Aleutian Islands area, 1935–97.

Year	Regulation
1935	Trawls prohibited except for shrimp and flounder fishing.
1937	Use of dynamite prohibited.
1938	Use of gillnets prohibited for catching halibut.
1942	Trawls permitted except for salmon and herring fishing.
1944	Use of trawls prohibited for catching halibut.
1948	5-inch minimum mesh size required for trawls.
1959	Trawls prohibited for taking any crab species. Trawling prohibited in Bristol Bay king crab pot sanctuary.
1967	Halibut nursery area closed to halibut fishing. Foreign fisheries prohibited around Fox Islands.
1969	Pribilof Islands area closed to foreign fishing.
1972	Pot gear prohibited for catching halibut.
1973	Use of tangle nets prohibited for catching crab.
1974	Catch quotas established for Japanese groundfish fisheries limit effort.
1975	Catch quotas established for USSR groundfish fisheries. Trawling prohibited in winter halibut savings area and along most of the Aleutian Islands.
1976	Magnuson Act passes, providing national standards and regulations.
1977	Preliminary BSAI Groundfish FMP implemented with several closure areas.
1982	BSAI Groundfish FMP implemented. Chinook salmon bycatch limits established for foreign trawlers.
1983	Halibut, salmon, king crab, and Tanner crab bycatch reduction schedule established for foreign trawling. Domestic trawling allowed in pot sanctuary and Halibut Savings Area.
1984	Further reductions in salmon bycatch limits for foreign trawling. Two million metric ton (t) optimum yield cap on groundfish established.
1987	Bycatch limits and zones established for red king crab, Tanner crab, and halibut taken in domestic and JV flatfish trawl fisheries. Area 512 closed to all trawling year-round.
1989	Bycatch limits for crab and halibut apply to all trawl fisheries. Area 516 closed to trawling seasonally during crab molting period.
1990	New observer program and data reporting system implemented.
1991	VIP established for red king crab and halibut bycatch. Herring Savings Areas established. Season for yellowfin sole fishery changed to May 1.
1992	Hotspot authority granted. VIP expanded for all trawl fisheries. Halibut PSC limits established for BSAI nontrawl fisheries.
1993	Gillnets and seines prohibited for groundfish fishing. Careful release requirements established for halibut bycatch in groundfish longline fisheries. Crab bycatch performance standards set for pelagic trawl fishery.
1994	Council adopts minimum mesh size requirements for trawl codends used in pollock, cod, and rock sole fisheries. Voluntary retention of salmon for food banks allowed. NMFS publishes vessel specific bycatch rates on the Internet.
1995	Chum Salmon Savings Area, Chinook Salmon Savings Area, and Pribilof Islands Habitat Conservation Area established as trawl closure areas. Bottom trawling prohibited in Red King Crab Savings Area established by emergency rule. Halibut and sablefish IFQ program allows retention of halibut in sablefish fisheries.
1996	Red King Crab Savings Area permanently established as year-round trawl closure area.
1997	Nearshore Bristol Bay closed to all trawling year-round. PSC limits for red king crab and Tanner crab reduced. PSC limits for snow crab implemented.

prohibited fishing by foreign vessels except as authorized under certain conditions. A major goal of the Act was to "Americanize" the fisheries off U.S. coasts. The Act required preparation of fishery management plans (FMP's) to achieve and maintain optimum yield from each fishery in accordance with seven national standards for conservation and management. A preliminary FMP for Bering Sea groundfish fisheries was implemented in 1977 with the objectives of rebuilding depleted groundfish and halibut stocks and preventing overexploitation of healthy stocks. This preliminary plan set up both the pot sanctuary and the winter halibut savings area no-trawl zones.

A FMP for Bering Sea and Aleutian Islands (BSAI) groundfish was formally implemented in 1982. The fisheries at that time were prosecuted primarily by foreign fleets from Japan, U.S.S.R., and the Republic of Korea. The pot sanctuary and halibut savings area were included in the original FMP, but the plan was amended in 1983 to allow domestic trawling within the areas. An overall management goal of the FMP is to minimize prohibited species catch (PSC) while attaining optimum yield of groundfish species. In 1982, the FMP was amended to establish a prohibite species catch limit of 55,250 chinook salmon, *O. tshawytscha*, for foreign trawl fisheries, which were annually allocated among foreign nations. Any nation that exceeded their salmon allocation would be prohibited from fishing in much of the Bering Sea for the remainder of the season. This amendment set a precedent for fleet-wide bycatch limits that trigger area or entire fisheries closures.

In 1983, the FMP was amended to reduce the incidental catch of Pacific halibut (50% reduction), Pacific salmon (75% reduction), and king and Tanner crabs (25% reduction) by the foreign trawl fisheries over a 5-year period. The FMP provided incentives for reaching this goal by allocating supplemental groundfish within a fishing season to nations on the basis of their bycatch performance. The Japanese fleet successfully accomplished bycatch reductions by allocating their bycatch allowance among participating vessels. If a vessel allocation was exceeded for any species, that vessel had to stop fishi unless it purchased unused bycat shares from other vessels. This systen

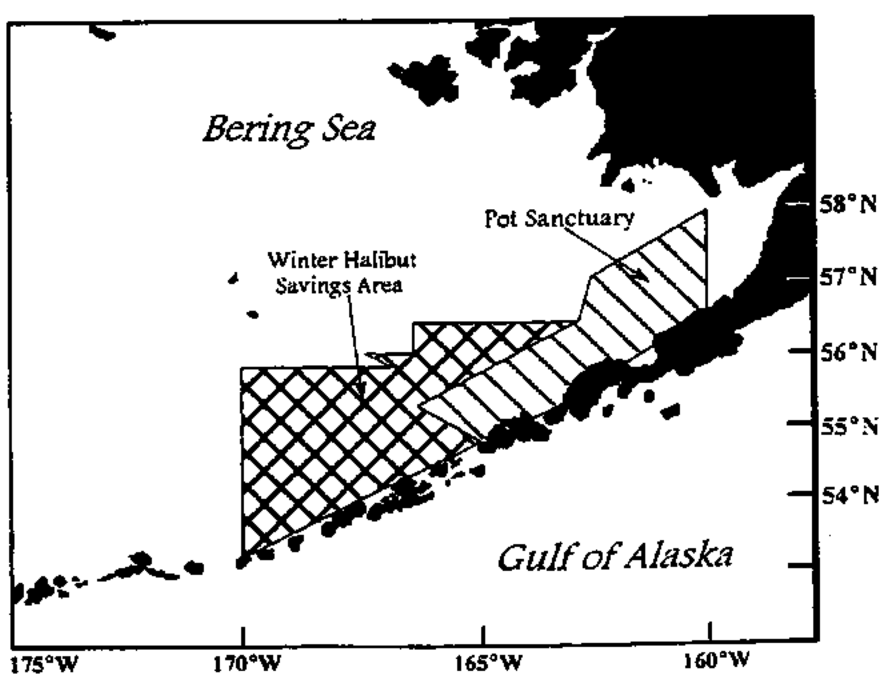

Figure 1. — The Bristol Bay Pot Sanctuary and the Winter Halibut Savings Area.

resulted in an overall bycatch savings by the entire fleet, and it represented the first working system of individual vessel bycatch accountability.

Joint Ventures and Developing Domestic Fisheries, 1985–88

The transition period from foreign to fully domestic groundfish fisheries was stimulated by a rapid increase in joint-venture (JV) operations. The American Fisheries Promotion Act (the so-called "fish and chips" policy) required that allocations of fish quotas to foreign nations be based on the nations contributions to the development of the U.S. fishing industry. This provided sufficient incentive for development of JV operations, with U.S. catcher vessels delivering their catches directly to foreign processing vessels, and moving to fully domestic fisheries. Additionally, conservation policies adopted by the NPFMC had the effect of restoring depleted stocks such as yellowfin sole, *Pleuronectes asper*; Pacific ocean perch, *Sebastes alutus*; and sablefish (Megrey and Wespestad, 1990). Based on good management, healthy fish stocks, the potential for hefty profits, and also the Bristol Bay red king crab fishery collapse, vessels were quickly built or converted for participation in JV and domestic groundfish fisheries in the North Pacific.

This transition period was an era of relatively few fishing regulations for U.S. groundfish vessels, and yet bycatch concerns of domestic halibut longliner fishermen and crab pot fishermen were recognized and addressed. In 1987, Amendment 10 to the FMP established bycatch limitation zones (Fig. 2) and PSC limits for red king crab, *C. bairdi*, and Pacific halibut. This amendment specified PSC limits of 135,000 red king crab and 80,000 *C. bairdi* in Zone 1, and 326,000 *C. bairdi* in Zone 2. These PSC limits applied to domestic and JV fisheries for yellowfin sole and other flatfish only. When this fishery reached the specified PSC limit, vessels were prohibited from flatfish fishing within that zone. In addition to PSC limits, all trawling was prohibited from Area 512 (long. 160° W to lat. 162° W, south of lat. 58° N) in Bristol Bay to protect red king crab stocks.

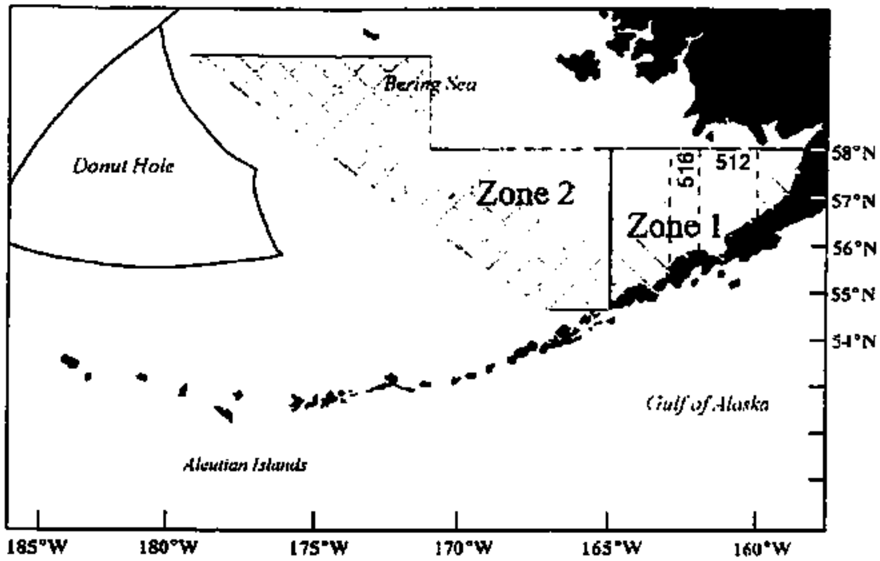

Figure 2. — The crab bycatch limitation zones and Regulatory Areas 512 and 516.

Domestic Fishery, 1988–97

Joint-venture operations peaked in 1987, giving way to a rapidly developing domestic fishery. By 1991, the entire BSAI groundfish harvest (2,126,600 t, worth U.S. $351 million ex-vessel) was taken by only 391 U.S. vessels (Kinoshita et al., 1993). Along with Americanization of the fleet came domestic squabbles over allocation and bycatch, leading to an array of regulations intended to control this bycatch.

In 1989, Amendment 12a to the FMP further addressed bycatch concerns by establishing a seasonal closure in Regulatory Area 516 and establishing bycatch limits for crab and Pacific halibut for all trawl fisheries. Total annual PSC limits were 200,000 red king crab and 1,000,000 *C. bairdi* for a Zone 1 closure, 3,000,000 *C. bairdi* for a Zone 2 closure, and 5,333 t of halibut for a BSAI closure. In 1992, halibut bycatch limits were extended to nontrawl fisheries (Amendment 21) and established in terms of mortality rather than total catch. PSC limits 3,775 t of halibut bycatch mortality for trawl fisheries and 900 t of halibut bycatch mortality for nontrawl fisheries were established. PSC limits are further seasonally apportioned into specified fisheries (Table 2), and several simulation models have been used to analyze alternative bycatch management measures in seeking optimal PSC apportionment (Smith, 1993).

In 1990, the Council adopted a "penalty box" system to penalize individual trawl vessels for excessive bycatch rates by requiring vessels to cease fishing for a set period. This system was disapproved by the Secretary of Commerce based on concerns about due process and the application of observer data. In its place, a vessel incentive program (VIP) was implemented. The VIP imposes fines for vessels exceeding bycatch rate standards. These standards for maximum acceptable bycatch rates are established preseason. Unfortunately, very few cases have been prosecuted due to insufficient staff resources necessary to investigate and prosecute a case.

In 1991, concern about unregulated Pacific herring bycatch in trawl fisheries led to implementation of herring bycatch limits that, when attained, trigger closures of established areas to trawling (Amendment 16a). Areas with relatively high bycatch rates of Pacific herring were identified from data collected by observers on foreign and JV vessels. From this information, three time/area closures (called Herring Savings Areas) were established, taking into account herring migration patterns (Fig. 3). These Herring Savings Areas close to trawling when a herring PSC limit is attained. Like other PSC limits, the herring PSC limit (set at 1% of estimated herring biomass) is apportioned among specified trawl fisheries. If a bycatch allowance is attained, Area 1 closes 15 June to 1 July, Area 2 closes from 1 July to 15 August, and Area 3 closes during the winter months (1 September through 1 March) for specified fisheries.

Analysis of bycatch and "hotspot" areas was greatly enhanced by the implementation of the domestic observer program in 1990, and development of Geographic Information System (GIS) technology. In the early 1990's, GIS technology was used to evaluate proposed trawl closure areas to protect blue king crab, *Paralithodes platypus*, habitat around the Pribilof Islands, and to define hotspot closure areas to control bycatch of chinook and chum salmon, *O. keta*. The Chum Salmon Savings Area (Fig. 4) closes to all trawling during 1–31 August, and remains closed if a bycatch limit of 42,000 chum salmon is taken in the catcher vessel operational area. Trawling is prohibited in the Chinook Salmon Savings Areas (Fig. 4) upon attainment of a bycatch limit of 48,000 chinook salmon in the BSAI. Beginning in 1995, the Pribilof Islands Habitat Conservation Area (Fig. 5) was closed to all trawling on a year-round basis (Fig. 5).

Closure of the Bristol Bay red king crab fishery in 1994 due to poor stock conditions brought about a flurry of regulatory activity to control crab bycatch. A new trawl closure area, called the Red King Crab Savings Area (Fig. 5), was established by emergency rule in 1995, and made permanent under Amendment 37. This 4,000 n.mi.^{2} area in outer Bristol Bay was a prime fishing ground for rock sole and other flatfish, but it was found to have high densities of adult male red king crab. In adopting this area closure, the Council expressed concerns about bycatch and unobserved mortality of these crab. Amendment 37 also prohibited all trawling on a year-round basis in the nearshore waters of Bristol Bay to protect juvenile red king crab and critical rearing habitat that could be impacted by trawling (Fig. 5). This nearshore area encompasses about 19,000 n.mi.^{2}. The third management measure adopted under Amendment 37 was a reduction of existing PSC limits for red king crab taken in trawl fisheries. Based on the 1996 survey abundance index, the 1997 PSC limit was established at 100,000 red king crab in Zone 1.

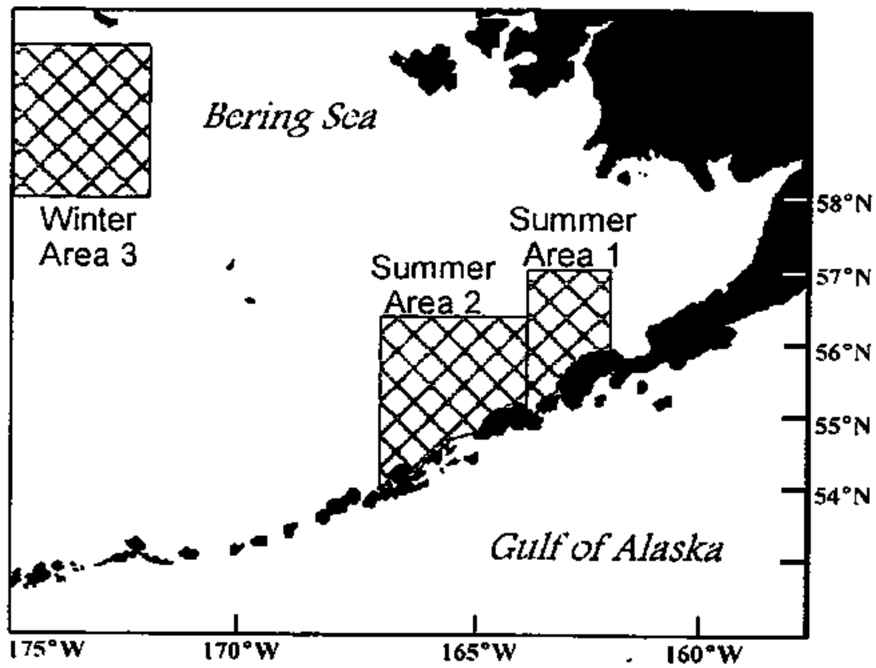

Figure 3. — The three Herring Savings Areas.

Table 2. — Pre-season apportionments of prohibited species for Bering Sea and Aleutian Islands groundfish fisheries, and resulting closures 1996.

Fishery and species	Pacific halibut (mortality in t)	Pacific herring (t)	Red king crab (Zone 1)	Tanner crab (Zone 1)	Tanner crab (Zone 2)	Closure reason 1996
Trawl fisheries						
Yellowfin sole						
Jan 20–Mar 31	160	287	5,000	50,000	1,530,000	Zone 1 Crab 3/20
Apr 1–May 10	150	RO[1]	15,000	200,000	RO	Halibut 6/17
May 11–Aug 14	100	RO	10,000	RO	RO	Halibut 10/26
Aug 15–Dec 31	410	RO	20,000	RO	RO	
Rock sole / other flatfish						
Jan 20–Mar 29	453	NA[2]	110,000	425,000	510,000	Halibut 2/26
Mar 30–Jun 28	139	NA	RO	RO	RO	Halibut 4/13
Jun 29–Dec 31	138	NA	RO	RO	RO	Halibut 6/8, 7/31
Rockfish						
Jan 20–Mar 29	30	7	NA	NA	10,000	
Mar 30–Jun 28	50	RO	NA	NA	RO	
Jun 29–Dec 31	30	RO	NA	NA	RO	
Pacific cod						
Jan 20–Oct 24	1,585	22	10,000	250,000	260,000	Halibut 5/14
Oct 25–Dec 31	100	RO	RO	RO	RO	Halibut 6/23 Halibut 11/9
Pollock (bottom trawl)/others						
Jan 20–Apr 15	330	154	30,000	75,000	690,000	Halibut 9/7
Apr 16–Dec 31	100	RO	RO	RO	RO	
Pollock (pelagic trawl)	NA	1,227	NA	NA	NA	
Total	3,775	1,687	200,000	1,000,000	3,000,000	
Nontrawl fisheries						
Pacific cod (longline)						
Jan 1–Apr 30	475	NA	NA	NA	NA	Halibut 5/15
May 1–Aug 31	40	NA	NA	NA	NA	Halibut 11/5
Sept 1–Dec 31	285	NA	NA	NA	NA	
Other longline fisheries	100	NA	NA	NA	NA	Halibut 5/15
Groundfish pot fisheries	NA	NA	NA	NA	NA	
Total	900 t					

[1] RO = rollover of remaining allowance until limit is attained.
[2] NA = not applicable.

Two other FMP amendments were adopted in 1996 to manage bycatch of crab. Amendment 41 reduced existing PSC limits for Tanner crab taken in BSAI trawl fisheries. Under this amendment, PSC limits in Zones 1 and 2 are based on total abundance of Tanner crab as indicated by the NMFS trawl survey. Based on 1996 abundance (185 million crabs), the PSC limit was specified at 750,000 crabs in Zone 1 and 2,100,000 crab in Zone 2 for 1997 fisheries. Amendment 40 will establish new PSC limits for *C. opilio*, taken in BSAI trawl fisheries. PSC limits for this species will be based on it's total abundance as indicated by the NMFS standard trawl survey and will be apportioned among trawl fisheries as bycatch allowances. The annual *C. opilio* PSC limit will be set at 0.1133% of its abundance index, with a minimum PSC of 4,500,000 *C. opilio* and a maximum of 13 million. The *C. opilio* taken within the *C. opilio* Bycatch Limitation Zone (Fig. 6) would accrue towards the bycatch allowance specified for individual trawl fisheries. Upon attainment of a *C. opilio* bycatch allowance apportioned to a particular trawl target fishery, that fishery would be prohibited from fishing within the *C. opilio* Bycatch Limitation Zone.

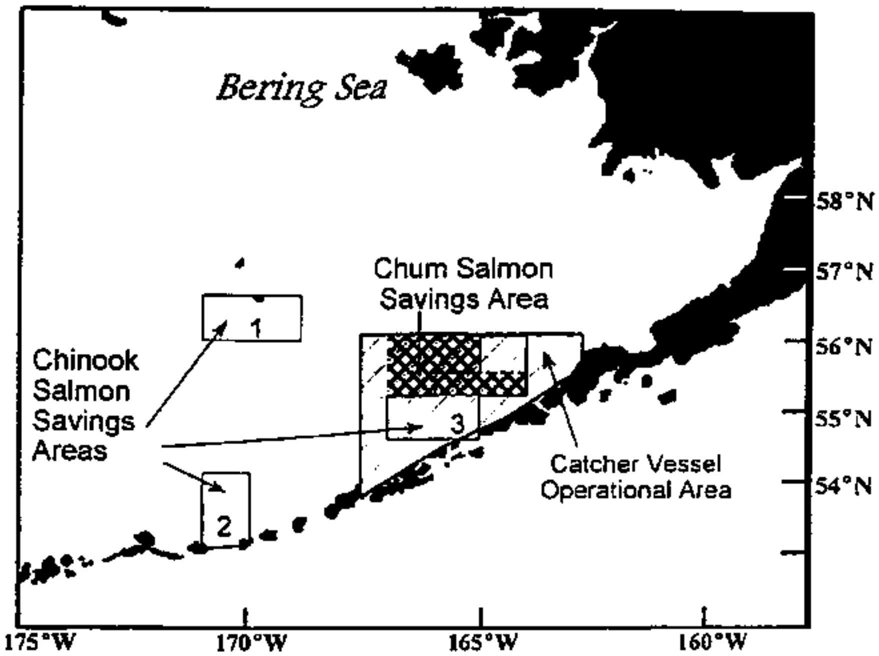

Figure 4. — The Chum Salmon Savings Area, the Chinook Salmon Savings Areas, and the Catcher Vessel Operational Area.

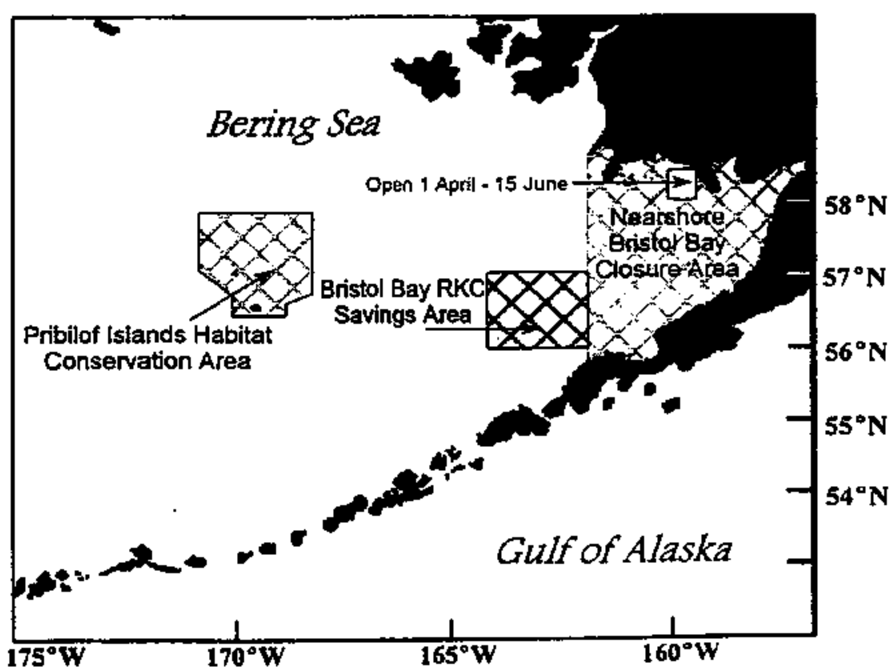

Figure 5. — The Pribilof Islands Habitat Conservation Area, the Red King Crab Savings Area, and the nearshore Bristol Bay trawl closure area.

Discussion

Regulations to control bycatch of certain species have been promulgated primarily to address allocation concerns from competing users of the resource. The bycatch of a prohibited species in the groundfish fishery decreases the amount of those species that can be taken by fishermen in the fisheries for those species, but efforts to decrease bycatch impose costs on groundfish fishermen. Hence, bycatch allocation has been a very contentious issue for the Council process, and will likely continue to be as directed fishery representatives demand more stringent bycatch controls. Unfortunately, optimal allocation of fishery resources among competing users is a problem not easily overcome (Wilson and Weeks, 1996).

One overall goal of the Council has been to maximize groundfish harvests (within biologically acceptable limits) while minimizing bycatch. As such, many regulations have been implemented in the past 20 years to control bycatch and associated mortality of prohibited species in Bering Sea groundfish fisheries. Regulatory measures have included bycatch limits, seasons, gear

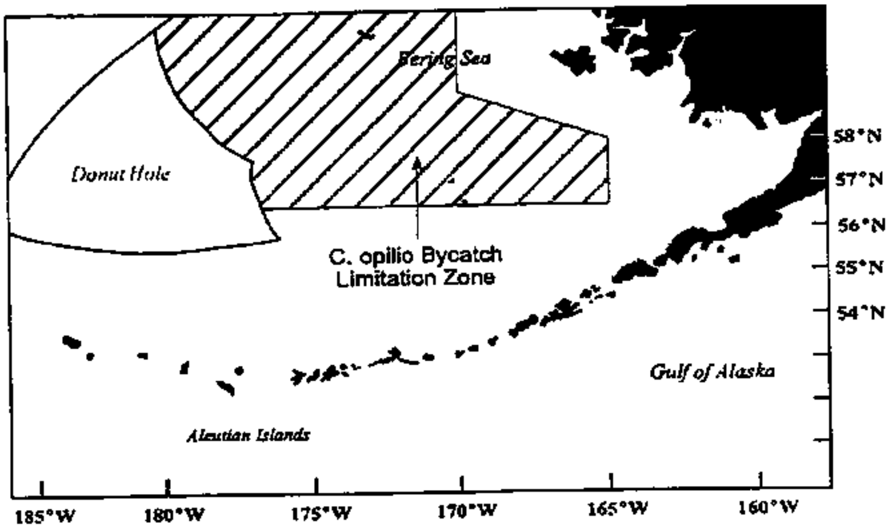

Figure 6. — The *C. opilio* Bycatch Limitation Zone.

Table 3. — Estimated bycatch of Pacific halibut (metric tons of mortality), king crab, Tanner crab, Pacific herring, chinook salmon, and other salmon taken in Bering Sea and Aleutian Islands groundfish fisheries, 1977-96. (1996 data are preliminary).[1]

Year	Pacific halibut (t)	King crab (no., all species)	*Chionoecetes* crab (no., all species)	Pacific herring (t)	Chinook salmon (no.)	Other salmon (no.)
1977	1,758	599,623	17,600,000	NA[2]	47,640	(combined)
1978	3,030	1,227,931	17,300,000	NA	44,548	(combined)
1979	3,269	1,007,796	18,000,000	NA	107,706	(combined)
1980	5,571	1,147,671	11,400,000	783	115,036	6,726
1981	3,866	1,817,152	6,300,000	287	36,218	5,800
1982	2,869	573,919	2,400,000	1,986	15,644	7,686
1983	2,575	1,034,157	3,000,000	2,513	10,334	32,134
1984	2,830	691,088	3,000,000	1,257	11,274	72,195
1985	2,538	1,225,073	2,700,000	4,539	11,069	10,598
1986	3,364	275,066[3]	7,200,000[3]	4,018[3]	9,237	14,433
1987	3,462	147,386[3]	7,400,000[5]	487[3]	22,221	4,799
1988	5,344	88,033[3]	3,100,000[3]	351[3]	30,320	3,709
1989	4,393	207,703[3]	3,800,000[3]	2,527[3]	40,354	5,545
1990	5,176	109,201[4]	1,731,725[5]	3,379	13,990	16,661
1991	6,046	255,607	14,498,270	3,252	35,766	31,987
1992	6,466	315,788	19,613,453	3,758	37,372	38,919
1993	4,684	388,664	18,881,490	1,076	45,964	243,246
1994	5,711	359,436	15,059,028	1,711	43,636	94,508
1995	5,264	48,191[4]	7,695,643	969	23,079	21,780
1996	4,893	26,682[4]	4,730,000	1,510	63,179	77,926

[1] Sources: Guttormsen et al., 1990; Queirolo et al., 1995; NPFMC, 1995; Williams, 1997.
[2] NA = not available.
[3] Foreign and joint-venture bycatch only.
[4] Red king crab only.
[5] *C. bairdi* only.

restrictions, time/area closures, bycatch rate standards, monitoring, and enforcement. Unfortunately, regulations or operational changes designed to reduce bycatch of one species, say Pacific halibut for example, may serve to increase bycatch rates of another PSC species such as Tanner crab. The multispecies nature of bycatch is a dilemma faced by policy makers designing bycatch regulations and fishermen attempting to abide by them.

Beginning in 1982 with the implementation of the BSAI groundfish FMP, regulations and incentives for foreign fisheries worked to control the bycatch of halibut, crab, and salmon (Table 3). Bycatch of these species remained low through 1985, but then increased with development of relatively unconstrained joint-venture operations until 1987 when bycatch limits for these fisheries were established. Bycatch further increased with development of the fully domestic fleet, but was quickly limited by regulation. Bycatch limits for Pacific halibut, Pacific herring, red king crab, and Tanner crab kept the bycatch from reaching higher levels. Bycatch of salmon remained unconstrained through 1994, and bycatch of *C. opilio* remained unconstrained through 1997.

Bycatch of prohibited species has been controlled by bycatch management measures, but not without cost to groundfish fisheries. In particular, halibut bycatch management measures have constrained groundfish harvests. Typically, all bycatch mortality (4,665 t) allocated to trawl and longline fisheries is taken, along with lesser amounts from pot fisheries and fisheries within Alaska state waters (Williams, 1997). Attainment of halibut bycatch mortality limits has caused many closures over the years, and these closures have decreased the amount of groundfish caught. For example, 6 closures were implemented in 1994, 12 closures in 1995, and 14 closures in 1996 due to Pacific halibut bycatch allowances being attained by specific fisheries. A summary of the 1996 closures is shown in Table 2. Pacific halibut bycatch limits have affected bottom trawl fisheries in particular, and consequently, portions of fishing quotas annually specified for most flatfish species have remained unharvested (Witherell, 1995). Longline fisheries have also been constrained by Pacific halibut bycatch, and careful release requirements have been implemented to improve survival of halibut discards (Smith, 1995). However, implementation of an individual fishing quota (IFQ) system for Pacific halibut and sablefish longline fisheries in 1995 allowed for more selective longline fisheries with lower bycatch (Adams, 1995).

Overall crab bycatch has been a function of crab abundance and PSC limits. High bycatches of king crab and *Chionoecetes* crab (mostly *C. opilio*) were taken in the 1970's by foreign fisheries, but regulations and incentives implemented with the FMP in 1982 reduced crab bycatch to much lower levels. In the domestic groundfish fisheries, bycatch of red king crab and Tanner crab have been kept in check with PSC limits for trawl fisheries. Bycatch of *C. opilio* increased drastically in the early 1990's (Table 3), corresponding to an expanding crab population, so *C. opilio* PSC limits were established in 1996.

Crab bycatch regulations have been based on concerns that trawling impacts crab populations directly in terms of trawl-induced mortality and indirectly through habitat degradation. Observed mortality, as measured by crab bycatch, has accounted for a small percentage of crab populations. For example, bycatch amounted to only 0.5% of the red king crab, 1.2% of the Tanner crab, and 0.1% of the *C. opilio* population on average, for 1992–95 (NPFMC, 1996). Because bycatch is small relative to other sources of mortality, time/area closure are thought to be more effective than PSC limits in reducing impacts of trawling on crab stocks (Witherell and Harrington, 1996). As such, numerous trawl closure areas have been instituted to address concerns about unobserved mortality (crab wounded or killed but not captured), and possible habitat degradation due to trawling and dredging.

The bycatch of Pacific herring and salmon has been controlled by time/area closures triggered by bycatch limits. Pacific herring closures have been effective at maintaining an acceptable level of bycatch in years when herring are abundant on the fishing grounds. This situation occurred in 1992, 1993, 1994, and 1995, when Herring Savings Areas 2 and 3 were closed to trawling for fisheries directed at walleye pollock, *Theragra chalcogramma*; rock sole, *Pleuronectes bilineatus*; yellowfin sole, and other flatfishes. Similarly, salmon bycatch limits are expected to trigger closures only during years when exceptionally high bycatch rates are encountered by the trawl fleet. During the first year of implementation in 1994, the Chum Salmon Savings Area was closed to all trawling from 20 August through 12 November. Without this closure, bycatch may have exceeded the record set in 1993, when over 240,000 chum salmon were taken (Table 3). By far, the highest bycatch rates for chum salmon occur during August, September, and October, with almost no chum salmon taken in other months (NPFMC, 1995).

It should be noted that bycatch of PSC is also controlled by nonregulatory means. Many measures have been embraced by the trawl and longline fleet to control and reduce bycatch of Pacific halibut, crab, and salmon. AGIS application has been used by the BSAI trawl and longline fleet to identify hotspots by using bycatch rates reported by individual vessels (Gauvin et al., 1995; Smoker, 1996). Bycatch rate information from individual vessels is received at a central location, aggregated daily, and then quickly relayed back to the entire fleet in the form of maps, so that hotspot areas can be avoided. PSC rates are reduced and corresponding higher groundfish catches can then be realized by the fleet. Unfortunately, because this is a voluntary program, nonparticipating vessels with high bycatch rates may keep the fleet as a whole from catching the entire quota of flatfish. Some bycatch reduction may also come in the form of peer pressure. Individual vessel bycatch rates are now published on the Internet for all to view. Vessels with high bycatch rates may be shamed into improving their bycatch performance.

Further reductions in bycatch may be achieved with individual vessel incentives. The current system tends to penalize vessels that adopt bycatch reducing tactics because they will probably have reduced catches of target species (Huppert et al., 1992). This external cost is due to the race for fish (and bycatch), as fish are allocated on a first-come-first-served basis. These external costs would be reduced if fishermen paid for the fish they use, or had defined property rights to those resources (NMFS, 1996). Under an individual bycatch quota system, also called a vessel bycatch account (VBA) system, each vessel would have an incentive to reduce its bycatch rate to maximize its catch of groundfish. Vessels with low bycatch rates would benefit by being able to catch additional groundfish without being shut down by vessels with higher bycatch rates, as they are with current fleet-wide bycatch limits. A VBA system could result in more groundfish being caught overall with less overall bycatch of prohibited species. Analysis of a VBA program is underway, and if adopted by the NPFMC and approved, could be implemented in the year 2000.

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ALASKA
CRAB
COALITION

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

DATE: April 9, 1996

TO: Mr. Clarence Pautzke,
Executive Director
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

FROM: Arni Thomson
Executive Director

RE: AGENDA ITEM C-2(d), COMMENT ON CRAB CLOSURES IN BRISTOL BAY, AMENDMENT 41, GROUNDFISH FMP, BSAI; HISTORICAL REFERENCE POINTS, THE SOUTHEAST BERING SEA KING CRAB POT SANCTUARY

INTRODUCTION:

The recently concluded meeting of the North Pacific Fishery Management Council Crab Rebuilding Committee (for the Southeastern Bering Sea) is essentially revisiting historic conservation and allocation issues, that revolve around the development of trawling for groundfish, versus sustainability of pot, hook and line and limited driftnet and purse seine gear fisheries for crab, halibut and salmon. Of significance, the committee has incorporated a considerable body of new scientific information and fisheries management experience into its discussions that is not a part of the administrative record for Amendment 37 to the Groundfish Fishery Management Plan for the Bering Sea/Aleutian Islands.

The development of Alaskan and Pacific Northwest concern over unregulated offshore targeted exploitation of first the high value traditional species, then groundfish exploitation with retention of high value species as bycatch, dates back to the 1930s. Regulatory measures to prevent depletion of the fishery resources that inhabit the continental shelf off the coast of Alaska began with international fisheries agreements. Ronald C. Naab, Fisheries Management Supervisor, Bureau of Commercial Fisheries, Juneau, Alaska has recorded the precedental agreements in "The Role of International Agreements in Alaskan Fisheries," (Commercial Fisheries Review, Vol. 30 , No. 10, Attachment 1.)

Mr. Naab notes the beginning of the treaties with an agreement to protect Northern fur seals in 1911, followed by the International Pacific Halibut Convention in 1924, the International Whaling Convention in 1937, and the International North Pacifc Fisheries Convention in 1953 to provide safeguards to three species of salmon.

HISTORIC ORIGINS OF THE "POT SANCTUARY":

It is within the context of Bilateral Agreements between the U.S. and the USSR and the U.S. and Japan from 1964 through 1977, that measures to protect king and tanner crab, halibut and salmon from exploitation and potential depletion by foreign fleets developed.

An area of particular concern, the near and offshore waters on the north side of the Alaska Peninsula became the focus of controversy between American and foreign fishing fleets in the early 1960s. This was due to overlapping abundance of commerically exploitable fishery resources of king and tanner crab, large concentrations of flounder species and juvenile halibut.

* May 1964, the U.S. enacted Public Law 83-308, the Bartlett Bill. This law prohibited foreign vessels from engaging in fisheries in U.S. territorial waters, or to take any Continental Shelf fishery resource that belongs to the U.S., except as provided by the Act or by an international agreement to which the U.S. is party. The prededental law defined Continental Shelf fishery resource to include "living organisms belonging to sedentary species; that is to say, organisms which, at the harvestable stage either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil." (Naab, Vol. 31, No. 6.) The U.S. prepared a list of organisms that qualified as Shelf resources and the list was published in the Federal Register. The listing included king and tanner crab and thus began initial measures to protect shellfish resources off the coast of Alaska.

* November 1964, Conclusion of the first Bilateral Agreement with Japan, followed by a similar agreement with the USSR. The agreement provided protection for the developing U.S. king crab fishery and initiated the first regulatory measures to safeguard the resource, which included: (1) quotas for the Japanese catches; (2) defined an area on the north side of Unimak Island where king crab fishing was restricted to the use of only pot gear; and (3) minimum mesh size was established for tangle nets and pots or tangle nets were the only gear allowed by the Japanese; minimum size of crabs taken was established and males only for retention. (See Naab, Figure 5.)

In December of 1964, a bilateral agreement between the U.S. and the USSR provided for the closure to trawling of six areas off Kodiak Island to protect the king crab fishery. These areas extended well beyond the 12 mile territorial fishery limit of the U.S., as did the "pot sanctuary" off the north side of Unimak Island.

Following the agreement with Japan in regards to king crab in the Southeastern Bering Sea, a similar agreement was reached with the USSR with almost identical provisions.

* October 1966, the U.S. Congress enacted Public Law 89-658. This legislation established a 9-mile contiguous fishery zone adjacent to the U.S. 3-mile territorial sea. "The law provides that the U.S. will have the same jurisdiction over fisheries within this newly created zone as it has within its territorial sea, subject to the continuation of "traditional" fisheries by foreign nations." (Naab, Vol. 30, No. 10, p. 53.) This law initiated the regulation of foreign fishing within 12 miles of the coast of the U.S. and it had major implications for foreign fishing off the coast of Alaska and helped protect not only king and tanner crab, but halibut and salmon.

* The pot sanctuary zone was expanded in 1968 when agreements with Japan and the Soviet Union were renegotiated. That change became effective in 1969 and the northern boundary changed from 55-28N to 55-54N. The Japanese government also prohibited trawling in an extensive area in the Eastern Bering Sea, including the pot sanctuary. Negotiations with the USSR that concluded in January 1969 resulted in the agreement on identical provisions with the Japanese agreement, including use of pot gear only in the pot sanctuary. The Soviets also agreed to refrain from trawling for other species within the sanctuary area.

Of particular interest to the Crab Rebuilding Committee in regards to the controversy over allowance of flounder fishing in the "pot sanctuary" area, Ron Naab notes in 1969 that the Soviet agreement on trawling "should be beneficial to U.S. fishermen in the area faced with interference by the large Soviet winter flounder fishing expeditions north of the Alaska Peninsula." (Ronald C. Naab, "Revisions of International Agreements Affecting Alaskan Fisheries," Commercial Fisheries Review, Vol. 31, No. 6. p. 34, Attachment 2.)

* The final expansion of the "pot sanctuary" occurred in 1975, when the U.S./Soviet fisheries agreement expanded the pot zone to its present configuration. The Japanese agreed to the same configuration. The final bilateral arrangements were carried forward in the foreign fishing regulations that implemented the Magnuson Act in 1977 and they remain in effect today. (Craig Hammond, NMFS Enforcement, Juneau, AK, correspondence to Arni Thomson, February 20, 1987, with attached chartlet on Foreign Fishing Regulations for the Bering Sea and Aleutian Islands, Attachment 3.)

* It is also worth noting that the International Pacific Halibut Commission recognizes the "pot sanctuary" zone as a significant halibut nursery area. In 1967, the IPHC

declared this area "a halibut nursery area" and closed it to directed fishing for halibut with longline gear. The rationale for the closure was to rebuild the Bering Sea halibut resource, as this area was known to contain large concentrations of juveniles. The boundaries of the closure area have changed only slightly since 1967, most recently in 1990 to allow for the establishment of a small commercial fishery within the nearshore Bristol Bay area. (NPFMC, Draft EA/RIR for BSAI Amendment 41, March 28, 1996, p. 95, Attachment 4.)

PASSAGE OF THE MAGNUSON FISHERY CONSERVATION AND MANAGEMENT ACT IN 1976, AND THE DEVELOPMENT OF DOMESTIC GROUNDFISH TRAWL FISHERIES:

The passage of the MFCMA in 1976 resulted in the creation of eight regional fishery management councils in the U.S. and development of a whole new series of fishery management plans (FMPs) to not just regulate, but to encourage the development of domestic groundfish fisheries. This ushered in the period of "Americanization of groundfish fisheries" off the coast of Alaska.

To encourage the development of flatfish fisheries in the Southeastern Bering Sea by a fleet of small coastal trawlers, the North Pacific Fishery Management Council first allowed an experimental joint venture fishery in 1981 within the boundaries of the long established pot sanctuary.

The experimental flatfish fishery expanded following the collapse of the Bristol Bay king crab fishery in 1982 and in 1984, the NPFMC approved Amendment 1 to the Bering Sea/ Aleutian Islands Groundfish FMP. Amendment 1 allowed year-round domestic trawling within the area. (NPFMC, 1995, Bering Sea Species Protection Areas, p. 14, Attachment 5.)

With the adoption of a single amendment to the Bering Sea FMP, 15 years of tediously negotiated international fisheries agreements structured for the protection of king and tanner crab, halibut, salmon and herring were dismantled to encourage the development of domestic flatfish and other groundfish commercial fisheries.

The passage of Amendment 1 created great consternation amongst crab and halibut fishermen concerned about exorbitant bycatches that were common knowledge through NMFS reports based on the foreign observer program. Fishermen were also concerned about the unobserved impacts of trawl gear to the benthic substrate.

Within one year of Amendment 1 being implemented, NMFS reported bycatches of king and tanner crab in the joint venture fisheries skyrocketed. King crab bycatch approached almost 1 million animals in 1985, at a time when overall abundance of king crab plummeted to historic low levels from which it has not recovered. (NPFMC Draft EA/RIR for

BSAI Amendment 41, p. 85, March 28, 1996.)

RECONSTRUCTION OF KING AND TANNER CRAB AND HALIBUT PROTECTION ZONES IN THE SOUTHEASTERN BERING SEA:

As a result of Bering Sea crab fleet's fears of the rapidly growing domestic trawl fleet virtually depleting the Bering Sea king and tanner crab stocks, a voluntary coalition formed, the Coalition of Concerned Crab Fishermen. (The Coalition evolved into the formation of the Alaska Crab Coalition in the spring of 1986.) The Coalition submitted a petition to the NPFMC in the fall of 1985 requesting emergency action to reinstate the provisions and boundaries of the "pot sanctuary."

* This resulted in the NPFMC adoption of Amendment 10 to the BSAI FMP reestablishing only the eastern portion of the pot sanctuary as a no trawl zone in 1987. Amendment 10 also created bycatch "caps" and bycatch cap zones for king and bairdi crab as part of the compromise package of regulations that provided flexibility for the groundfish fleet. The actual closure and bycatch cap zones were implemented by emergency rule in 1986, then extended by Amendment 10. (Attachments 6 and 7).

* Amendments 12A and 16 implemented in 1989 and 1991 increased the king and bairdi caps to their present levels and established Zone 1, Zone 2H, and BSAI-wide halibut caps at their present levels. (Attachment 8.)

* Amendment 18 to the BSAI FMP adopted on June 1, 1992, like Amendment 1, may also prove to have far reaching impacts on the potential rebuilding of king and bairdi crab stocks of the Southeastern Bering Sea. Amendment 18 which initiated the inshore/offshore pollock allocation program, included the creation of the Catcher Vessel Operational Area (CVOA) for trawl catcher vessels delivering to the inshore component. The eastern portion of the CVOA that extends east of Cape Saricheff, closely parallels the boundaries of the original pot sanctuary on the north side of Unimak Island. (NPFMC, Bering Sea Species Protection Areas, 1995, p. 11, Attachment 9.) The area has now become a preferential access area for shorebased trawlers, who operate extensively in this area, fishing not only for pollock, but for cod and some flounder. This area, once an area of high king crab abundance and harvests, is now an area of intensive bottom trawling. As Bob Otto pointed out to the Crab Rebuilding Committee, the 1995 NMFS Bering Sea king crab survey illustrates this is now coincidentally an area devoid of king crab.

* The most recent NPFMC action to affect the rebuilding of king crab, is Amendment 37, implemented as an emergency rule in 1995 and continued in 1996. Amendment 37 establishes the King Crab Savings Area, 56N - 57N and 162W - 164W, closed to non-pelagic trawling from January 1 through March 31. This

expansion of the (eastern pot sancturary) no trawl zone is in response to the continued recruitment failure of king crab stocks despite conservative directed pot fisheries in the late 1980s and early 1990s. This is yet another attempt to provide a compromise measure for king crab protection while allowing development of shorebased flounder fisheries. (NPFMC Bering Sea Species Protection Areas, Attachment 10.)

CONCLUSION:

Based on the circumstances of abundant king crab harvests that developed out of extensive protection of king crab from 1967 through 1981, compared to the persistent recruitment failure and historic low abundance levels under the compromise protection program initiated in 1986, it is recommended that the NPFMC close the King Crab Savings Area year-round.

SEP. # 825
OCT. 1968

THE ROLE OF INTERNATIONAL AGREEMENTS IN ALASKAN FISHERIES

By Ronald C. Naab*

Foreign fleets fishing in international waters off Alaska are capable of depleting the resources supporting Alaska's largely inshore fisheries. Recognizing this threat, the United States has increasingly utilized international fisheries agreements, particularly during the last few years, to provide safeguards essential to the U. S. fisheries off Alaska. Policing these agreements by joint Coast Guard-Bureau of Commercial Fisheries patrols has been stepped up to keep pace with the increased enforcement responsibilities and growing foreign fishing efforts. As nations of the world increase their harvests of protein from the seas, international agreements will become more important in protecting U.S. interests in the vast fishery resources of the Alaskan area.

Marine resources supporting Alaska's foremost sustaining industry, commercial fisheries, are highly vulnerable to depletion by fleets operating in international waters adjacent to Alaska's shores. The species traditionally most important to Alaska--salmon, halibut, king crab, and fur seal--spend a major part of their lives in waters of the high seas beyond U. S. jurisdiction. While in these offshore areas, these migratory animals, in the absence of international safeguards, could be intercepted by fishermen of any nation before reaching Alaska's largely inshore fisheries.

The same threat hangs over the underutilized fishery stocks that offer the greatest potential for development by the U. S. fishing industry. These include species already becoming more important to Alaska's fisheries--tanner crab, shrimp, and scallops--as well as stocks likely to be developed in the future: pollock, ocean perch, flounders, and sablefish.

The U.S. has long recognized this danger to Alaskan fisheries and has increasingly sought to provide protection by international agreements. The urgent need for such protective agreements was accelerated greatly by the alarming growth of Japanese and Soviet fisheries off Alaska during the past decade (figs. 1 and 2). Since 1964, the number of such agreements and associated U. S. laws has nearly trebled, climbing from 4 to 11. Through these agreements, harvesting by foreign fishermen of species essential to the Alaskan fisheries either has been controlled, or prohibited. The gravity of this situation is evidenced by 1966 statistics. These show the species protected by such agreements provided 96 percent of the value of Alaska's commercial fisheries manufactured products, which had a total wholesale value of over $200 million.

DEVELOPMENT OF AGREEMENTS

The pattern of increased protection afforded the U. S. fisheries can be pictured by tracing the development of international agreements and associated laws affecting the Alaskan area.

North Pacific Fur Seal Convention

This was the first, and is perhaps the best known, international fishery convention that followed a serious decline or depletion of fishery resources of concern to several nations. It is a notable example of how nations, faced with a mutual conservation problem, worked together to restore and maintain a resource so that it provided a sustainable annual yield.

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 825

The main North Pacific fur seal herd breeds on the Pribilof Islands in the eastern Bering Sea. These animals migrate over a wide range in the North Pacific Ocean: east along the North American coast to off southern California, and west along the Asian coast to near central Japan. Wholesale slaughtering of the seals both on the breeding islands and the high seas had decimated the herds by the late 1800's. In 1911, following negotiations inspired by concerned conservationists, the original North Pacific Fur Seal Convention was signed by Great Britain (for Canada), Japan, Russia, and the U. S. The original agreement was terminated in 1941. An Interim Convention signed in 1957 is subject to renegotiation in 1969.

This agreement prohibits the taking of fur seals on the high seas and limits their harvesting to government-controlled removals on the breeding islands. Since its inception, the Pribilof fur seal herds have increased from fewer than 150,000 animals to about 1,750,000 in recent years.

During 1960-67, the average yearly harvest from the Pribilofs was 65,800 seals. The U. S. share of the proceeds from these pelts was nearly $3 million a year. The State of Alaska profits directly from these harvests by receiving 70 percent of U. S. net receipts.

International Pacific Halibut Convention

The eastern North Pacific halibut stocks, like the fur seal herds, declined severely under intensive and unregulated fishing by more than one nation. The halibut fishery of the U. S. and Canada began in 1888. By 1915, the annual catch had soared to a record 69 million pounds. Then catches fell precipitously and remained low until well into the 1930's.

Recognizing the need to preserve this resource, the U. S. and Canada formulated the International Pacific Halibut Convention, which became effective in 1924. Management of the fishery by the two nations has been continuous through later conventions. The present agreement of 1953 will remain in force until either nation gives notice of its desire to terminate it.

Regulations formulated under this agreement establish fishing areas and seasons, catch quotas, legal types of fishing gear, and minimum sizes of fish that can be taken. Under the careful management of the two-nation commission, the halibut stocks have been restored. The catches have reached a sustained level of over 60 million pounds a year--taken predominantly on the Continental Shelf off Alaska.

In recent years, maintenance of the U. S.-Canada longline halibut fishery has been complicated by growing Japanese and Soviet trawl fisheries. These trawl fisheries take some halibut incidental to their catches of other groundfishes, which amount annually to well over a billion pounds. Although halibut represent only a very small percentage of the Soviet and Japanese trawl catches, the cumulative removals may endanger maintenance of the halibut stocks. The impact of the incidental trawl catches is receiving increasing study by the Halibut Commission.

International Whaling Convention

Whaling as an industry began as early as the 12th Century and has deep roots in early U. S. history. The whale populations of the world's oceans have been depleted progressively--first those of the Northern hemisphere and, more recently, the southern seas. The declines were hastened by development in the mid-1920's of pelagic or high-seas whaling with the harpoon gun and the large mechanized factory ship. By 1930, excessive and unrestricted catches had so reduced the number of whales that it was obvious to all whaling nations that limits were needed to protect the remaining stocks. A conference was held in 1930. An agreement was finally reached and adopted in 1937. Most major whaling nations were signatories to later revisions, which resulted in the 1946 convention now in force. Nations may withdraw from the convention in any year.

The convention provides for setting whaling seasons and areas, limiting numbers and species of whales killed, recommending research programs, and reviewing scientific findings. In general, the convention provides that each Contracting Government exercise broad powers of regulation and enforcement over whaling by its flag vessels. Since U. S. whaling has not been conducted off Alaska for many years, the principal U. S. role in the Alaskan area has been surveillance of the large foreign whaling fleets to determine their compliance with the international regulations.

International North Pacific Fisheries Convention

In 1953, the International North Pacific Fisheries Commission (INPFC) was established by a Convention between Japan, Canada, and the U. S. to provide major safeguards to three species vitally important to Alaskan and other North American fishermen. The safeguards were provided through the introduction of a new concept in international fisheries regulation--"abstention." This concept recognizes that the high levels of productivity maintained in some fisheries are the result of long and continuous conservation efforts. In view of these efforts, the Convention provides for abstention from fishing these stocks by some member nations where it can be shown that, historically, these have not fished the stock--and that the other member nations are fully utilizing the resource and have it under study and scientific management.

Under the terms of this Convention, the Japanese currently abstain from fishing for salmon in either the Bering Sea or North Pacific Ocean east of the "abstention line" of long. 175° W. (intersects the central Aleutians), and the Canadians abstain from fishing salmon in the Bering Sea east of the same line. Further, the Japanese also refrain from fishing for halibut of North American origin in Convention waters off the coasts of Canada and the U. S., exclusive of the Bering Sea (fig. 3). Fishing for herring by the Japanese along parts of the Canadian Pacific coast is also prohibited. The INPFC will continue in force until one year following notice of intent to terminate by a Contracting Party.

This Convention has been criticized and described sometimes as inadequate. But it does protect nearly all the North American salmon stocks, including most major runs in Alaska, as well as the eastern Pacific halibut populations of great importance to the U. S. and Canada.

Prohibition of Foreign Fishing Within Territorial Waters

In May 1964, the U. S. enacted Public Law 88-308, commonly known as the Bartlett Bill. This law makes it unlawful for a foreign fishing vessel, or a master of such vessel, to engage in the fisheries in U. S. territorial waters or to take any Continental Shelf fishery resource that belongs to the U. S., except as provided by the Act or by an international agreement to which the U. S. is party. The Act establishes penalties, provides for seizure and forfeiture of a vessel or its catch or

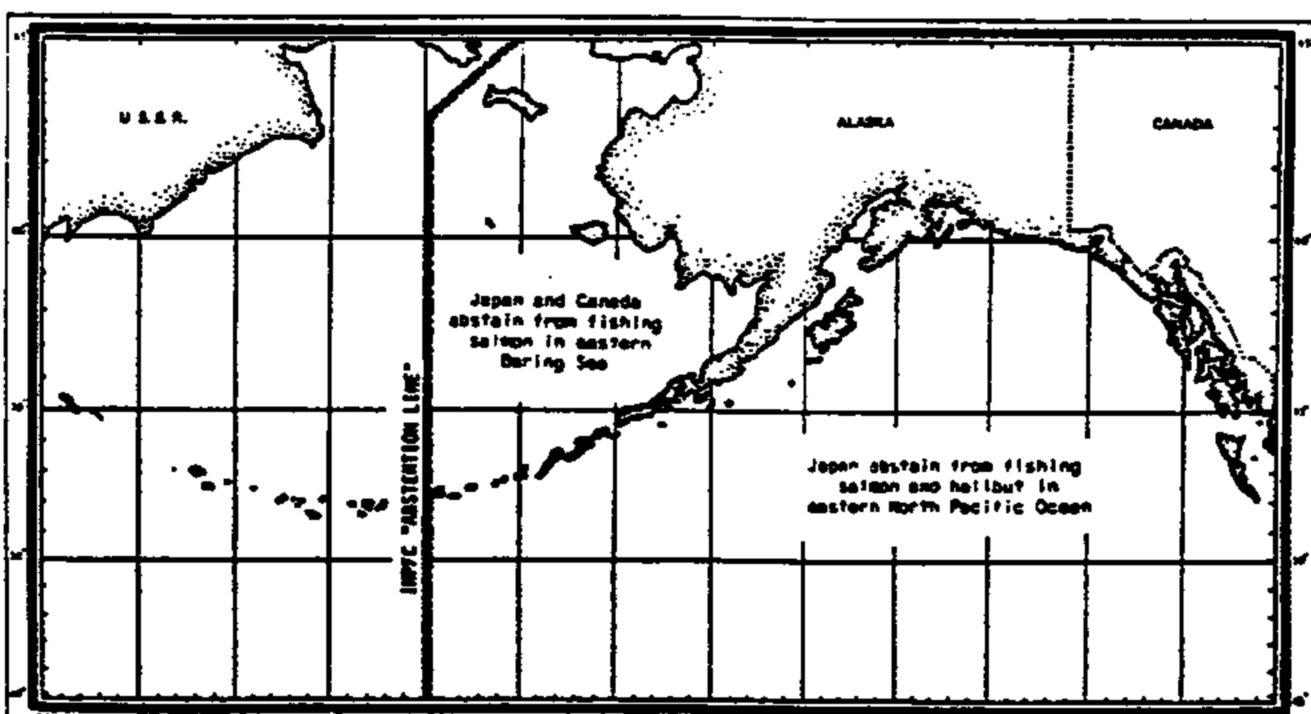

Fig. 3 - "Abstention" areas established by the INPFC.

gear, and delegates enforcement responsibility and enforcement powers. It was enacted following increasing entries by foreign fishing vessels into the territorial waters off Alaska. It had become evident that existing laws were inadequate to make abundantly clear that foreign vessels are denied the privilege of fishing within U. S. territorial waters and, further, that there were no effective sanctions to punish violators.

This Act defines "fisheries" as the "taking, planting, or cultivation of fish, mollusks, crustaceans, or other forms of marine animal or plant life." Enactment of Public Law 90-427 in July 1968 broadened the definition of fisheries to include support operations.

This law provides the legal framework for the U. S. to designate fishery resources of the Continental Shelf and, thereby, to regulate their harvest by foreign nations. The Continental Shelf fishery resource is defined as including "living organisms belonging to sedentary species; that is to say, organisms which, at the harvestable stage either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil." This language conforms to that in the United Nations Convention on the Continental Shelf, which became effective in June 1964.

The designation of a Continental Shelf fishery resource could produce repercussions in other countries. Citing the U. S. action as a precedent, other nations could make claims to species off their shores which might not meet the precise criteria laid down in the United Nations Convention. Nonetheless, the U. S. is proceeding with the preparation of an initial list of living organisms that qualify as Shelf resources. Publication of this list in the "Federal Register," provided by the 1964 Act, will make it illegal for foreign fishing vessels to harvest on the Continental Shelf of the U. S. those species listed.

U. S.-USSR Kodiak King Crab Gear Area Agreement

This agreement became effective in December 1964. It was designed to reduce recurring interference with, and damage to, the U. S. king crab fishery by Soviet trawlers in the Kodiak Island area. The agreement provides for the closure to trawling of six areas off Kodiak Island during periods when concentrations of king crab pots occur there (fig. 4).

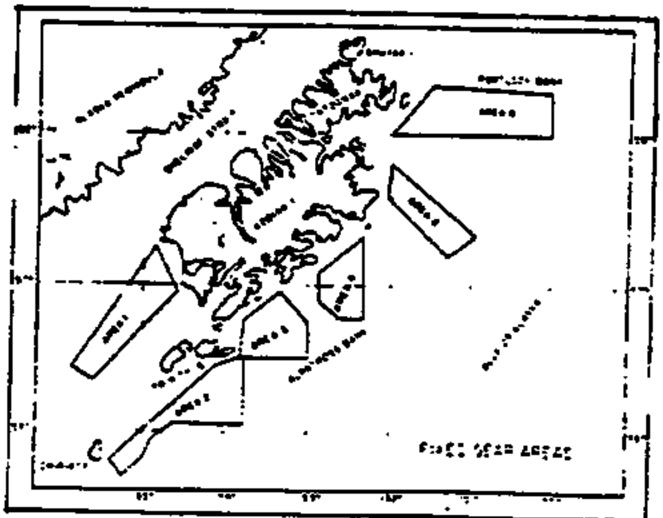

Fig. 4 - Fixed fishing gear areas established by 1964 U.S.-USSR agreement.

These areas were established in accordance with the past pattern of the U. S. king crab fishery off Kodiak Island. The areas extend well beyond the 12-mile fishery limit of the U. S. and have provided a high degree of protection for U. S. fishing gear. Since this agreement became effective, conflicts in the Kodiak area have been greatly reduced. There have been no documented Soviet violations.

The agreement provided that small shrimp trawlers will be permitted to operate in such a way that they do not interfere with fixed gear in the specified areas. This provision allows the increasing number of Kodiak-based U. S. shrimp trawlers to operate within the fixed gear areas throughout the year.

The original agreement was for 3 years and has been extended for 1 year without change. It will be the subject of discussions with the Soviet Union in early 1969.

U. S.-Japan King Crab Agreement

Following the U. S. declaration of intent in Public Law 88-308 to protect resources of the Continental Shelf, this agreement covering the king crab fishery in the eastern Bering Sea was negotiated in November 1964. In the agreement, the U. S. contended that king crab are a resource of the Continental Shelf and subject to U. S. control anywhere on the shelf adjacent to the U. S. Japan, which is not a signatory to the Convention on the Continental Shelf, argued that king crab are a high-seas resource. The agreement was concluded without prejudice to the positions of both parties, but Japan agreed to certain restrictions on its longstanding crab fishery in the Bering Sea.

Major features of this agreement, which protected the rapidly growing U. S. king crab fishery and safeguarded the king crab resource, included: (1) limiting Japanese catches to an annual quota; (2) providing an area north of Unimak Island where pots only may be used for king crab fishing (other types of gear may be fished for other species in this area); and (3) restricting Japanese fishing gear and methods such as minimum mesh size of tangle nets, use only of pots or tangle nets, minimum size of crabs taken, and retention only of male crab. It also permitted continuation of the longstanding Japanese king crab fishery in the eastern Bering Sea--essentially on the Continental Shelf of outer Bristol Bay.

These provisions allowed the U.S. fishermen to continue expanding their king crab fishery in the Gulf of Alaska and along the Aleutian Islands without competition from Japanese crab fleets; also the agreement enabled the expansion of the U. S. crab fishery into an area of the eastern Bering Sea without interference by Japanese tangle nets (fig. 5).

The agreement of November 1964 was for a 2-year period and established an annual quota for the Japanese during 1965 and 1966 of 185,000 twenty-four-pound cases. The agreement was extended for 2 years in November 1966 with a provision reducing the annual Japanese catch quotas in 1967 and 1968 to 163,000 twenty-four-pound cases.

U. S.-USSR KING CRAB AGREEMENT

Following the agreement with Japan, a similar one was reached with the Soviets in February 1965. Its provisions were basically identical, with the exception that the Soviets' annual catch quota was less than the Japanese. The exception was based primarily on the Soviets' smaller catches and shorter history of king-crab fishing in the eastern Bering Sea. The Soviets recognized the U. S. position that king crab were a resource of the Continental Shelf over which the coastal state has sovereign rights.

This 2-year agreement protected the growing Alaska king-crab fishery and permitted

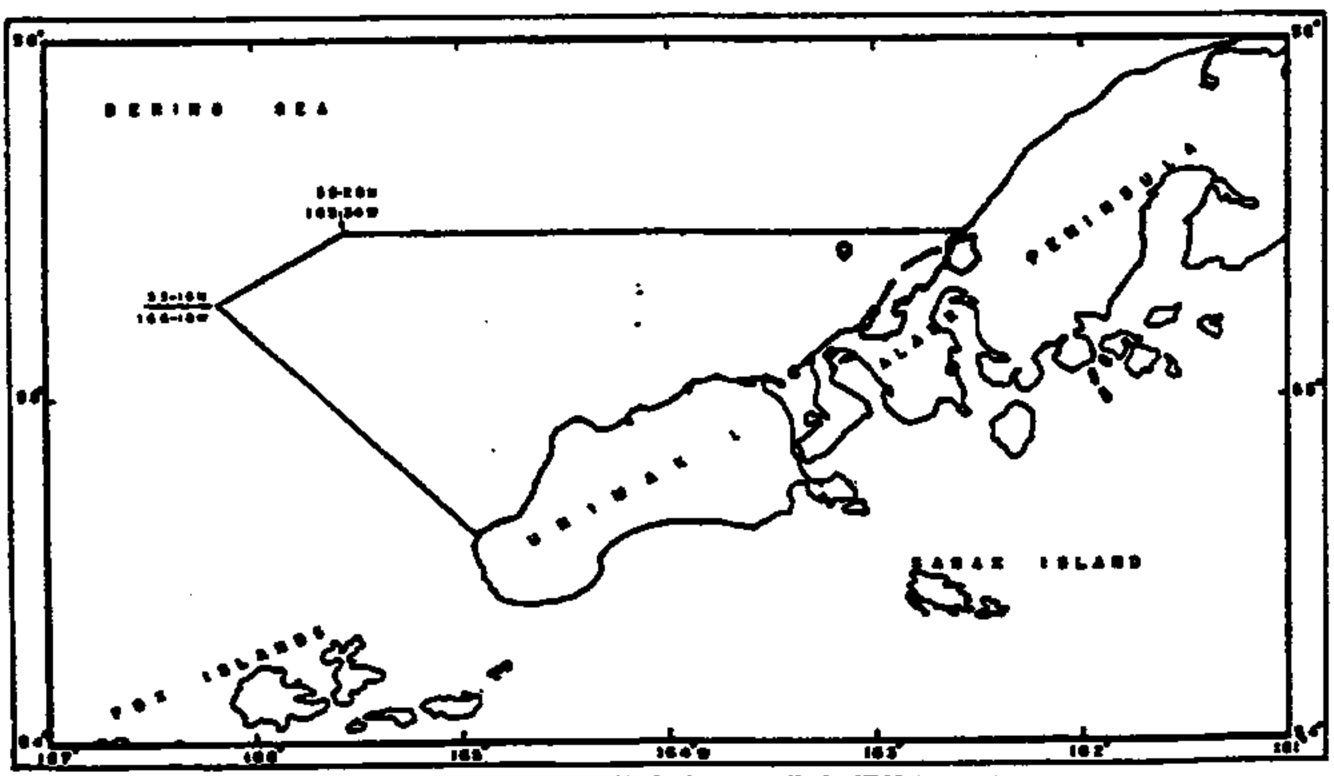

Fig. 5 - Pot fishing zone established by U. S.-Japan and U. S.-USSR king crab agreements.

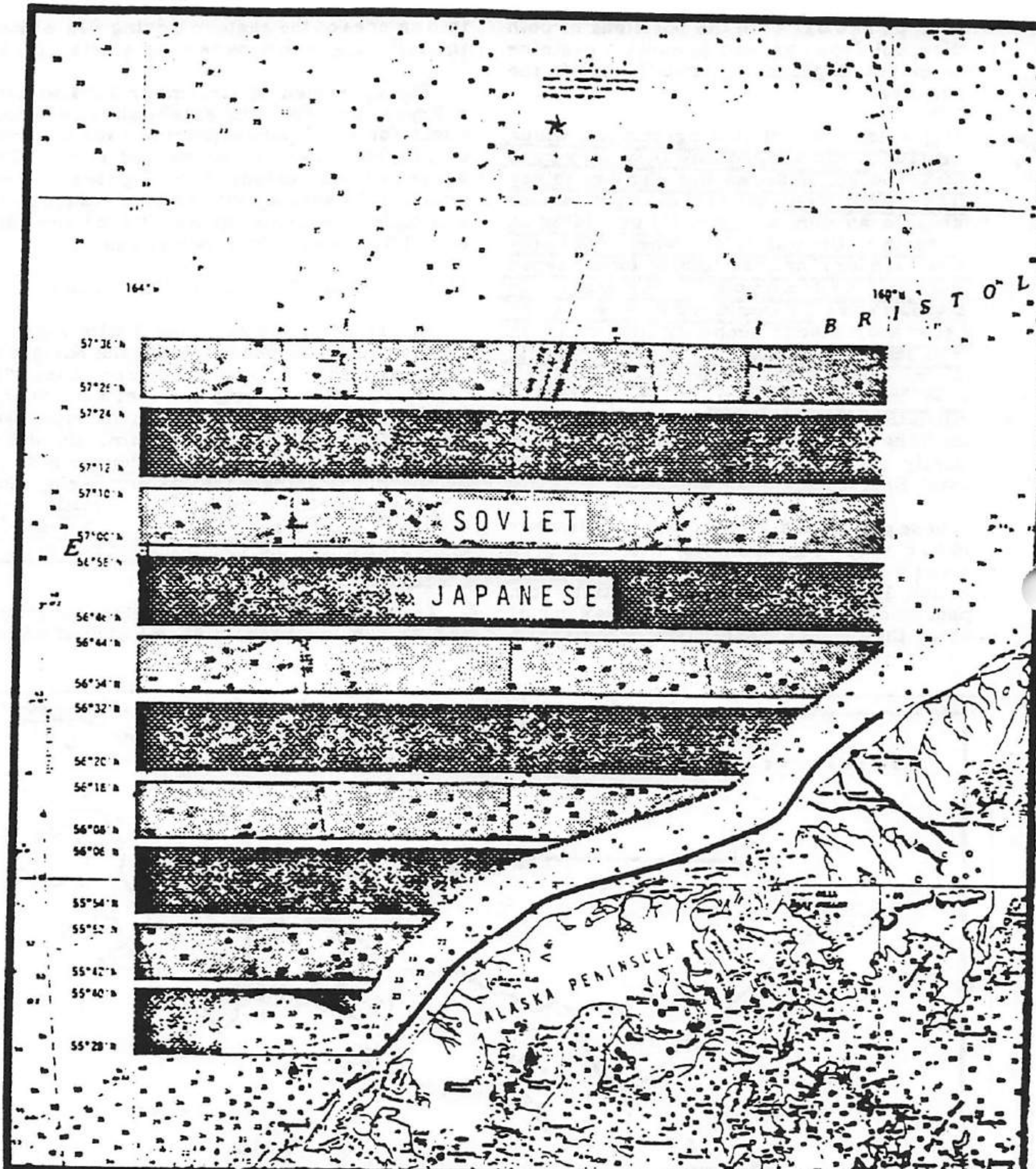

Fig. 6 - 1965 Japanese and Soviet king crab fishing areas established by 1967 Japan-USSR agreement.

the Soviet king-crab fishery off Alaska to continue only in the eastern Bering Sea. The agreement provided that in 1965 and in 1966 the Soviets could take 118,600 twenty-four-pound cases. This agreement was extended for 2 years in February 1967, with the provision that the annual pack in 1967 and 1968 would not exceed 100,000 twenty-four-pound cases.

One innovation resulting from renegotiation of this and the Japan king-crab agreements was the division of the fishing area between the Soviets and Japanese (fig. 6). The agreement between the two established specific fishing zones for each country to prevent gear conflicts. More important for the U. S., the agreement would prevent wasteful fishing methods by the two countries. In the past, Soviet and Japanese fishermen competed for better fishing areas and reserved selected regions by preoccupying them with excessive amounts of gear. Such practices resulted in excessive mortality of king crabs.

Regulation of Foreign Fishing Within the Contiguous Fishery Zone

Public Law 89-658, enacted by Congress in October 1966, established a 9-mile contiguous fishery zone adjacent to the U. S. 3-mile territorial sea. The law provides that the U. S. will have the same jurisdiction over fisheries within this newly created zone as it has within its territorial sea, subject to the continuation of "traditional" fisheries by foreign nations.

Shortly after enactment of the contiguous fishery zone law, the U. S. began negotiations with the foreign nations whose fisheries off Alaska might be considered "traditional."

U. S.-USSR Contiguous Fishery Zone Agreement

This agreement was the first resulting from the negotiations and was concluded in February 1967. The Soviets were permitted to fish within the 9-mile (3 to 12 miles offshore) contiguous fishery zone in three areas off the Alaskan coast little used by U. S. fishermen. The areas include one in the Gulf of Alaska, a second along the eastern Aleutian Islands, and a third encompassing the far western Aleutians (fig. 7). The Soviets were also permitted to conduct loading and fishing vessel support operations within the contiguous fishery zone in three small areas in the Gulf of Alaska: (1) off Forrester Island, (2) off Kayak Island, and (3) off Sanak Island.

To reduce interference with U. S. halibut fishermen by Soviet trawlers, the Soviets agreed to refrain from fishing in international waters in two large zones in the Gulf of Alaska during the first 15 days of the halibut fishing season. The agreement also contains provisions protecting U. S. fisheries off Washington and Oregon. This 1-year agreement was extended for a second year at negotiations in late 1967.

U. S.-Japan Contiguous Fishery Zone Agreement

In May 1967, the U. S. and Japan negotiated a 2-year agreement permitting the Japanese to continue crab fishing in the 3- to 12-mile zone off the Pribilof Islands, trawl fishing along the Aleutian Islands except during specified periods in zones in the eastern and central Aleutians, and whaling along Alaska's coast except in a portion of the Gulf of Alaska (fig. 8). The Japanese were permitted to conduct salmon fishing operations in the contiguous zone off the Aleutian Islands west of long. 175° W. (provisional line specified in the International North Pacific Fisheries Convention). They agreed to conduct their salmon operations with due regard to the conditions of the runs of salmon of Alaskan origin.

Japan was also granted authorization to conduct loading and support operations within the contiguous zone in two areas in the Gulf of Alaska: (1) off Kayak Island, and (2) off Sanak Island. Except for Alaska, no recognition was given to continued Japanese fishing inside the U. S. 3- to 12-mile fishery zone of the contiguous 48 States of the U. S. and Hawaii.

The agreement also provided that Japan refrain from fishing during the first 15 days of the U. S. halibut season in the two zones off Kodiak described in the Soviet agreement. Further, Japan agreed not to fish from September through February in: (1) the six crab pot zones surrounding Kodiak Island, the boundaries of which are identical to those established by the 1964 U. S.-USSR agreement, and (2) a zone north of Unimak Island and the eastern Fox Islands used extensively by the U. S. king crab pot fishermen. Prior to the agreement's expiration, the parties are to review it and discuss possible arrangements for continued Japanese fishing.

POLICING OF FISHERIES AGREEMENTS

U. S. responsibilities for policing the international agreements and for enforcing the U. S. laws and regulations implementing the agreements lie with the Bureau of Commercial Fisheries and the Coast Guard. In 1960, with the increasingly evident threat posed by foreign fleets, BCF and the Coast Guard initiated a system of joint Alaskan international fisheries patrols. Coast Guard fisheries patrol ships and aircraft are accompanied by BCF fisheries enforcement agents. In addition to enforcement, the joint patrols gather information on foreign fisheries not subject to international agreements. This is done to help determine their impact on fishery stocks of current or potential value to the U. S. Such information is essential to formulate U. S. national and international fisheries policies.

To keep pace with the increasing foreign fisheries and the obligations imposed by additional agreements, the joint Coast Guard-BCF patrols have been increased from a few weeks by a single ship in 1960 to year-round surface and aerial patrols. During the past few years, Coast Guard cutters, augmented by aircraft from Annette and Kodiak Islands, annually logged about 250,000 miles (10 times around the earth) on international fisheries patrols off Alaska.

CONCLUSIONS

Historically, international agreements have played a significant role in Alaskan fisheries. Within the past few years, such agreements have been relied upon increasingly to protect U. S. fisheries confronted with continual competition by burgeoning Soviet and Japanese fleets. As the world turns increasingly to the living marine resources of the seas as a source of food, the fishery resources on the vast Continental Shelf off Alaska will be subjected to more and more intensive foreign fishing efforts. There can be little doubt that bilateral and multilateral fishery agreements will assume even greater importance in preventing foreign encroachment on the stocks and fishing grounds essential to the maintenance and growth of a viable U. S. fishing industry in the Alaska area.

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Sep. #841 June 196

REVISIONS OF INTERNATIONAL AGREEMENTS AFFECTING ALASKAN FISHERIES

Ronald C. Naab

Recently the United States renegotiated several fishery agreements with Japan and the USSR that affect Alaska's fisheries. The principal changes in the agreements and the benefits to U.S. fishing interests are discussed in this article.

Alaska's commercial fisheries are: (1) dependent upon species that range the high seas far beyond waters of U.S. jurisdiction; (2) vulnerable to depletion by foreign fleets fishing on the high seas; and (3) receiving increasing protection through U.S. Government negotiation of international fisheries agreements. An earlier article1/ traced the evolution of the safeguards afforded Alaskan fisheries as they were faced with increasing competition by the growing foreign fleets.

Constant changes in the Alaskan and foreign fisheries require frequent revisions of international fisheries agreements to ensure that maximum benefits are being obtained for U.S. fishery interests. In late 1968 and early 1969, U.S. negotiators and advisors met with their counterparts of Japan and the USSR to reexamine several fisheries agreements.

Japanese Agreements

Negotiations with Japan began in November 1968 and extended over 3 weeks. The discussions centered around 2 agreements and involved the questions of Japanese fishing for king and tanner crabs in the eastern Bering Sea, fishing for groundfish within the U.S. contiguous fishery zone off Alaska, and fishing for groundfish in high-seas waters off the coasts of Alaska, Washington, and Oregon. The new arrangements came into effect in late December 1968 and extended the agreements, as modified, until January 1971.

King Crab Catch Quota Halved

Provisions of the modified Japanese agreements are more favorable to U.S. fishing interests than the earlier ones. The Japanese king crab catch in the eastern Bering Sea in 1969 and 1970 will be only about one-half the 1967 and 1968 catches because their annual quota was reduced from 163,000 cases to 85,000 cases. Such a drastic reduction was needed to conserve the declining eastern Bering Sea king crab stocks while enabling U.S. fishermen to expand in the area and increase their share of the biologically allowable harvest. In addition, the modified king crab agreement further facilitated U.S. fisheries by providing for an enlarged crab pot sanctuary north of Unimak Island, within which no tangle net fishing for king crab will be allowed (figure 1). As in the earlier version, the agreement does not prohibit the Japanese from fishing in the sanctuary with other types of gear for other species. But the Japanese Government, as a domestic, is prohibiting trawling in an extensive area in the eastern Bering Sea, including the pot sanctuary.

Annual Tanner Crab Catches Limited

In recent years, the Japanese began fishing for tanner crab largely as an incidental catch by their king crab fleets. During 1968, however, the Japanese greatly increased their fishing for tanner crab to the point where the numbers of tanner crab taken far exceeded their king crab catch. Prompted, in part, by this increased Japanese fishery, the U.S. in November 1968 published a list of Continental Shelf fishery resources considered under its sole jurisdiction. Included were tanner and king crab. The recent negotiations, therefore, were expanded to include also tanner crab. The Japanese have agreed to take measures to ensure a prudent catch of tanner crabs in the eastern Bering Sea. It was feared that uncontrolled Japanese fishing for tanner crab could quickly deplete the resource--as it was becoming increasingly needed for Alaskan fisheries.

Mr. Naab is with the Enforcement and Surveillance staff, BCF, Juneau, Alaska.
This article was directed toward fishermen and processors.
1/CFR, October 1968, pp. 46-56. Also Sep. No. 825.

U.S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 841

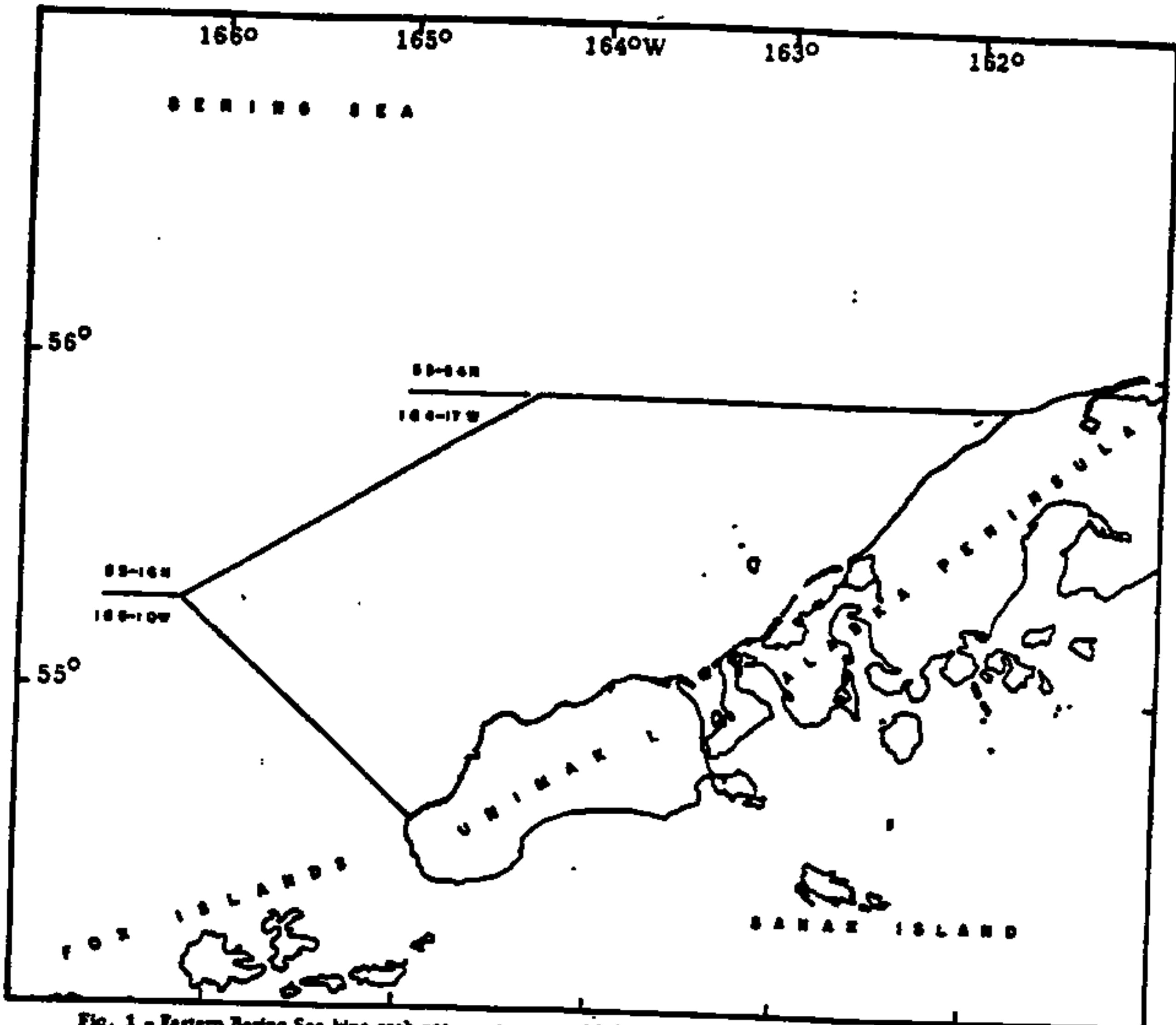


Fig. 1 - Eastern Bering Sea king crab pot sanctuary established by U.S.-Japan and U.S.-USSR Agreements.

Halibut Fishermen Further Protected

Gear interference and conflict between foreign fishing vessels and U.S. halibut vessels has been a problem. American halibut fishermen, for several years, have found it difficult to fish in areas of the Bering Sea because of the large numbers of foreign fishing vessels operating on the traditional halibut fishing grounds. The revised agreements provide for restrictions of Japanese fishing to avoid interfering with U.S. halibut fishing. These restrictions include a new commitment by the Japanese to refrain from trawling during darkness in an area of the eastern Bering Sea where U.S. fishermen are concentrated during the short period of the spring halibut season (figure 2). The extended agreements continued the provisions for the 2 zones in the Gulf of Alaska, where the Japanese will refrain from fishing during the first weeks of the halibut season.

New Loading Zones Designated

In return for Japanese concessions on the high seas, the U.S. agreed to new areas in which Japanese vessels could conduct loading operations within the 3- to 12-mile contiguous fishery zone. Two new loading zones were provided the Japanese in the Gulf of Alaska: one off Afognak Island north of Kodiak, another off Forrester Island near Dixon Entrance.

Other provisions of the 1967 agreements with the Japanese were continued in force.

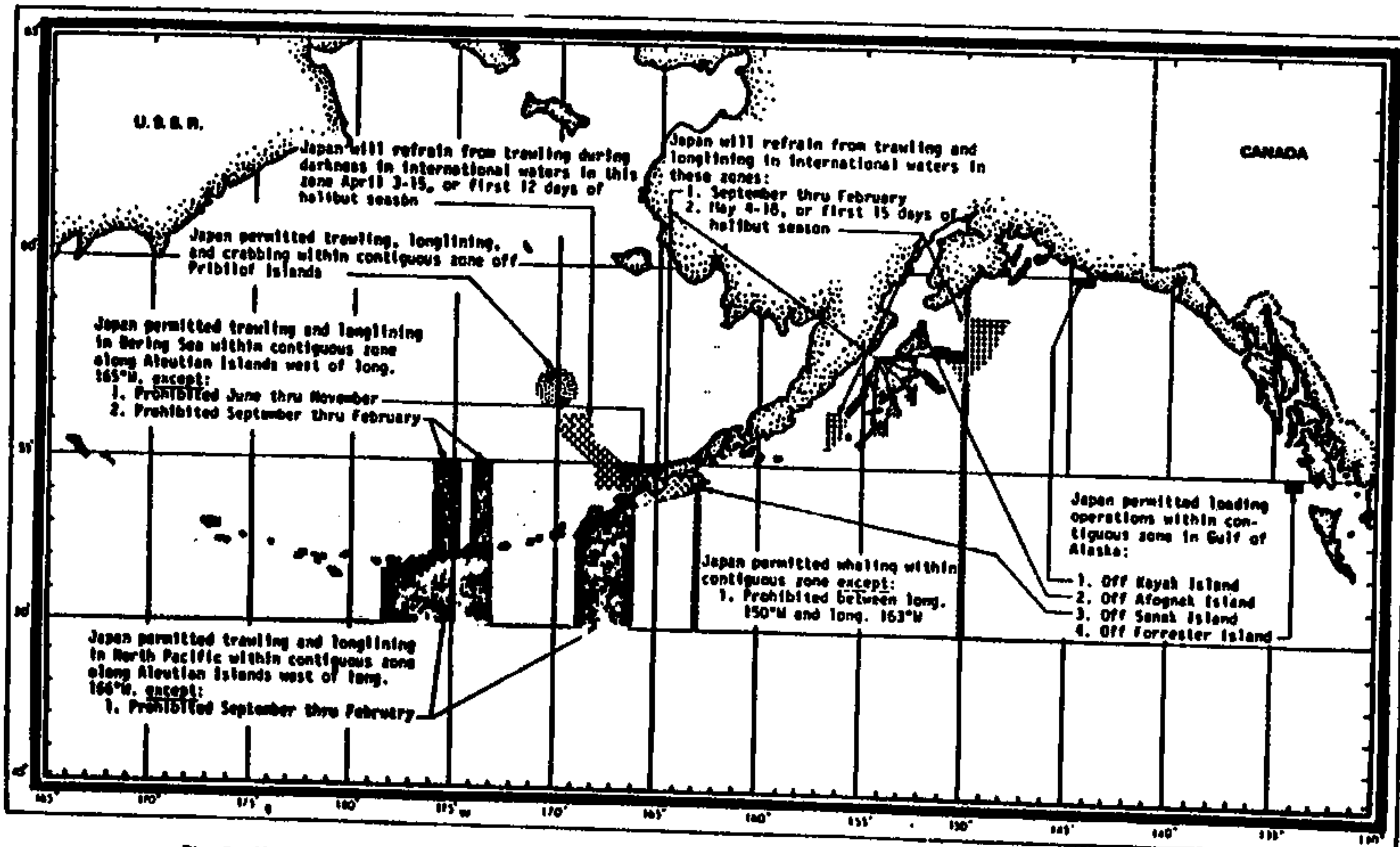


Fig. 2 - U.S.-Japan agreements implementing U.S. contiguous fishery zone May 1967, extended and modified December 1968.

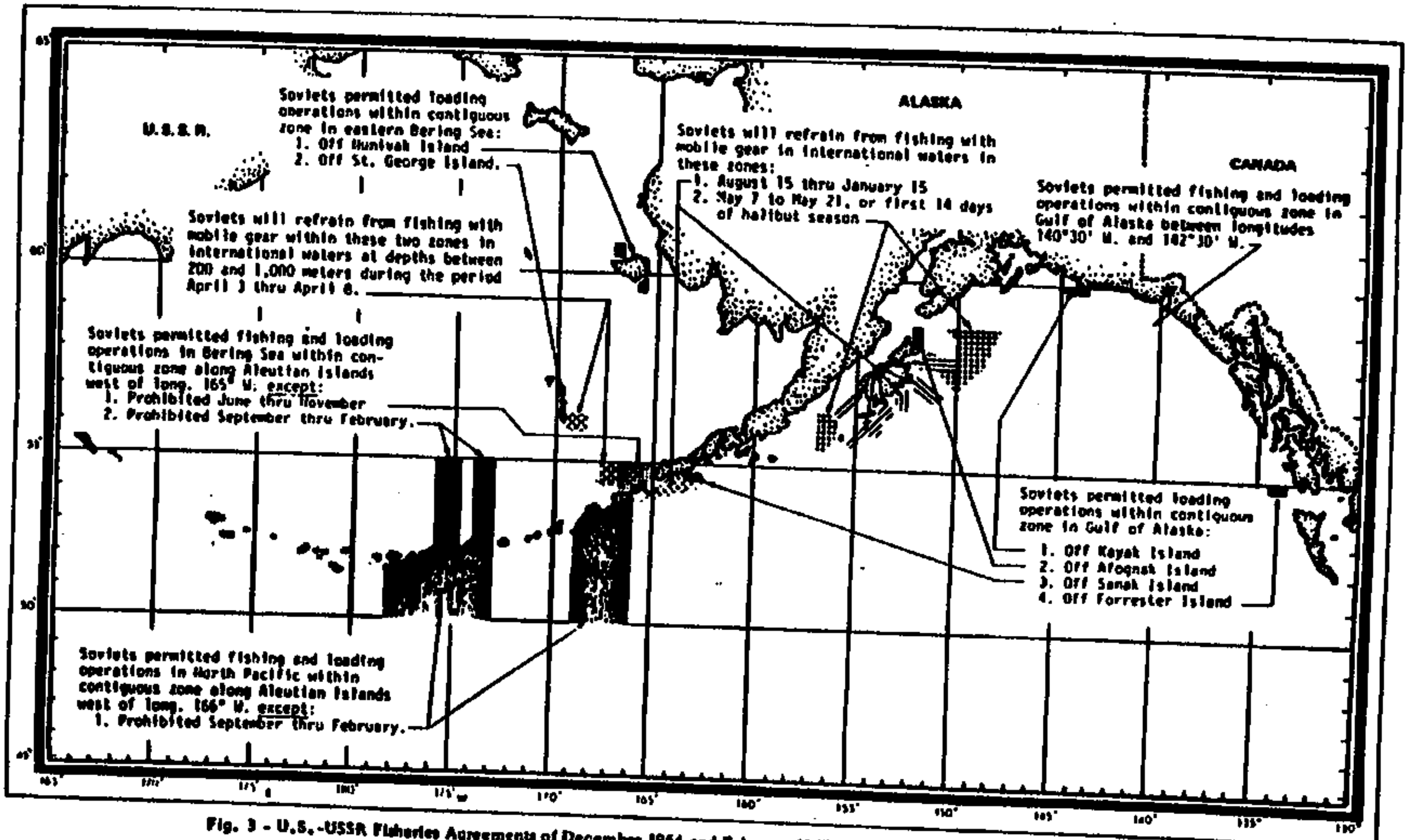


Fig. 3 - U.S.-USSR Fisheries Agreements of December 1964 and February 1967 as extended and modified January 1969.

Essentially, they afford protection to U.S. king crab fishermen on the high seas in 6 areas off Kodiak Island, and the Davidson Bank region south of Unimak Island; they permit the Japanese to fish within the contiguous fishery zone along the Aleutian Islands and off the Pribilof Islands.

Soviet Agreements

After nearly 4 weeks, negotiations with the Soviet Union ended in late January 1969 with the signing of modifications of 3 fishery agreements. The new arrangements are of 2-years' duration. They involve Soviet fishing for king and tanner crabs in the eastern Bering Sea; fishing within the contiguous fishery zone off the coasts of Alaska, Washington, Oregon, and California; and fishing in the vicinity of American crab pot and halibut longline concentrations on the high seas.

King Crab Catches Reduced

The new arrangements negotiated with the Soviets also were more advantageous to the U.S. than the earlier agreements. King crab fishing by the Soviets in the eastern Bering Sea was curtailed by reduction of their annual catch quota from 100,000 cases to 52,000 cases in 1969 and 1970. The Soviets also agreed to an expanded crab pot sanctuary; the boundaries are identical to those agreed to by the Japanese (figure 1). Provisions of the Soviet agreement not only prohibit fishing in the sanctuary with other than pot gear for king crab but also tanner crab. In addition, the Soviets agreed to refrain from trawling for other species within the sanctuary area. The latter provision should be beneficial to U.S. fishermen in the area faced with interference by the large Soviet winter flounder fishing expeditions north of the Alaska Peninsula.

Take of Tanner Crab Restricted

The Soviet catch of tanner crab from the U.S. Continental Shelf was also brought under control for the first time by the modified agreement. The Soviet take of tanner crab, unlike the Japanese, is primarily taken incidentally with king crab. It was limited to 40,000 cases (about 6 million crabs) annually in 1969 and 1970.

Halibut Grounds Closed to Trawlers

Soviet vessels operating near the traditional halibut fishing grounds in the eastern Bering Sea, like the Japanese, presented problems to American longline fishermen during the short spring halibut fishing season. The revised agreement calls for Soviet trawlers to refrain completely from fishing on 2 prime halibut fishing grounds during the first 6 days of the halibut season (figure 3). Protection of U.S. halibut fishermen from Soviet trawling in the 2 high-seas areas adjacent to Kodiak Island was continued in the new arrangements.

Crab Pot Areas Protected

U.S. king crab fishing on the high seas was also provided protection by the January agreements with the Soviets. The 6 high-seas areas of U.S. king crab pot concentrations off Kodiak Island remained closed to trawling during a period revised to coincide with present Alaskan crab fishing seasons. The Soviets also agreed to refrain from trawling during the king crab season in the same area on Davidson Bank as did the Japanese.

Additional Loading Zones Permitted

In view of the concessions on the high seas by the Soviet Union, the U.S. agreed to 3 new Soviet loading areas within the contiguous fishery zone: one in the Gulf of Alaska off Afognak Island, and 2 in the Bering Sea off St. George and off Nunivak Islands. In addition, the fishing areas allowed the Soviets within the contiguous fishery zone along the Aleutian Islands were altered. They now coincide with the fishing zones provided the Japanese. Other provisions of the 1967 agreement were continued without change.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 1668
Juneau, Alaska 99802

February 20. 1987

Mr. Arni Thompson
Executive Secretary
Alaska Crab Coalition
3901 Leary Way N.W.
Suite #9
Seattle, WA 98107

Dear Mr. Thompson:

I have reviewed the evolution of the eastern Bering Sea pot zone and have found the following series of events. The original zone came into existence in 1965. The boundaries ran from Cape Sarichef to 55-16N 166-10W, northeastward to 55-28N 165-34W, thence eastward along 55-28N to the Alaska Peninsula. That was a provision of the 1965 U.S./Soviet crab agreement and the U.S./Japan crab agreement concluded in late 1964.

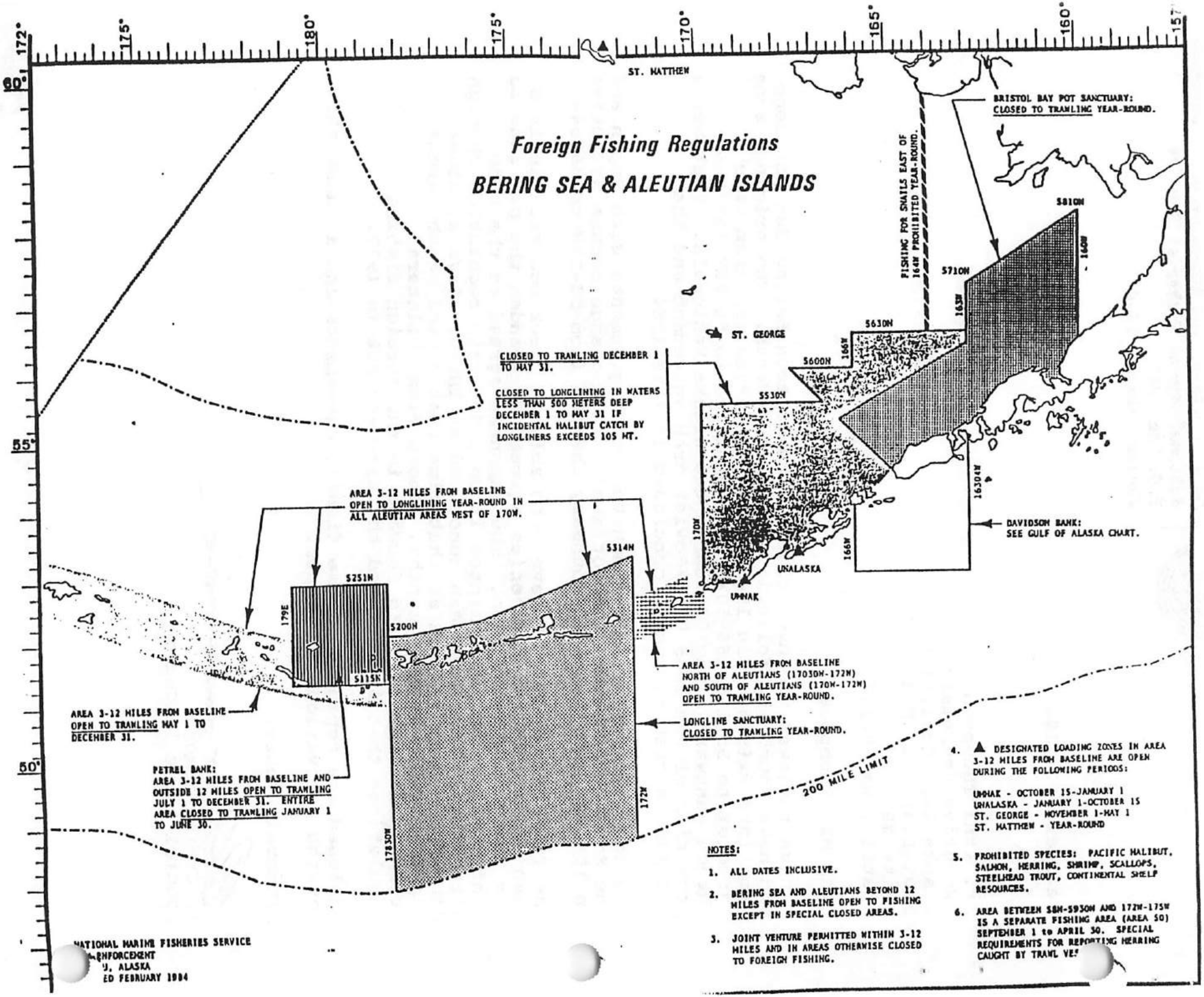
The zone expanded in 1968 when the crab agreements with Japan and the Soviet Union were renegotiated. That change became effective in 1969 and the northern boundary changed from 55-28N to 55-54N.

The final change that I have been able to track occurred in 1975 when the U.S./Soviet fisheries agreement expanded the pot zone to its present configuration. The Japanese agreed to the same configuration but implemented it as a domestic regulation through arrangements that had been concluded at INPFC. Several other concessions were gained at that time that closed nearby areas to trawling during winter months. Those final bilateral arrangements were carried forward in the foreign fishing regulations that implemented the Magnuson Act in 1977.

Enclosed are copies of those fishing agreements and a chartlets showing the various pot zones.

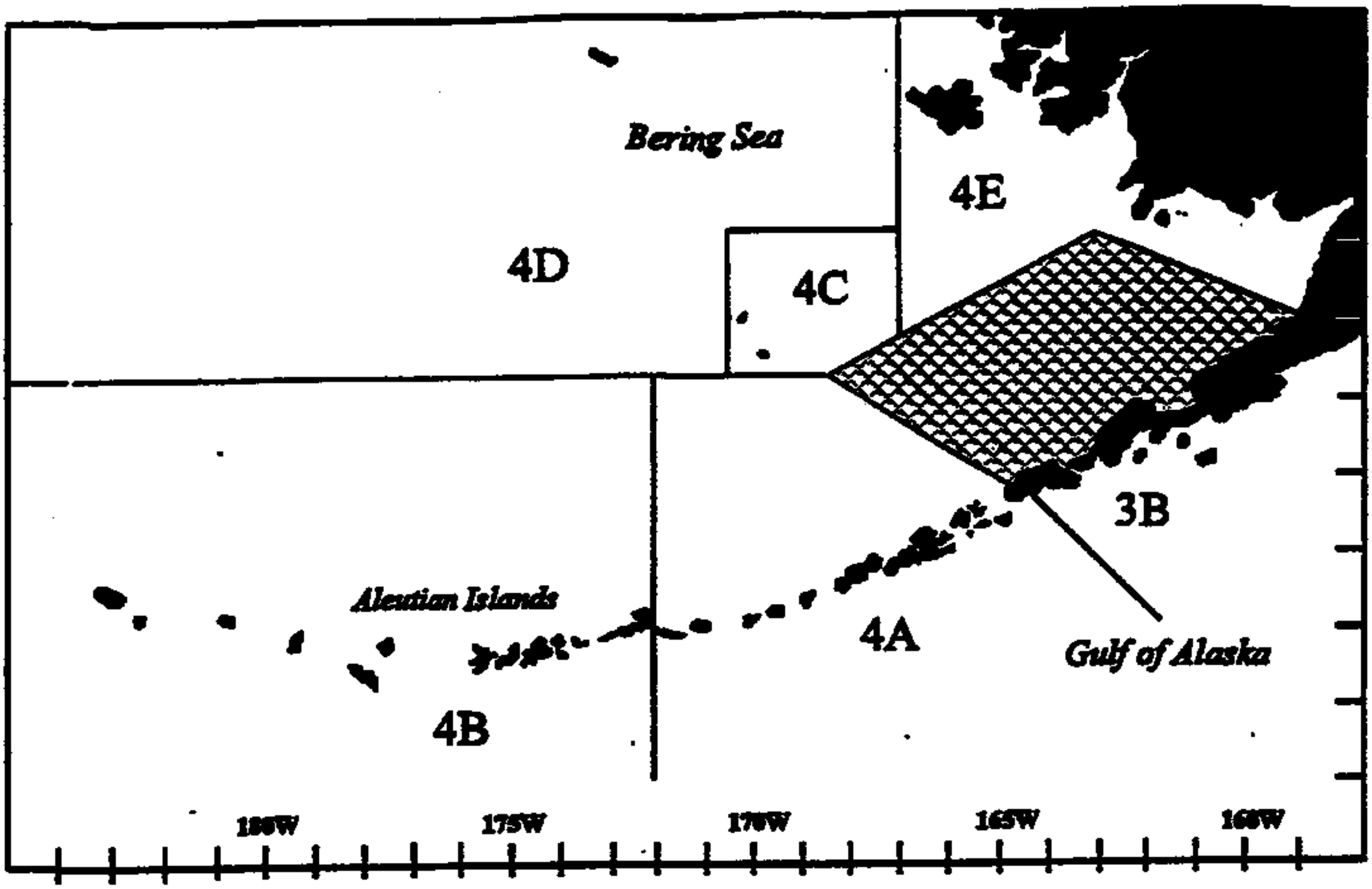
Sincerely yours,

J. Craig Hammond
Special Agent in Charge



Foreign Fishing Regulations
BERING SEA & ALEUTIAN ISLANDS
ST. MATTHEW
BRISTOL BAY POT SANCTUARY: CLOSED TO TRAWLING YEAR-ROUND.
FISHING FOR SNAILS EAST OF 164W PROHIBITED YEAR-ROUND.
5810N
160W
5710N
163W
5630N
166W
5600N
5530N
ST. GEORGE
CLOSED TO TRAWLING DECEMBER 1 TO MAY 31.
CLOSED TO LONGLINING IN WATERS LESS THAN 500 METERS DEEP DECEMBER 1 TO MAY 31 IF INCIDENTAL HALIBUT CATCH BY LONGLINERS EXCEEDS 105 MT.
16304W
DAVIDSON BANK: SEE GULF OF ALASKA CHART.
170W
166W
UNALASKA
UMNAK
AREA 3-12 MILES FROM BASELINE OPEN TO LONGLINING YEAR-ROUND IN ALL ALEUTIAN AREAS WEST OF 170W.
5314N
5251N
179E
5200N
5115N
AREA 3-12 MILES FROM BASELINE NORTH OF ALEUTIANS (17030W-172W) AND SOUTH OF ALEUTIANS (170W-172W) OPEN TO TRAWLING YEAR-ROUND.
LONGLINE SANCTUARY: CLOSED TO TRAWLING YEAR-ROUND.
AREA 3-12 MILES FROM BASELINE OPEN TO TRAWLING MAY 1 TO DECEMBER 31.
PETREL BANK: AREA 3-12 MILES FROM BASELINE AND OUTSIDE 12 MILES OPEN TO TRAWLING JULY 1 TO DECEMBER 31. ENTIRE AREA CLOSED TO TRAWLING JANUARY 1 TO JUNE 30.
172W
17830W
200 MILE LIMIT
NOTES:
1. ALL DATES INCLUSIVE.
2. BERING SEA AND ALEUTIANS BEYOND 12 MILES FROM BASELINE OPEN TO FISHING EXCEPT IN SPECIAL CLOSED AREAS.
3. JOINT VENTURE PERMITTED WITHIN 3-12 MILES AND IN AREAS OTHERWISE CLOSED TO FOREIGN FISHING.
4. ▲ DESIGNATED LOADING ZONES IN AREA 3-12 MILES FROM BASELINE ARE OPEN DURING THE FOLLOWING PERIODS:
UMNAK - OCTOBER 15-JANUARY 1
UNALASKA - JANUARY 1-OCTOBER 15
ST. GEORGE - NOVEMBER 1-MAY 1
ST. MATTHEW - YEAR-ROUND
5. PROHIBITED SPECIES: PACIFIC HALIBUT, SALMON, HERRING, SHRIMP, SCALLOPS, STEELHEAD TROUT, CONTINENTAL SHELF RESOURCES.
6. AREA BETWEEN 58N-5930N AND 172W-175W IS A SEPARATE FISHING AREA (AREA 50) SEPTEMBER 1 to APRIL 30. SPECIAL REQUIREMENTS FOR REPORTING HERRING CAUGHT BY TRAWL VE
NATIONAL MARINE FISHERIES SERVICE
ENFORCEMENT
J, ALASKA
ED FEBRUARY 1984
172°
175°
180°
175°
170°
165°
160°
157
60°
55°
50°

Figure 4.5 IPHC regulatory and closure areas for the halibut longline fishery in the Bering Sea, 1995.



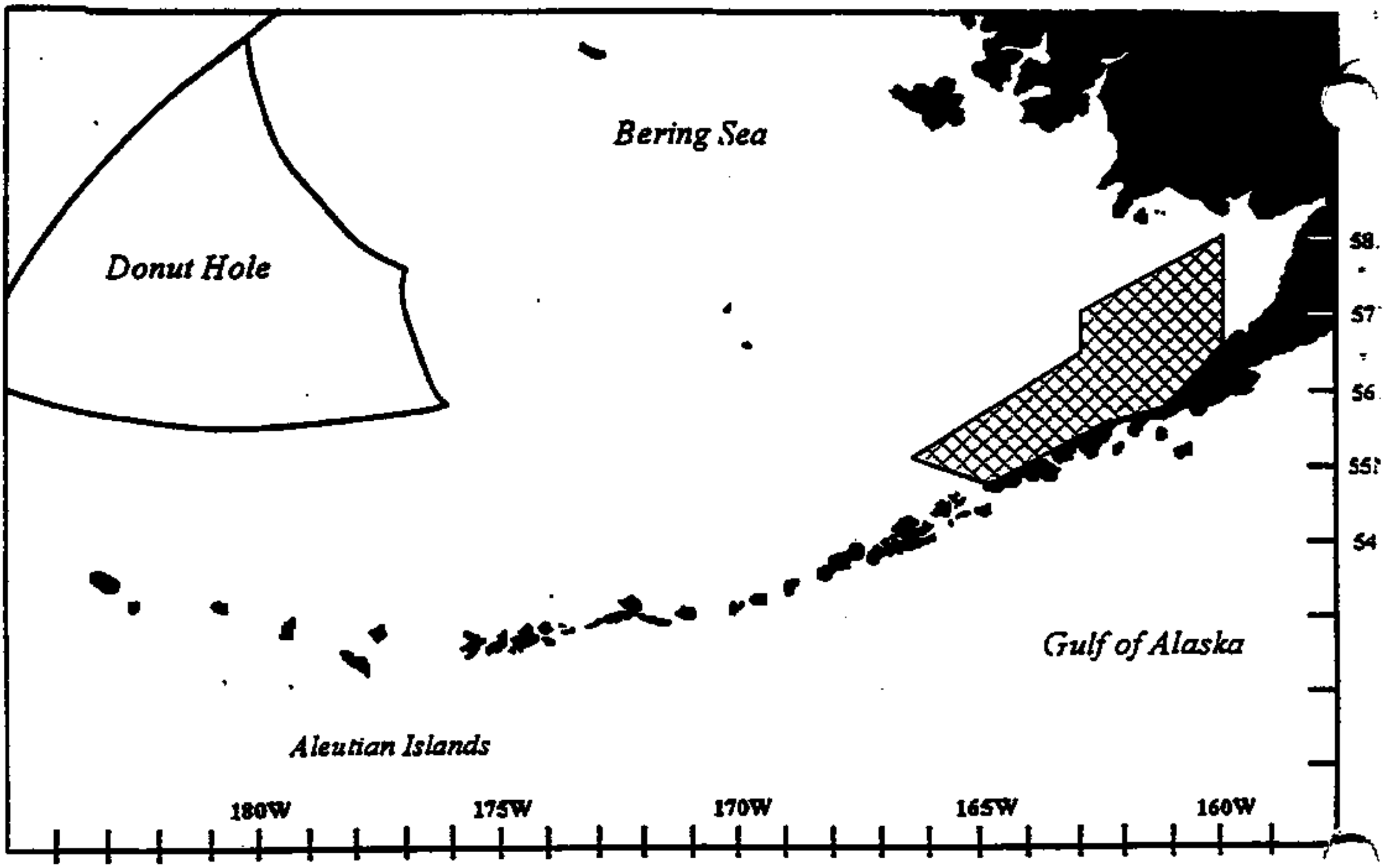
Halibut Longline Closure Area

Rationale for Closure: This area is closed to directed halibut fishing with longline gear. Closure of the prescribed area was enacted by IPHC in its effort to rebuild the Bering Sea halibut resource, as this area was known to contain large concentrations of juveniles.

Origin: Declared a halibut nursery area by IPHC in 1967 and closed to commercial fishing for halibut. Referred to as the Closed Area in International Halibut Commission regulations. Boundaries have changed slightly since 1967, most recently in 1990 to allow for the establishment of a small commercial fishery within the nearshore Bristol Bay area.

Description of Area: The portion of the EEZ encompassed by straight lines connecting the following points, in the order listed:

Cape Sarichef Light	54°36'00" N - 164°55'42" W
	56°20'00" N - 168°30'00" W
	58°21'25" N - 163°00'00" W
	56°53'18" N - 158°50'37" W



Bristol Bay Pot Sanctuary

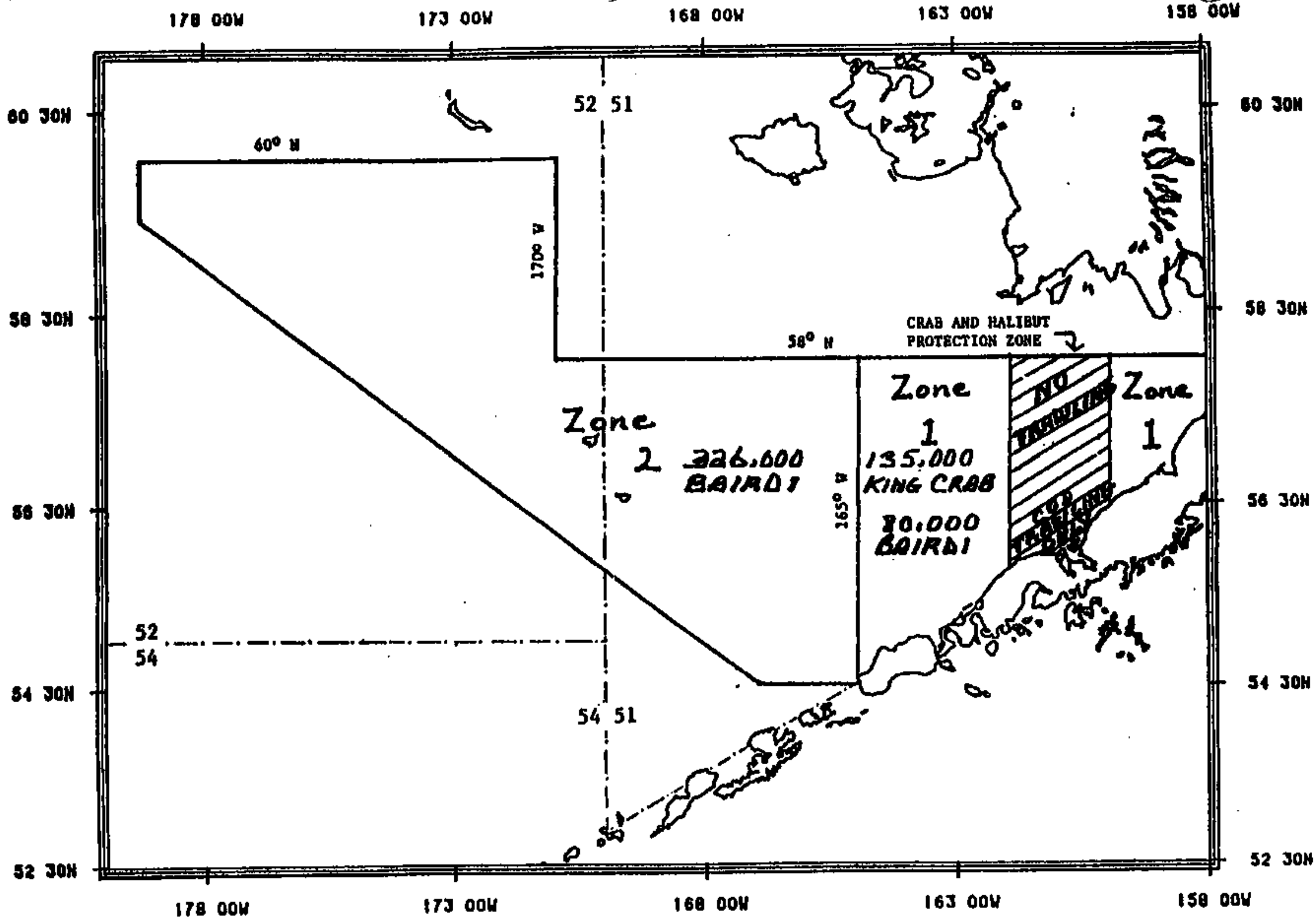
Rationale for Closure: Originally closed to trawling to prevent conflicts between foreign mobile gear and concentrations of US crab pots, also to prevent incidental catch of juvenile halibut that are known to concentrate in this area. Regulation still on books as reserved.

Origin: Part of original FMP. Modified under Amendment 1 implemented on January 1, 1984 to allow year-round domestic trawling within area.

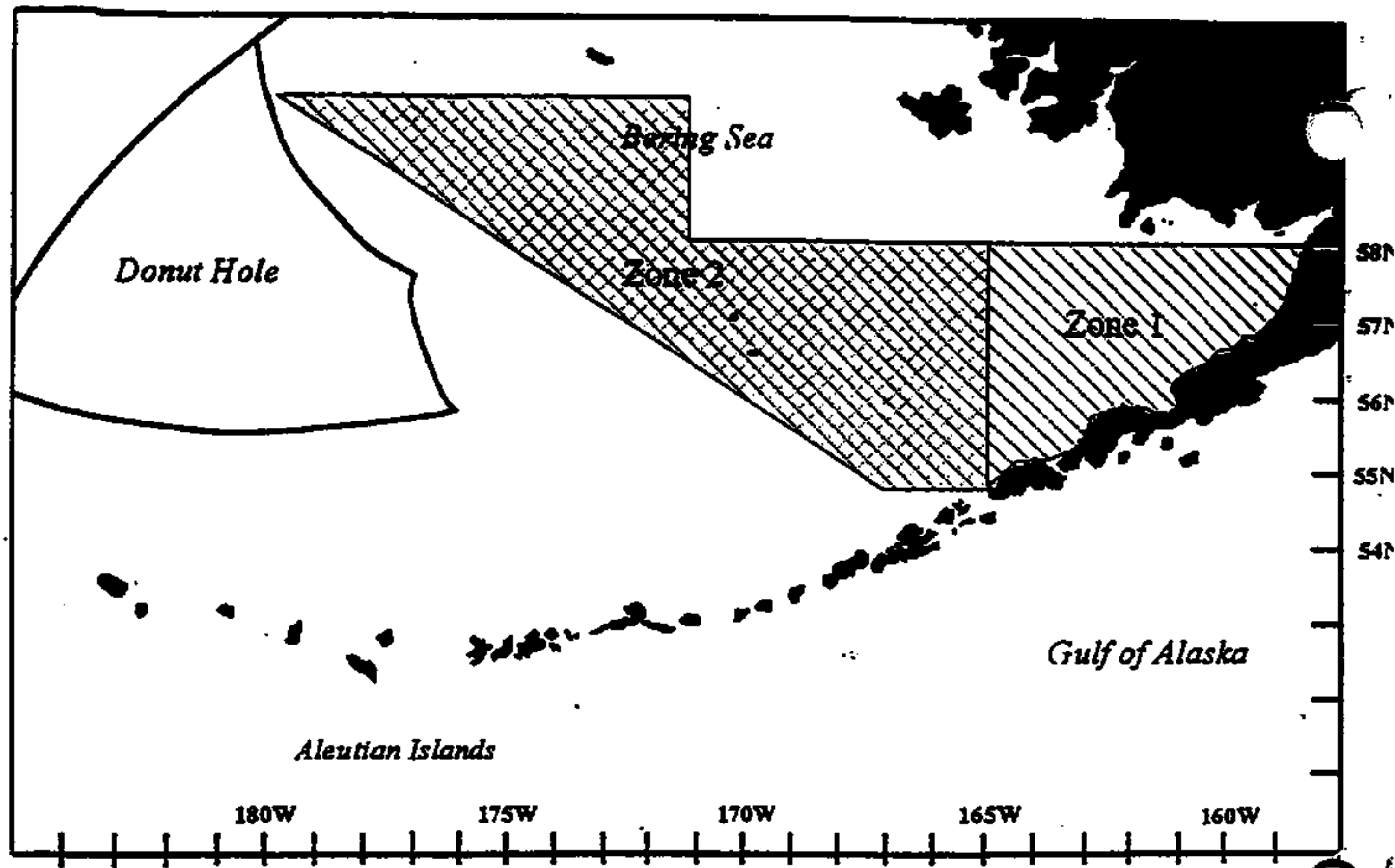
Description of Area: The portion of the EEZ encompassed by straight lines connecting the following points, in the order listed:

Cape Sarichef Light (54°36'N - 164°55'42"W)
55°16'N - 166°10'W
56°20'N - 163°00'W
57°10'N - 163°00'W
58°10'N - 160°00'W
Intersection of 160°00'W with the Alaska Peninsula

EASTERN BERING SEA TRAWL BYCATCH RESTRICTIONS ON KING AND TANNER CRAB



BERING SEA RESTRICTED TRAWLING ZONES AS ESTABLISHED BY THE NPFMC EMERGENCY RULE OF 1986, AND AMENDMENT #10 TO THE BERING SEA FMP, MARCH 1987. RESTRICTIONS APPLY TO TRAWLING FOR YELLOWFIN SOLE AND OTHER FLOUNDERS. SUCH RESTRICTIONS WILL REMAIN IN EFFECT UNTIL DECEMBER 31, 1988, DURING WHICH TIME THEY WILL BE REVIEWED BY THE NPFMC "BYCATCH SUBCOMMITTEE" WHICH WILL PROPOSE REVISED GUIDELINES TO GO IN EFFECT JANUARY 1, 1989.



Prohibited Species Bycatch Limitation Zones

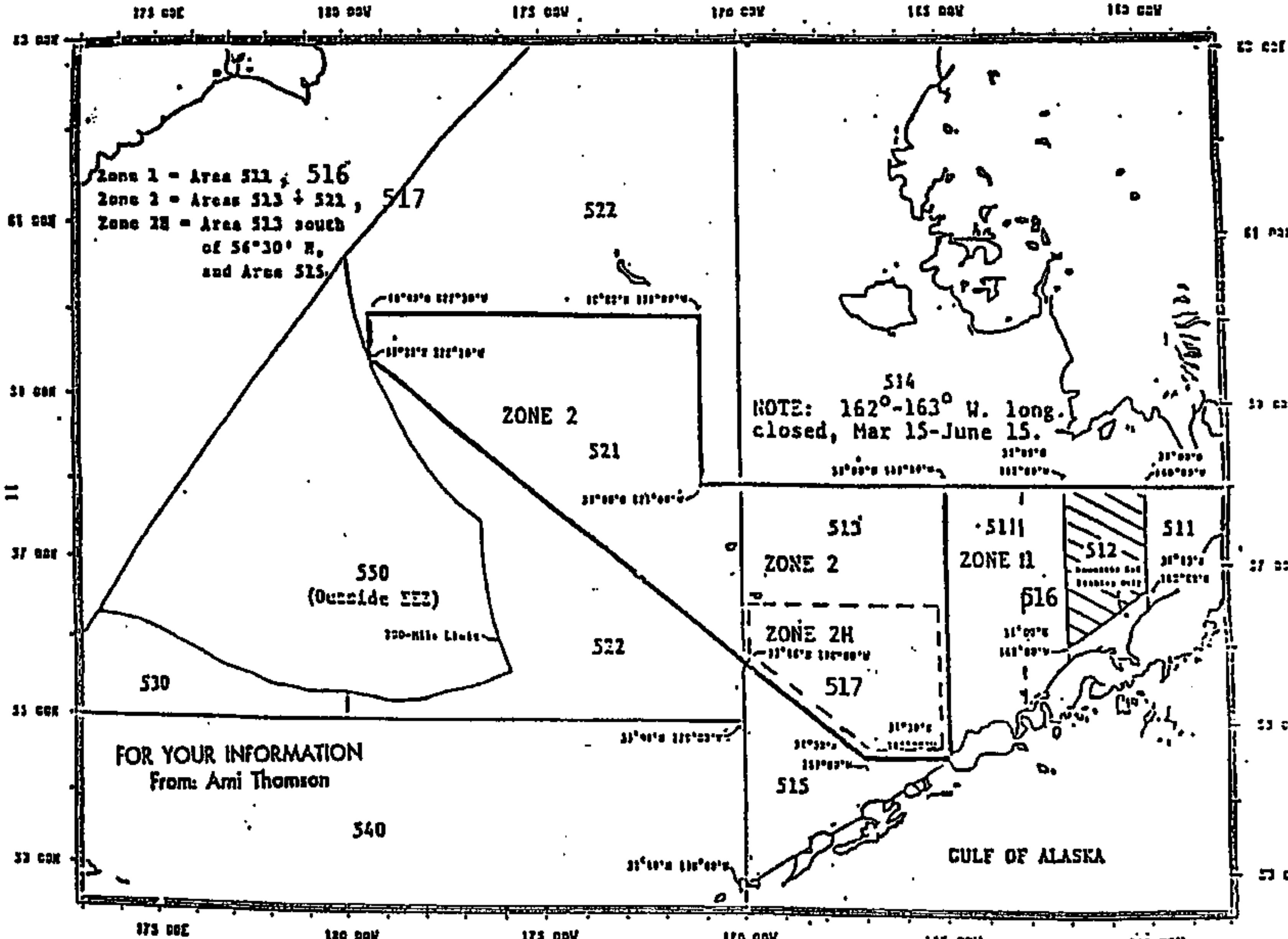
Rationale for Closure: To allow for control of red king crab and C. bairdi Tanner crab bycatch.

Origin: Implemented under Amendment 10 on March 16, 1987.

Description of Area: Areas close to directed fishing when crab bycatch caps are attained in specified fisheries. Bycatch Limitation Zone 1 means that part of the Bering Sea Subarea that is south of 58° 00' N. latitude and east of 165° 00' W. longitude. Bycatch Limitation Zone 2 means that part of the Bering Sea Subarea bounded by straight lines connecting the following coordinates in the order listed:

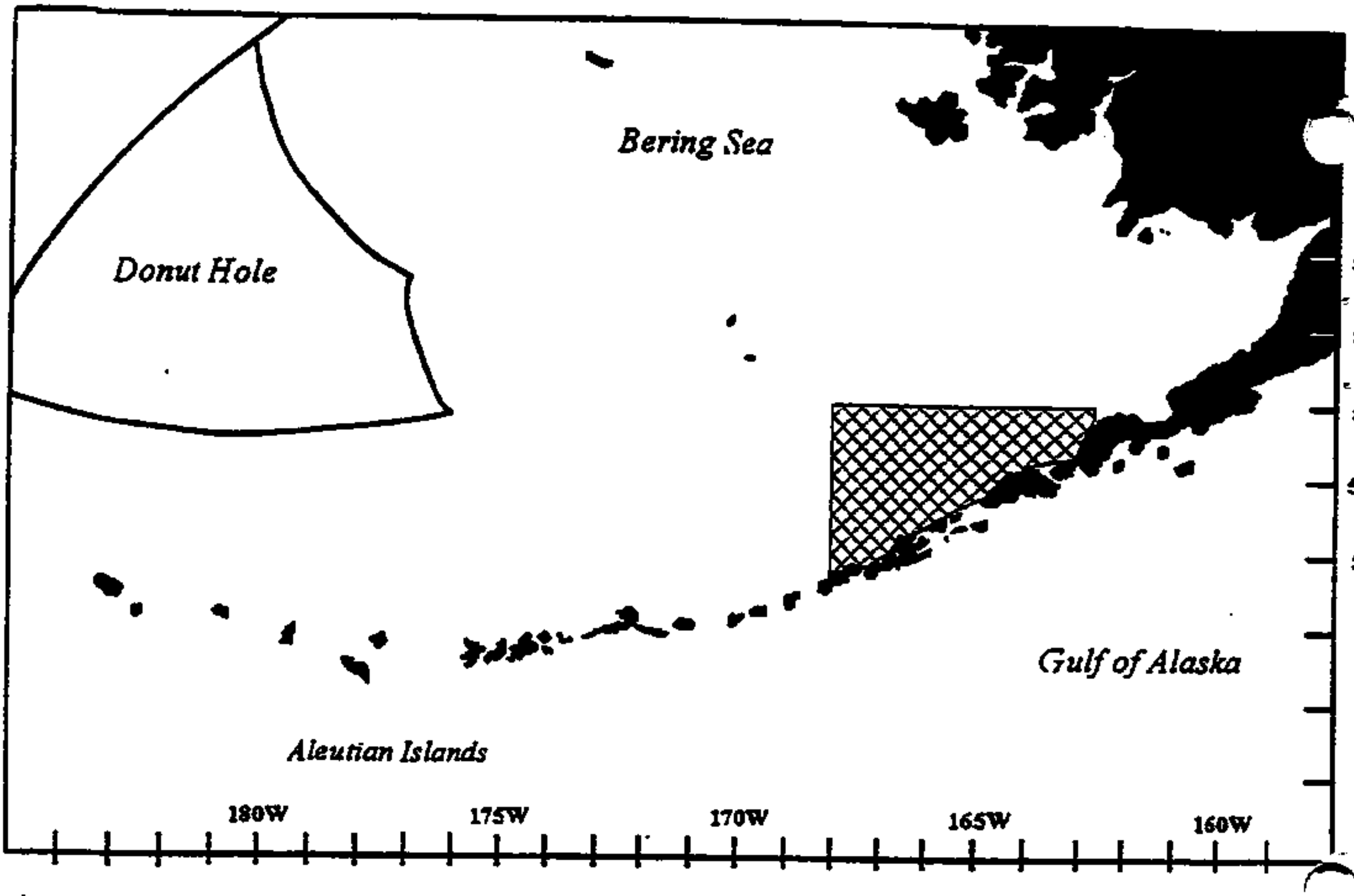
North latitude	West longitude
54° 30'	165° 00'
58° 00'	165° 00'
58° 00'	171° 00'
60° 00'	171° 00'
60° 00'	179° 20'
59° 25'	179° 20'
54° 30'	167° 00'
54° 30'	165° 00'

NPFMC APPROVED RESTRICTED TRAWL GROUNDFISH ZONES AND PROHIBITED SPECIES CAPS IN THE EASTERN BERING SEA, AS ESTABLI[cut off] BY AMENDMENTS 10, 12A AND 16 TO THE BS/AI FMP, 1986 THROUGH 1991.



Red king crab:	200,000 crabs in Zone 1 to close Zone 1.
C. bairdi crab:	1,000,000 crabs in Zone 1 to close Zone 1.
	3,000,000 crabs in Zone 2 to close Zone 2.
Pacific halibut:	4,400 mt catch in BS/AI to close Zones 1 and 2H (as modified)
	5,300 mt catch in BS/AI to close entire BS/AI

(Caps apply to JVP and DAP flatfish and groundfish fisheries)



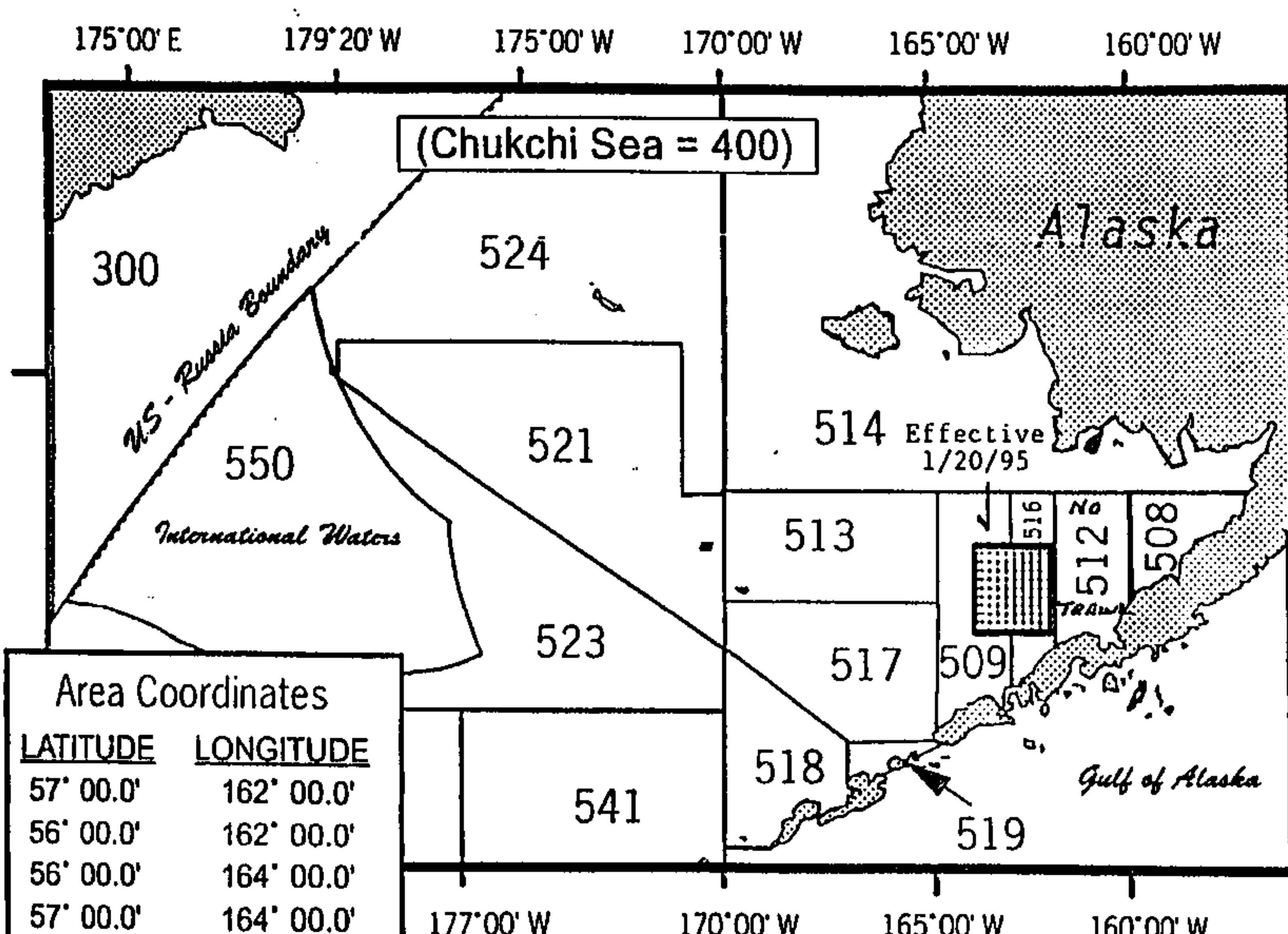
Catcher Vessel Operational Area (CVOA)

Rationale for Closure: Established to limit access to pollock within the area to catcher vessels delivering to the inshore component.

Origin: Implemented as part of Amendment 18 (inshore/offshore) on June 1, 1992, and revised on December 18, 1992.

Description of Area: The offshore component is prohibited from fishing in the CVOA during the pollock "B" season. The CVOA is defined as that area in the Bering Sea subarea south of 56° 00' N. latitude, and between 163° 00' and 168° 00' W. longitude.

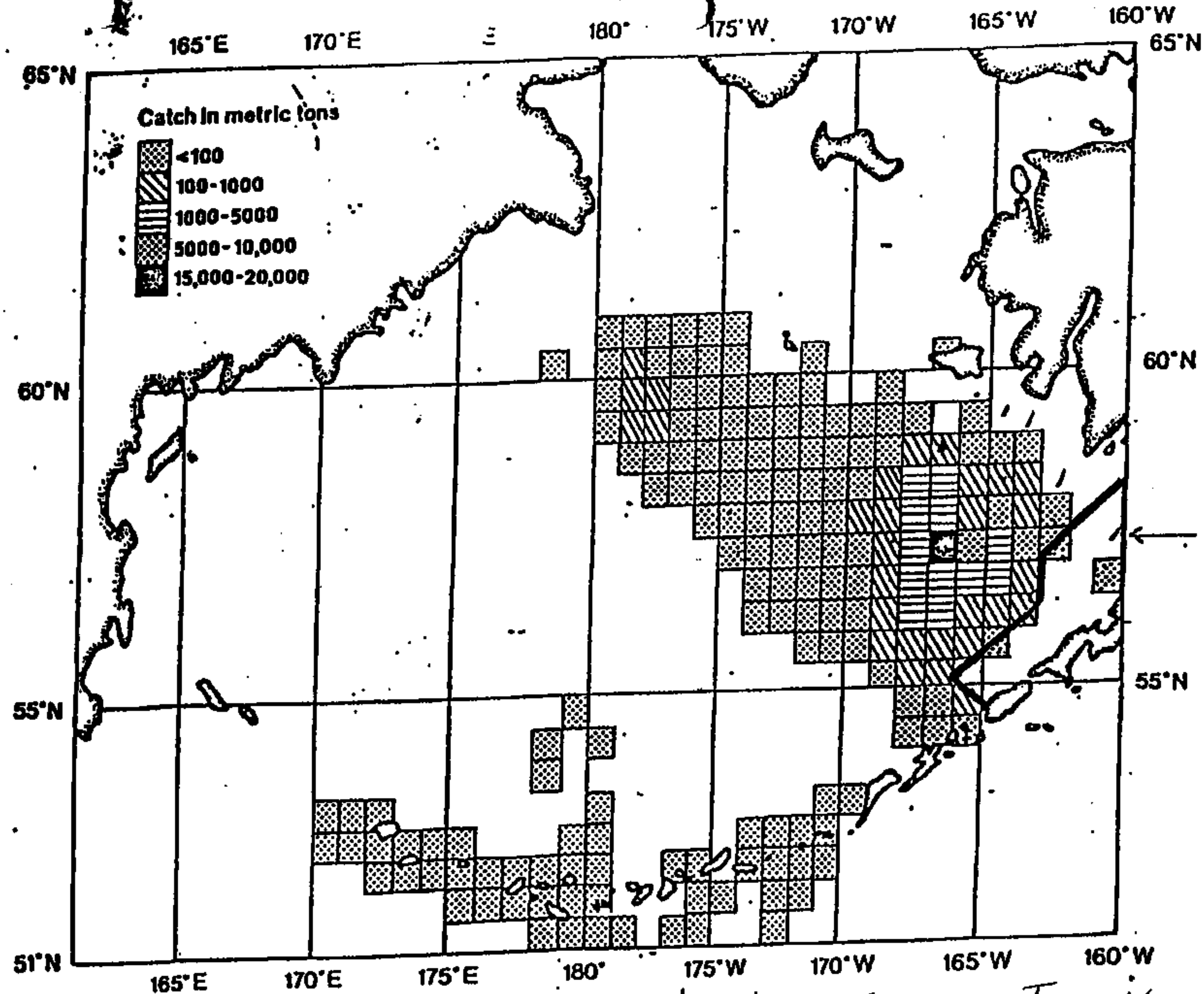
RED KING CRAB PROTECTIVE AREA



Area Coordinates

LATITUDE	LONGITUDE
57° 00.0'	162° 00.0'
56° 00.0'	162° 00.0'
56° 00.0'	164° 00.0'
57° 00.0'	164° 00.0'
57° 00.0'	162° 00.0'

NMFS Emergency Rule closes new area to all trawling for groundfish, except vessels fishing for pollock with pelagic trawl gear and an observer onboard at all times. Vessels fishing for flatfish in Zone 1 (508, 516,509) must carry an observer onboard at all times and report catch of groundfish and bycatch daily via INMARSAT A or C



CATCHES YELLOWFIN SOLE - JAPAN

Figure 1. ~~Average annual catches of yellowfin sole by Japan according to~~ blocks of $\frac{1}{2}^{o}$ latitude by 1^{o} longitude within the Bering Sea/Aleutian region, 1977–1982.

Area A -- Bristol Bay Pot Sanctuary

The portion of the Fishery Conservation Zone encompassed by straight lines connecting the following points, in the order listed:

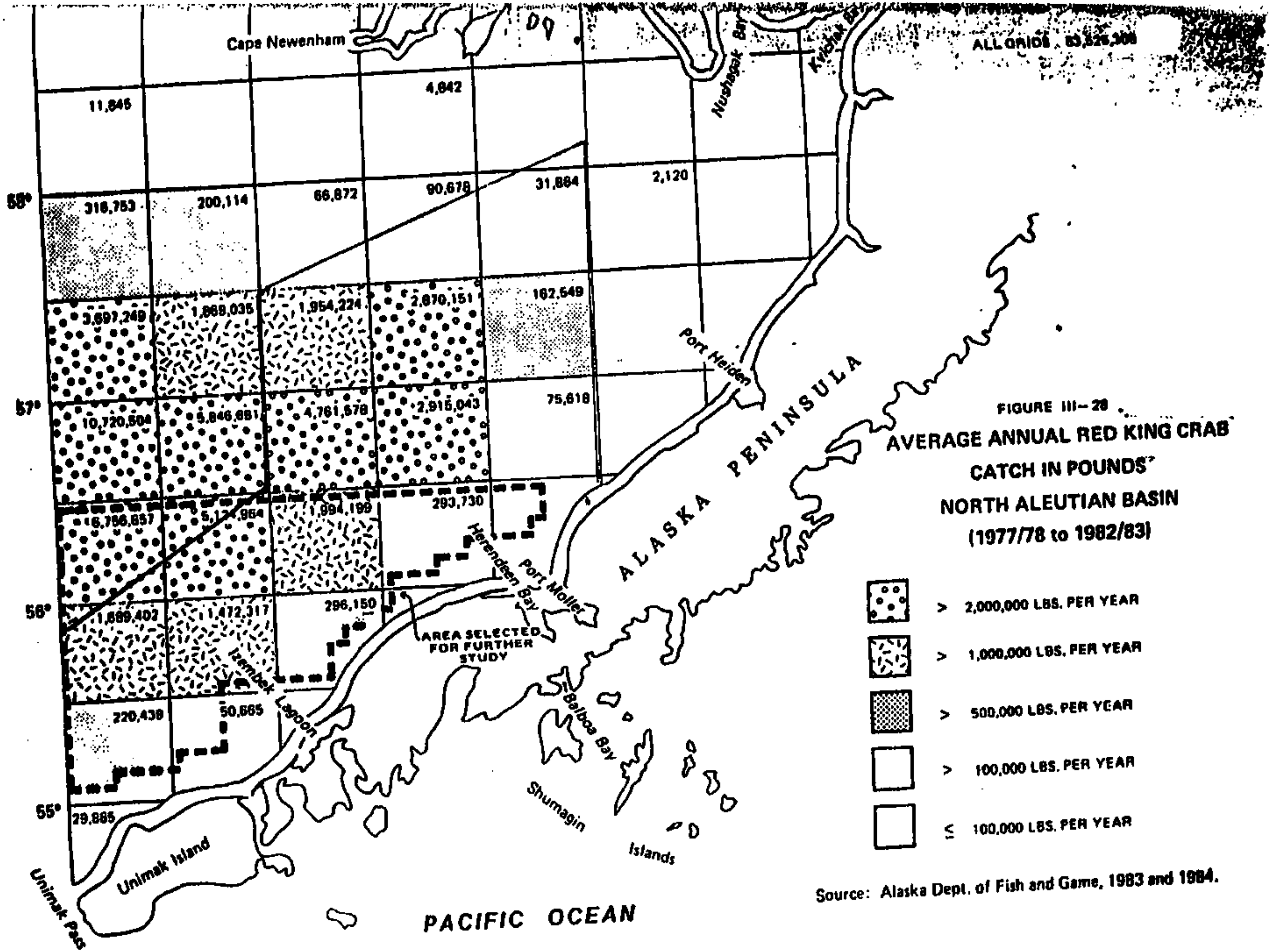
Cape Sarichef Light (54°35'N - 164°55'42"W)
55°16'N - 166°10'W
56°20'N - 163°00'W
57°10'N - 163°00'W

FIGURE III-28

AVERAGE ANNUAL RED KING CRAB CATCH IN POUNDS

NORTH ALEUTIAN BASIN

(1977/78 to 1982/83)



Source: Alaska Dept. of Fish and Game, 1983 and 1984.

Alaska Groundfish Data Bank P.O. Box 2298 • Kodiak, Alaska 99615

TO: RICK LAUBER, CHAIRMAN
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

RE: SECTION 7 CONSULTATION RPA'S

DATE: NOVEMBER 4, 1998

SENT BY FAX: 2 PP

COMMENTS ON REASONABLE AND PRUDENT ACTIONS FOR PROTECTING ENDANGERED SEA LIONS IN THE GULF OF ALASKA

The members of Alaska Groundfish Data Bank are appalled at the severity of the proposed RPA's for the Gulf of Alaska. From 1969 through 1997 the pollock biomass in the Gulf of Alaska has ranged from 100,000's MT to several million metric tons and the sea lion decline continued. There appears to be no correlation between the decline of sea lions and the amount of pollock available.

However, the sea lion decline does appear to correlate with the many changes in the Gulf of Alaska ecosystem which first became apparent in the mid-1970's. There are a number of papers documenting these changes which included the movement of pollock and Pacific cod from off the shelf to onto the shelf and the decline of many forage fish, including capelin. We continue to be puzzled by the resistance to considering the sea lion decline as part of what is now called the regime shift.

Further, the sea lion decline seems to have flattened out, though we expect that due to El Nino that pup production may be low and pup survival low for a year or two.

We are also appalled that no analysis has been done of the efficacy of the current sea lion protective measures and that the proposed RPA's are really more of the same and still there is no research plan to monitor effectiveness.

IF A JEOPARDY FINDING IS MADE AND FURTHER PROTECTIVE MEASURES IMPLEMENTED AGDB RECOMMENDS THE FOLLOWING MEASURES

1. A research and monitoring program be put in place in conjunction with any additional RPA's.

2. The rookery and haul-out trawl exclusion zones in the Gulf of Alaska be limited to those rookeries and haul-outs where 200 sea lions have been counted between 1989 and 1998. Using the years 1960 to 1998 makes no sense since many of the rookeries and haul-outs have been long abandoned. 1989 is the beginning of the time series during which the rate of sea lion declines appears to have leveled off. If the stock recovers enough to begin to repopulate now abandoned sites new there will be time to consider other measures.

3. For rookeries and haul-outs used only seasonally by sea lions the trawl exclusion zones should also be seasonal. It makes no sense to close areas where there are not significant sea lions.

Chris Blackburn • Director • (907) 486-3033 • FAX (907) 486-3461 • e-mail 7353974@mcimail.com

4. Set the Gulf second trimester opening back from July to June. Fishing pollock in July guarantees that there will be high chum and Chinook bycatch. Salmon bycatch was the reason for eliminating the July pollock fishery. July is also the time Pacific Ocean Perch can be taken with the least halibut bycatch and the salmon season. Operationally it is questionable whether the Gulf plants could process pollock along with the other fisheries.

5. Closing all the trawl exclusion zones to all trawl fisheries does not seem justified, particularly in view of the number of rookeries and haulouts which would be closed, even if the time frame of 1989 to 1998 were used to select the haul-outs and rookeries. Since there is no data showing a relationship between the trawl fishery and sea lion declines we suggest the current no trawl zones be left in place and trawling for species other than pollock be allowed in any new trawl exclusion zones.

6. The continued exclusion of industry from the process remains a serious problem. This is the second time there has been a lawsuit, the second time industry has been presented with what appears to be a *fait accompli.* We suggest the following measures be considered to keep industry informed and to draw on the expertise of the industry.

   The section 7 consultation process should be ongoing and involve industry. The local knowledge of people who live in the communities and spend their lives on the sea should be part of the process.

   By making the section 7 consultation an ongoing process industry will have the opportunity to remain aware of the measures being considered in a time y matter, participate in the decisions, offer their knowledge and adjust their business plans accordingly. In plain English we don't want any more last minute measures forced because somebody filed a lawsuit. We want a process that reflects the seriousness of the sea lion decline and the seriousness of the impact on our industry, communities and families.

   B. As part of the current section 7 consultation process we request that there be a written research plan which contains at least the following:

      1. More than one hypothesis.
      2. Expected results of the sea lion protection measures under each hypothesis.
      3. Time needed to see expected results under each hypothesis.
      4. Results that would indicate a hypothesis was wrong.
      5. Things industry could do to provide additional information and data.

The assessment of fishermen in the Kodiak area after plotting the proposed trawl exclusion zones on a chart is that very little pollock, Pacific cod or shallow flatfish grounds will be available for fishing.

Thank you for your consideration of our comments.

Chris Blackburn, Director
Alaska Groundfish Data Bank

KRIS POULSEN & ASSOCIATES COMMERCIAL FISHING VESSELS • M/V BERING SEA • M/V ARCTIC SEA • M/V NORTH SEA

1143 N.W. 45TH STREET • SEATTLE, WASHINGTON 98107 • OFFICE: 206-783-6708 • FAX: 206-784-2502

November 4, 1998

Rick Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue, Ste. 306
Anchorage, Alaska 99501-2252

RE: C-2, Steller Sea Lions

Dear Rick,

I am concerned with the implications of the recently passed American Fisheries Act (S.1221) on both King and Bairdi crab within the Catcher Vessel Operational Area (CVOA). The CVOA is a critical area for the success of both King and Bairdi crab. Unfortunately, the passage of 1221 will increase effort by trawlers within this sensitive area. All pollock gear is now mid-water trawl gear. However, this gear is still towed across the bottom and disturbs the benthic environment as well as catching and crushing an unknown amount of crab. Even though the CVOA is relatively small in comparison to the Bering Sea, it is very significant in its importance to all life stages of Bristol Bay Red King and Bairdi crab.

It has been well documented by Gregory McMurray and David Armstrong that the area just North of Unimak Island is critical to King Crab. This area is a premier hatching area for eggs carried by female King Crab. King Crab hatched just North of Unimak Island are in close proximity to nutrients flowing through Unimak Pass, and into Bristol Bay. Therefore, the more females which inhabit this area North of Unimak Island, the greater the chance of a true recovery in the Biomass of Red King Crab.

In addition, McMurray and Armstrong theorize that the area just North of Unimak Island (the CVOA) is ideal for larval hatch of King Crab due to the direction of sea currents. They theorize crab larvae hatched from this location have the highest probability of encountering an ideal environment to settle upon. Unfortunately, excessive trawling over the years has devastated this zone, since it is within the CVOA. Female King Crabs have moved on to less disturbed areas probably East of 162 degrees where they are not caught in trawl gear and the benthic environment is not disturbed. As a result, very few King Crab larvae are surveyed in this area, as they were prior to the explosion of King Crab during the 1970's.

The trawl impacts upon Bairdi in the CVOA have not been investigated or analyzed, but could be much more significant than those impacts on King Crab. I have recently completed research estimating the amount of Bairdi within the CVOA to that outside the

CVOA (please see attachments). Very significant amounts of Bairdi reside within the CVOA. ***For such a relatively small area, the CVOA has great importance for the success of all life stages of Bairdi crabs, especially when one considers that up to 57% of small female Bairdi reside within the CVOA, as was the case in 1997*** (see attachment).

According to the 1998 NMFS Survey, Bairdi are at historic low levels, and the population of legal males and large females have never been lower since surveys have been conducted. Given that the Bairdi stock is currently listed as overfished according to National Standard 1, it seems prudent to reduce effort within the CVOA, not to increase effort in this critical habitat area.

Unfortunately, S.1221 does increase effort within the CVOA. How much this effort is increased depends upon whether proposed season changes are enacted. However, either way, effort within the CVOA will increase a substantial amount, to the detriment of an already devastated crab stock.

I ask the Council to consider closing the CVOA to all trawling as it was when the pot sanctuary was in place. This protection will lay the foundation for a rebuilding of Bairdi crab as well as King crab in the near future.

Sincerely,

Edward Poulsen

Edward Poulsen

References

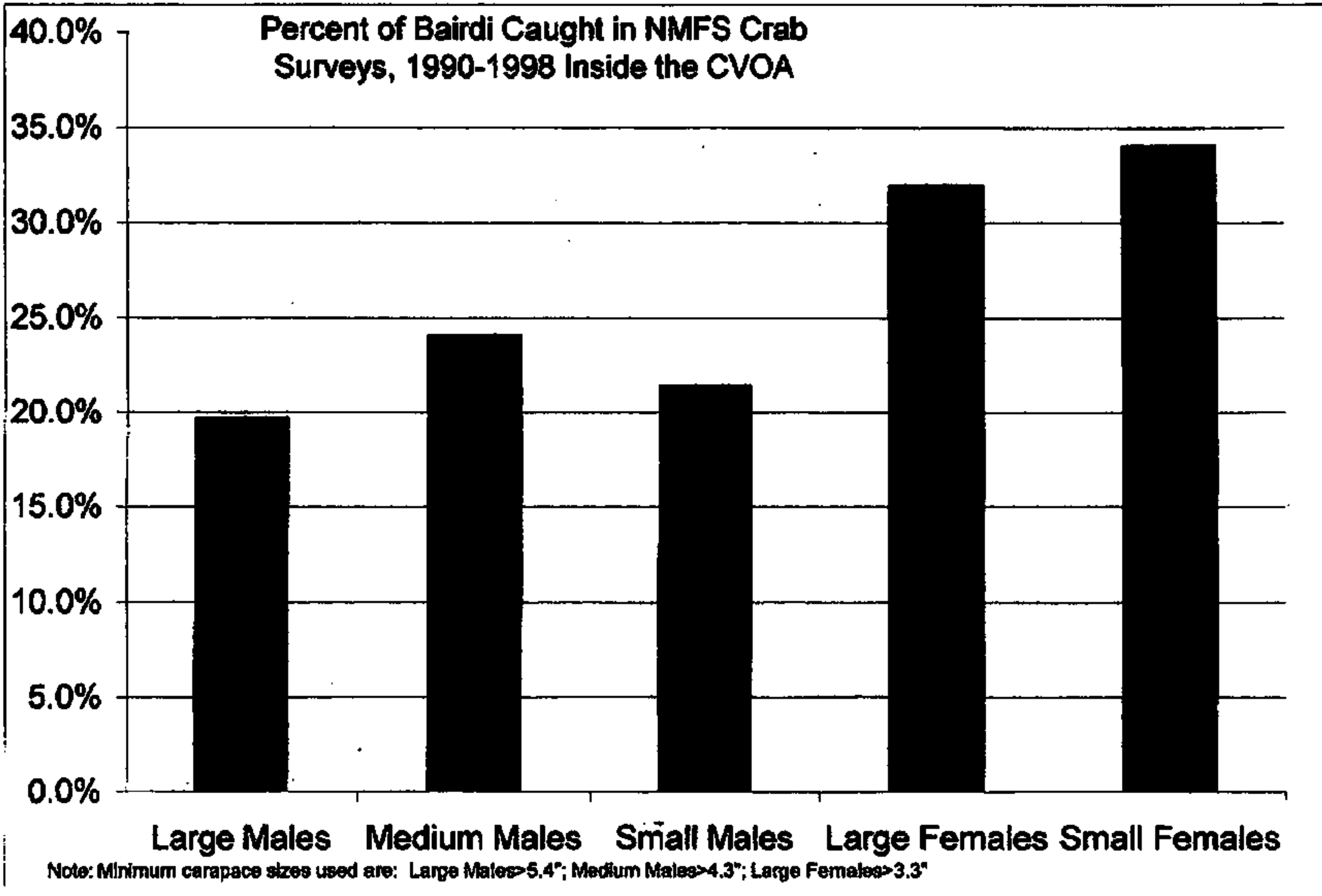
Becker, Paul. Environmental Characterization and Biological Utilization of the North Aleutian Shelf Nearshore Zone. Contract No: 84-ABC-00125. NOS/OMA/OAD Anchorage, Alaska. 1987.

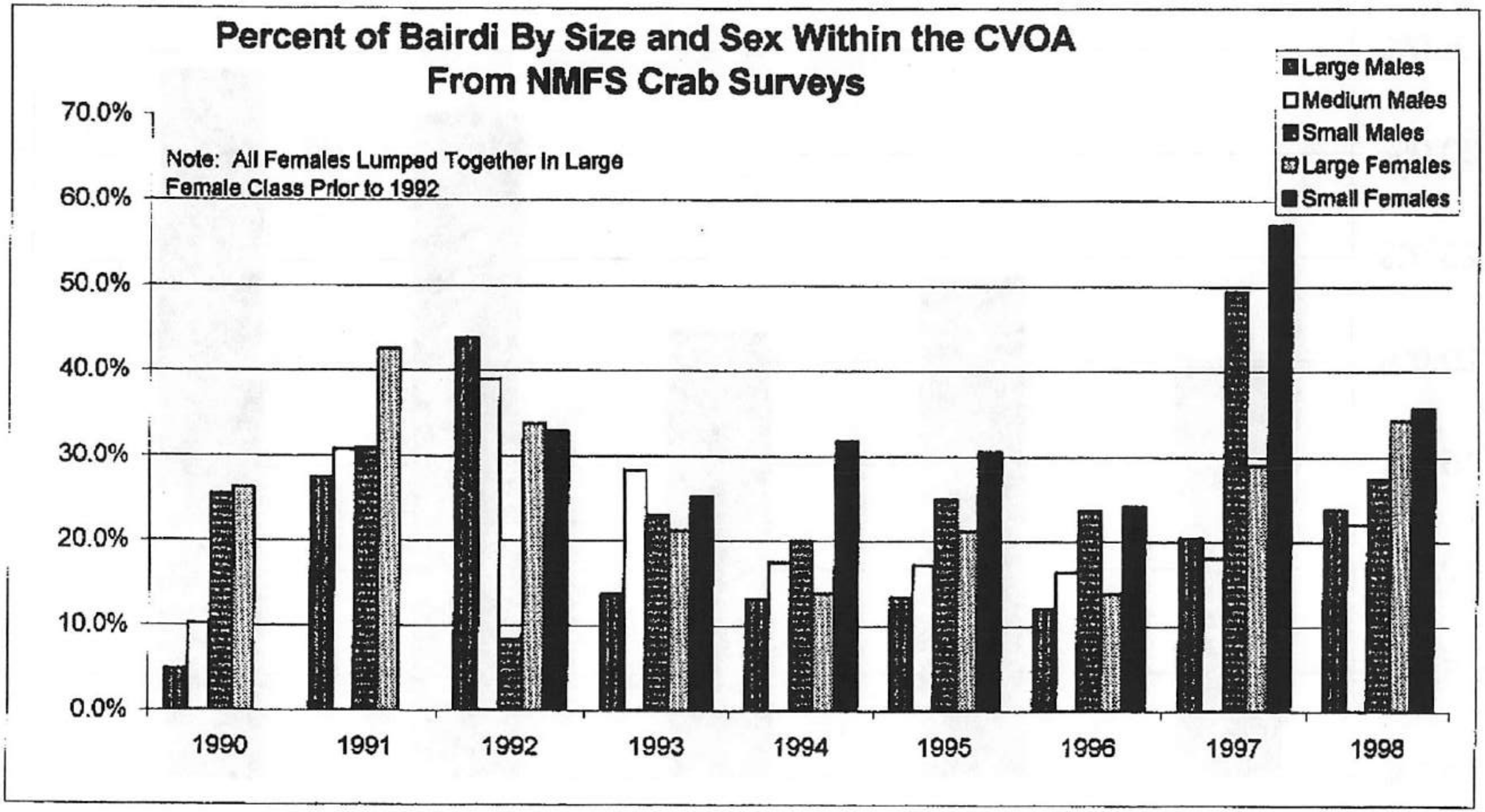
Johnsen, Wes. Yellowfin Trawl Damage. Alaska Fisherman's Journal. pp 32-35. November 1985.

McMurray, Gregory, David Armstrong and Steven Jewett. Distribution of Larval and Juvenile Red King Crab (Paralithodes Camtschatica) In Bristol Bay. Outer Continental Shelf Environmental Assessment Program. Anchorage, AK. 1984.

Stevens, B., R. Otto, J. Haaga, and R. MacIntosh. Report To Industry On The 1990 (through 1998) Eastern Bering Sea Crab Survey. National Marine Fisheries Service. 1990-1998.

Attachments: 4


Percent of Bairdi Caught in NMFS Crab Surveys, 1990-1998 Inside the CVOA
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Large Males
Medium Males
Small Males
Large Females
Small Females
Note: Minimum carapace sizes used are: Large Males>5.4"; Medium Males>4.3"; Large Females>3.3"


Percent of Bairdi By Size and Sex Within the CVOA
From NMFS Crab Surveys
Note: All Females Lumped Together In Large Female Class Prior to 1992
Large Males
Medium Males
Small Males
Large Females
Small Females
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
1990
1991
1992
1993
1994
1995
1996
1997
1998

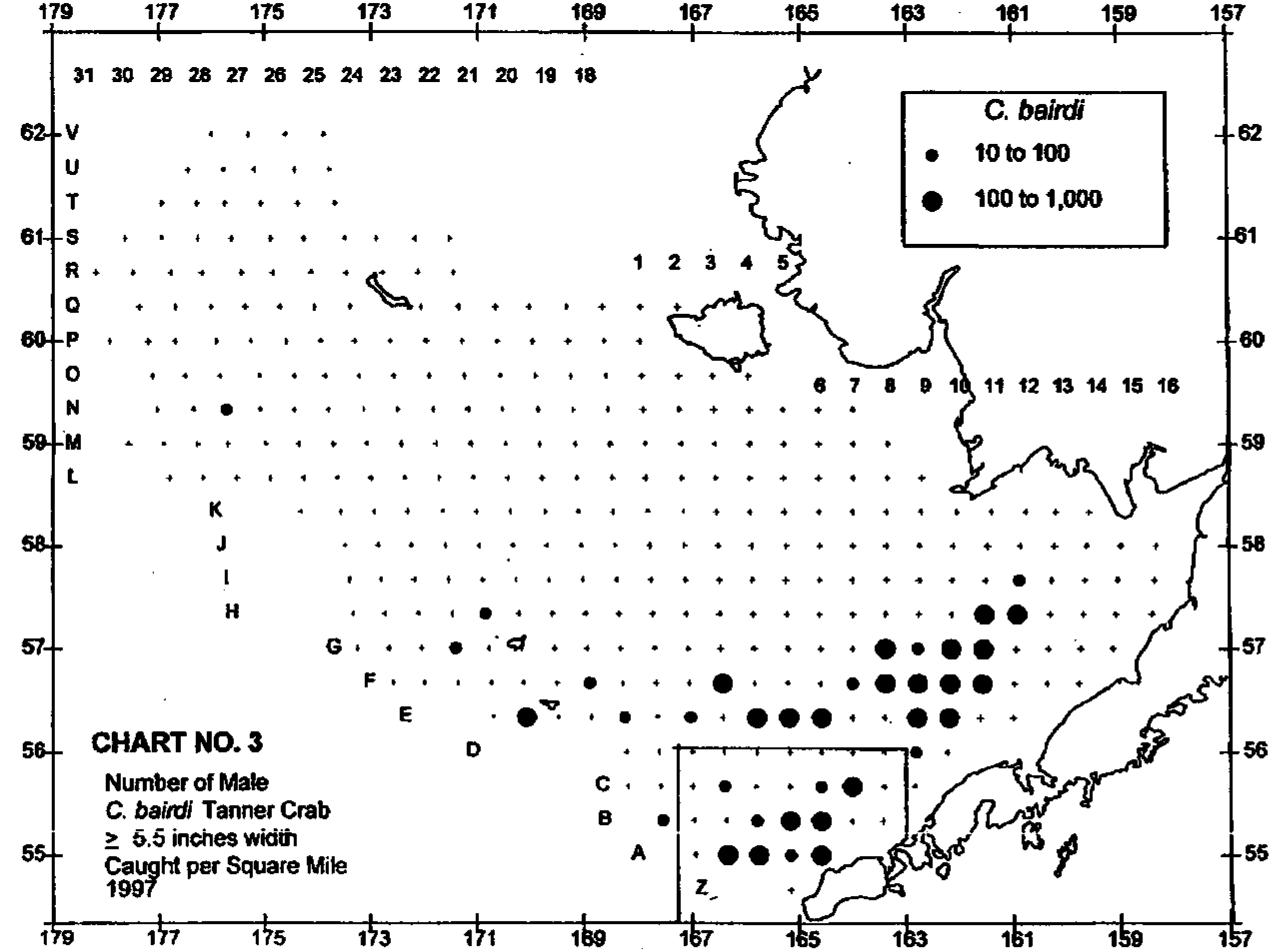
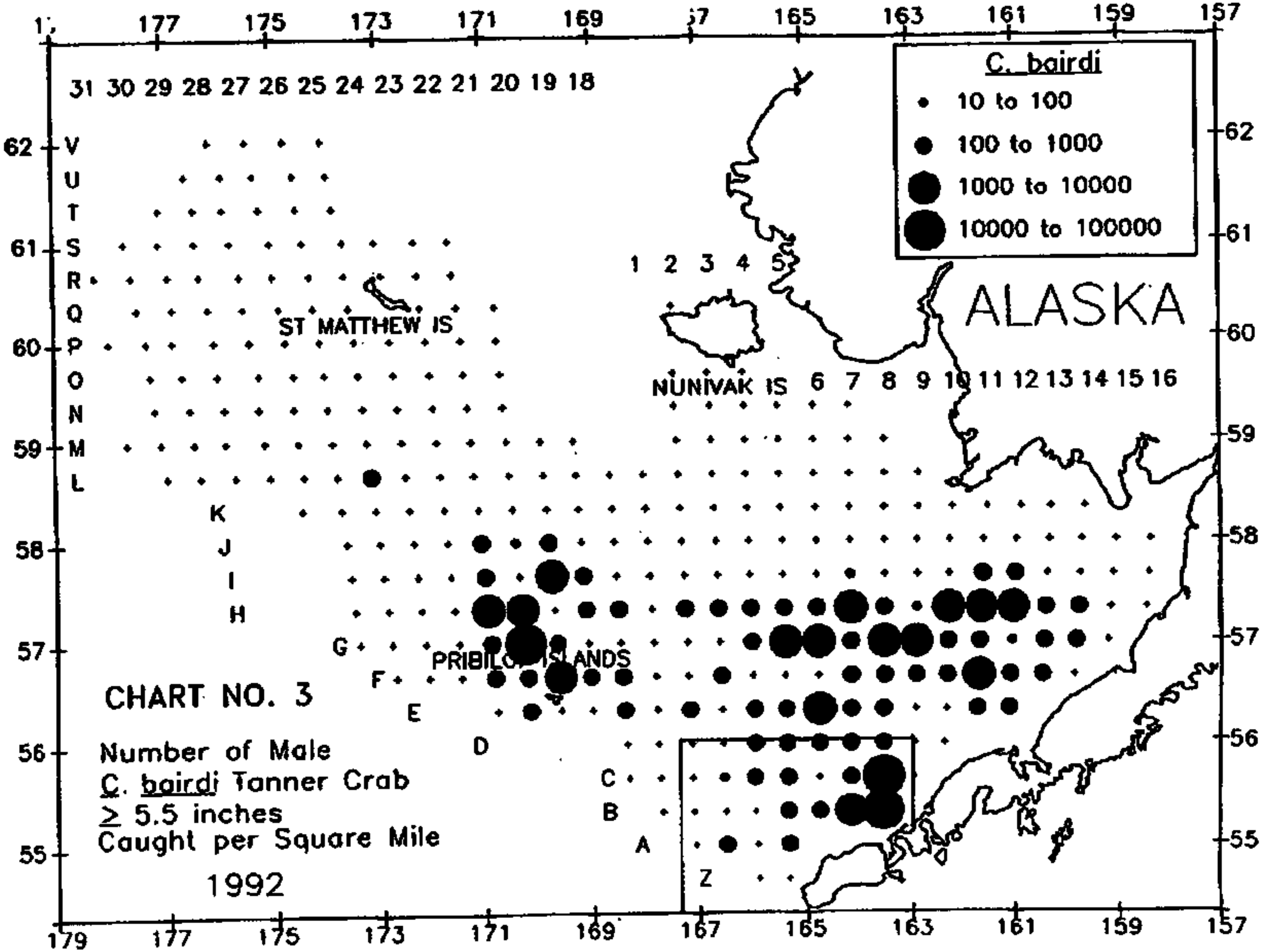


CHART NO. 3

Number of Male
C. bairdi Tanner Crab
≥ 5.5 inches width
Caught per Square Mile
1997


C. bairdi
10 to 100
100 to 1000
1000 to 10000
10000 to 100000
ALASKA
ST MATTHEW IS
NUNIVAK IS
PRIBILOF ISLANDS
CHART NO. 3
Number of Male
C. bairdi Tanner Crab
≥ 5.5 inches
Caught per Square Mile
1992

QAGAN TAYAGUNGIN TRIBE
P.O. Box 447
Sand Point, AK 99661

November 5, 1998

Mr. Rick Lauber, Chairman
North Pacific Fisheries Management Council
605 W. 4th Ave., Suite 306
Anchorage, AK 99501

Dear Mr. Lauber:

We are writing to you regarding the National Marine Fishery Service proposal to further institute management measures regarding the Steller Sea Lions.

The Qagan Tayagungin people (The Eastern People) have resided in the Shumagin Islands & Pavlof Islands for thousands of years. Our people have depended on these Islands and the sea for their subsistence and livelihood. Encroachment by people from other states and countries, starting with the Russians before Alaska was purchased by the United States, have continually attempted to drive us from our communities, by over harvesting our natural resources. Once again our way of life is being threatened by people and organizations from the federal government. They have not taken the time to talk to us about new regulations and laws that could have the potential to eliminate our entire way of life if they are passed and promulgated.

Let me tell you what has happened to our fisheries in the past 25 years.

Our coastline was rich with king crab, Tanner Crab, shrimp, salmon, halibut, and bottom fish. As long as the fleet from the local communities did the harvesting for these stocks, all was well. Once the large catcher vessels were allowed to participate, stock depletion became a process that virtually wiped out stocks of crab and shrimp.

Halibut IFQ's were instituted and the benefit was more for the out-of-state fisherman than the in-state fisherman. Very few IFQ's were available to commercial fisherman in our coastal communities. Most of them were so small that people sold them because costs were prohibitive to gear up. It won't be long before the bottom fishery will experience the same problems due to over fishing by the large out-of-state catcher vessels. Climate shift could have been an equally important factor. The Aleut people proposed regulatory changes that could have made a difference with our natural stocks. A past chairman of the North Pacific Fishery Management Council told us that unless a fish stock was in trouble they would not pass regulations that restricted that fishery from any vessels participating.

Why is it that the people who sit on state and federal boards, councils, and commissions cannot learn from past actions and attempt to keep history from repeating itself over and over? By placing federal laws and regulations that have a negative and everlasting affect on the indigenous people, "The Eastern Aleuts," there is no question that we will be an endangered specie. Our local trawl fishery of small vessels have zero contact with the Stellar Sea Lion during fishing operations.

The following suggestions are ways to deal with the endangered mammal "the Stellar Sea Lion" problem.

(1) We do not believe that the National Marine Fisheries conducts an accurate count of the Stellar Sea Lion population. Our belief is based on past experience when a 1997 count was conducted by the Alaska Department of Fish & Wildlife, regarding the number of caribou that were on the Alaska Peninsula between False Pass and Port Heiden. They counted approximately 1200 animals; as a result of the low number, a harvesting season could not be allowed. We told them that we had seen more than that in our travels throughout the area and suggested that they include some of the local hunters during their count. The Alaska Department of Fish & Wildlife was instructed by the Federal Subsistence Board to included local residents during their next caribou count. When it occurred the second time, the count was approximately 3800 animals. As a result of the increase in numbers, our communities were allowed to harvest caribou. Is it possible this is happening with the Stellar Sea Lions? What kind of a count system is conducted and what is the margin of error? Many of our commercial fishermen claim to have seen more Stellar Sea Lions in the area than they have seen in several years. Our recommendation to you would be to include residents from the local communities when doing the Stellar Sea Lion count.

(2) We have been told by National Marine Fishery Biologists that pollock is not a nutritional food source for the Stellar Sea Lion. They feed on other species of seafood. Surely this must have an impact on the decisions establishing trawl zones around Stellar Sea Lion habitat. We believe that Stellar Sea Lions are getting all the food they need. Stellar Sea Lions are food for the Orca in the Bering Sea and the Gulf of Alaska. Restricting our commercial fishing population could have a devastating affect on the Pacific and Bering Sea ecosystems.

Our recommendations are the following:

(a) Allow funds that Senator Stevens is appropriating to study the Bering Sea and the Gulf of Alaska ecosystems to include the Steller Sea Lion and Orca populations.

(b) Do not place "No Trawl Zones" around areas of Stellar Sea Lion haul outs until there is biological information that supports such measures.

(3) The fleet of harvesting vessels that participate in the pollock and cod fisheries off the coast of the Gulf of Alaska are very small compared to the large catcher vessels that also harvest these same stocks. Our catcher vessels are 58'-75' and carry approximately 50,000-175,000 pounds of product compared to the larger catcher vessels that carry 500,000-1,500,000 pounds of product. The fishing gear that is used by our fleet is very insignificant compared to the mid water and hard

on bottom trawls that are the size of a football field used by the larger vessels. Engine horsepower that powers our vessels range form 365 horsepower to 550 horsepower versus 1200 horsepower to over 5000 horsepower of the larger vessels. To us there is something wrong with this picture.

Our recommendations to you would be to consider the following actions:

(a) Establish a committee with representation from the local coastal communities, catcher vessels, NPFMC, & NMFS to consider and implement regulation that would address restricting vessel size, horsepower, and gear to allow for longer season and more fish in the ocean.

(b) Do not allow for a pollock season in June because the fish are very small during this time.

(c) Allow for trip limits, this would make the seasons longer and safer for the smaller vessels that participate in the fishery at this time.

Whatever this council decides to do, remember, you are responsible for the welfare of the coastal communities and the people that are going to be impacted by those decisions. If you act irresponsibly, our tribal government will put this council as well as other government agencies on notice. We will not tolerate decisions that place our coastal resources and people in life threatening situations. We will exercise all of our sovereign rights and powers as an indigenous, sovereign nation to be able to continue to live our subsistence way of life and to commercial fish successfully.

Sincerely,

David O. Osterback

David O. Osterback, President
Qagan Tagagungin Tribe

SOUTHWEST ALASKA MUNICIPAL CONFERENCE

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RESOLUTION 98-20

A RESOLUTION OF THE SOUTHWEST ALASKA MUNICIPAL CONFERENCE REQUESTING MITIGATION OF PROPOSED SEA LION PROTECTION MEASURES IN THE GULF OF ALASKA AND BERING SEA

WHEREAS, it is generally accepted that an ocean ecosystem "regime shift" in the Central and Western Gulf of Alaska and Bering Sea and Aleutian Islands areas occurred in the 1970's which dramatically affected the species composition of marine fish and shellfish; and

WHEREAS, the "regime shift" resulted in a decline in abundance of herring, capelin and other high-fat content fish, which are important prey for Steller sea lions; and

WHEREAS, these high-fat species were replaced by species with lower nutritional value, such as pollock; and

WHEREAS, from the 1970's through the present, there has been an abundance of pollock available to Steller sea lions, nevertheless the population of Steller sea lions in the Central and Western areas of the Gulf and in the Aleutian Islands has continued to decline; and

WHEREAS, the apparent decline in Steller sea lion populations that has occurred since the early 1970's has no demonstrable connection to the pollock fisheries of the Central and Western Gulf of Alaska and the Bering Sea and Aleutian Islands; and

WHEREAS, buffer zones around certain sea lion rookeries have been closed to vessel transit of any type (out to three miles) and trawling (out to ten miles) since 1993, and there is no evidence that such measures have had any effect on the Steller sea lion decline; and

WHEREAS, there is scientific evidence that reducing or moving pollock fishing efforts from areas where the fishery is currently conducted could have adverse effects on Steller sea lions by increasing the predation on juvenile pollock in critical habitat of Steller sea lions and increasing the bycatch of important non-pollock species such as herring and salmon; and

WHEREAS, the National Marine Fisheries Service is now proposing to close to trawling in 20-nautical-mile buffer zones around all rookeries and haul-outs where 200 sea lions were ever counted between the years 1960 and 1998, even though many of the proposed closures surround rookeries and haul-outs have not been used by 200 sea lions for many years; and

WHEREAS, the proposed additional haul-out and rookery closures preclude fishing in many of the major pollock fishing areas; and

WHEREAS, many of the rookeries used recently by 200 or more Steller sea lions are used only seasonally; and

WHEREAS, the scope of the proposed closures will significantly impact the pollock fisheries on which Cordova, Seward, Kodiak, Sand Point, King Cove, Dutch Harbor, and Akutan depend; and

WHEREAS, the National Marine Fisheries Service is now proposing a trimester pollock fishery regime which opens the second trimester in July that will result in increases in salmon bycatch in the Gulf of Alaska and herring and salmon bycatch in the Bering Sea; and

WHEREAS, requiring a trimester fishery for the Bering Sea increases substantially the cost of operations, including flying in processing workers three times a year instead of two; and

WHEREAS, a trimester starting in July in the Bering Sea could result in poorer product quality concerns and lower product recovery rates; and

WHEREAS, the affected communities do support reasonable Sea Lion Protection measures and the analysis of the current Sea Lion protective measures; and

WHEREAS, the industry, communities, and support sector businesses have provided funding to North Pacific Marine Science Foundation on Stellar Sea Lion research;

NOW, THEREFORE, BE IT RESOLVED BY SOUTHWEST ALASKA MUNICIPAL CONFERENCE (SWAMC) that SWAMC requests that the Alaska Municipal League, the Alaska Congressional Delegation, the Governor of Alaska and the Alaska Legislature urge the National Marine Fisheries Service to refrain from adopting any pollock fishery management measures other than those based on verified scientific research that demonstrates such measures are likely to benefit Steller sea lions, and are not likely to have an adverse affect on Steller sea lion recovery equal to or greater than their potential benefit to Steller sea lion recovery; and

NOW, THEREFORE, BE IT FURTHER RESOLVED BY SOUTHWEST ALASKA MUNICIPAL CONFERENCE that any measures adopted by the National Marine Fisheries Service concerning interaction between Steller sea lions and commercial fisheries should be designed to permit scientific verification over time whether such measures are beneficial to Steller sea lions; and

NOW, THEREFORE, BE IT FURTHER RESOLVED BY SOUTHWEST ALASKA MUNICIPAL CONFERENCE that any closures to commercial fishing be limited to rookeries and haul-outs that have contained 200 or more Sea Lions during the years 1990-1997.

NOW, THEREFORE, BE IT FURTHER RESOLVED BY SOUTHWEST ALASKA MUNICIPAL CONFERENCE that any closed rookery or haul-out areas be closed only during the time period when Steller Sea Lions are known to be present.

PASSED AND APPROVED BY THE SOUTHWEST ALASKA MUNICIPAL CONFERENCE THIS 6th DAY OF NOVEMBER, 1998.

Frank Kelty, President

Sarah Leonard

KODIAK CHAMBER OF COMMERCE

P.O. Box 1485, Kodiak, Alaska 99615 (907) 486-5557 FAX: (907) 486-7605

November 11, 1998

Rick Lauber
Chairman
North Pacific Fisheries Management Council
P.O. Box 103136
Anchorage, AK 99510

Dear Mr. Lauber,

Enclosed please find a resolution that was passed and approved by the Board of Directors of the Kodiak Chamber of Commerce at their meeting on November 09, 1998. This resolution outlines our opposition to the proposed Sea Lion protection measures proposed for the Gulf of Alaska. The Board of Directors firmly believes that before a plan of this magnitude is implemented, there must be credible science conducted upon which to base this closure. We firmly believe that the proposed closure of substantial fishing areas in the Gulf of Alaska has the potential to severely impact the economics of all coastal communities around the Gulf of Alaska, the Aleutian Islands and the Bering Sea.

It is generally accepted that an ocean ecosystem "regime shift" in the Central and Western Gulf of Alaska, the Bering Sea and the Aleutian Island occurred in the 1970's which dramatically affected the species composition of marine fish and shellfish. This "regime shift" resulted in a decline in abundance of herring, capelin and other high-fat content fish, which are important prey for Steller sea lions. These high-fat species were replaced by species with lower nutritional value such as pollock.

To the best of our knowledge, there has been no scientific analysis that has shown any relationship between the pollock fishery and the sea lion decline. Further, there has been no evidence shown that closure of the pollock fishery in the Gulf of Alaska will ensure that the sea lion population will rebound. From the early 1970's through the present, there has been an abundant supply of pollock available to Steller sea lions. Nevertheless, the population of Steller sea lions in the Central and Western areas of the Gulf and the Aleutian Islands has continued to decline.

The Board of Directors of the Kodiak Chamber of Commerce strongly urges the North Pacific Fisheries Management Council to demand an analysis of the effects of the current Steller sea lion protection measures be conducted before implementing additional protection measures. If upon completion of the analysis it becomes necessary to close additional fishing areas near rookeries, we would ask that those closures apply only to rookeries and haul-outs known to be utilized by 200 or more sea lions. Additionally, those closures should only be in effect when sea lions are actually present.

Your thoughtful attention and careful consideration of this request is sincerely appreciated.

Yours in economic prosperity,

Andrew T. Tierney
President

PC: Governor Tony Knowles
Chairman Rick Lauber
Senator Ted Stevens
Senator Frank Murkowski
Rep Don Young
Senator Jerry Mackie
Rep. Alan Austerman

KODIAK CHAMBER OF COMMERCE
RESOLUTION 98-11-01

A RESOLUTION
REQUESTING MITIGATION OF PROPOSED SEA LION PROTECTION MEASURES IN THE GULF OF ALASKA AND BERING SEA

WHEREAS, the Steller Sea Lions in the Central and Western Gulf of Alaska and Bering Sea and Aleutian Islands have declined steadily for at least the past 28 years; and

WHEREAS, the Protected Species Division of National Marine Fisheries Service in 1992 listed Steller Sea Lions as threatened species and implemented protective measures which closed three-mile buffer zones around rookeries to all vessels and ten-mile trawl zones around rookeries; and

WHEREAS, these measures failed to result in any change in the decline of Steller Sea Lions; and

WHEREAS, no scientific analysis has shown any relationship between the pollock fishery and the Sea Lion decline, and there is no evidence that any closure of the pollock fishery will ensure that the Sea Lion population will rebound; and

WHEREAS, the Protected Species Division has decided that access to pollock is the reason for the continued decline but has produced no analysis to substantiate this belief; and

WHEREAS, the rookeries showing the least decline in Steller Sea Lions are rookeries where both Atka Mackerel and pollock are available to the resident Steller Sea Lions; and

WHEREAS, Richard Merrick, in a peer reviewed and published paper "Diet Diversity of Steller Sea Lions (Eumetopias jubatus) and Their Population Decline In Alaska: A potential Relationship", suggests that Sea Lions require more than one fishery species be available to recover; and

WHEREAS, the Sea Lion decline in the Central/Western Gulf of Alaska arid Bering Sea/Aleutians began in the 1970s when a Regime Shift occurred which dramatically changed the species composition. This change included a dramatic increase in pollock in the Central/Western Gulf; and

WHEREAS, the Office of Protected Species is now proposing to close to trawling all rookeries and haul-outs where 200 Sea Lions were ever counted between the years 1960 and 1998, even though most of the proposed closures are rookeries and haul-outs which have not been used by 200 sea lions for many years; and

WHEREAS, the proposed additional haul-out and rookery closures preclude fishing in all the major pollock fishing areas; and

WHEREAS, a number of the rookeries and haul-outs currently used by more than 200 Steller Sea Lions are used only seasonally; and

WHEREAS, the scope of the proposed closures will virtually eliminate the pollock fisheries on which the economies of Cordova, Seward, Kodiak, Sand Point, King Cove, Dutch Harbor, and Akutan depend; and

WHEREAS, the proposed trimester pollock fishery regime which opens the second trimester in July will result in high Chinook and Chum Salmon bycatch in the Gulf of Alaska; and

WHEREAS, requiring a trimester fishery for the Bering Sea increases substantially the cost of operations, including flying in processing workers three times a year instead of two; and

WHEREAS, the affected communities do support reasonable Sea Lion protection measures and the analysis of the current sea lion protective measures;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE KODIAK CHAMBER OF COMMERCE that the Governor of the State of Alaska and the North Pacific Fishery Management Council are urged to request the National Marine Fisheries Service analyze the effects of the current Steller Sea Lion protection measures before implementing additional measures; and

BE IT FURTHER RESOLVED BY THE BOARD OF DIRECTORS OF THE KODIAK CHAMBER OF COMMERCE that any increase in closures be limited to rookeries and haul-outs that have contained 200 or more Sea Lions during the years 1990-1997; and

BE IT FURTHER RESOLVED BY THE BOARD OF DIRECTORS OF THE KODIAK CHAMBER OF COMMERCE that any closed rookery or haul-out areas be closed only during the time period when Steller Sea Lions are known to be present.

ADOPTED BY BOARD OF DIRECTORS OF THE KODIAK CHAMBER OF COMMERCE

THIS 9th DAY OF November, 1998

SIGNED

Andrew T. Tierney
President
Kodiak Chamber of Commerce

ATTEST:

Genedine D. Taan
Secretary to the Board
Kodiak Chamber of Commerce

CITY OF UNALASKA
P.O. BOX 610
UNALASKA, ALASKA 99685
(907) 581-1251
FAX (907) 581-1417

UNALASKA, ALASKA

November 6, 1998

RECEIVED
NOV - 6 1998
N.P.F.M.C

Mr. Richard Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Ave., Suite 306
Anchorage, Alaska 99501

RE: Agenda Item C-2: Steller Sea Lions

Dear Mr. Chairman and Member of the Council,

This is written on behalf of the Unalaska City Council and the community of Unalaska. We are very concerned about the proposed regulatory measures developed by the National Marine Fisheries Services addressing the steller sea lion issue that the North Pacific Fishery Management Council will be addressing at its meeting next week.

If these proposed measures are adopted, they will have devastating negative economic effects on the communities of Unalaska, Kodiak, Sand Point, King Cove, Akutan, Seward, and Cordova that depend on pollock and cod. The proposed expansion of the "no fishing" buffer zones will severely impact the pollock fisheries in these areas.

The "Reasonable and Prudent Alternatives" (RPA's) for the groundfish fisheries off Alaska have been drafted without incorporating any new relevant scientific information. This is not good science. During 1991-1993, NMFS implemented protective 10 and 20 nm trawl exclusion zones in many areas of the Gulf of Alaska and Bering Sea. To date, the NMFS has not assessed the effectiveness of these existing protective measures, and now proposes to add more regulatory measures. **Additional measures are being proposed despite an indication in the October 1998 MMPA Annual Report to Congress that states: "NMFS indicated that it was taking steps to reassess the effectiveness of existing protective measures. Given the current**

understanding of the sea lion/fishery prey interactions, additional research is warranted prior to establishing revised management actions" (P.87) The existing protective measures must be analyzed before consideration of additional measures that will have such devastating negative effects on Alaskan communities.

The proposed trimester pollock fishery, which opens a season in July, will also have negative effects on the fishery and communities. There will be increased by-catch of herring and salmon, and the short season would force shore-side plants to operate inefficiently by having to bring processing crews up three times per year instead of the current two. There would also be concerns about quality and lower product recovery rates during this time of year. These negative effects on communities should be addressed in light of the 1996 NRC et.al. report "The Bering Sea Ecosystem" concluding advice which was to find a BALANCE between the region's fishing communities and resources such as marine mammals. **Clearly, these proposed protective measures have not addressed a balance.**

It is evident that the effected communities support reasonable sea lion protection measures and analysis of those protective measures. For many years, the industry sector, communities, and business support sectors have provided funding to the North Pacific Marine Science Foundation for steller sea lion research. This research should also be analyzed before implementing further protective measures.

We request that the North Pacific Fishery Management Council urge the National Marine Fisheries Service to:

1) Refrain from additional regulation of the industry unless jeopardy is proven though a scientific research program;

2) if jeopardy is proven, reduce the scope of the proposed RPA's to only those rookeries and haulout areas which had resident steller sea lion populations of 200 or more within the last eight years;

3) adopt seasonal restrictions, rather than year-round restrictions, to reflect the fact that steller populations do not inhabit all rookeries or haulouts on a year-round basis; and

4) develop a research program designed specifically to determine the effectiveness of such RPA's and their effects on coastal communities.

In closing, I wish to thank the North Pacific Fishery Management Council for the opportunity to comment on these proposed regulatory measures. The City of Unalaska requests that the NPFMC always consider the BALANCE between the region's fishing communities and resources such as marine mammals when addressing regulatory measures.

Sincerely,
CITY OF UNALASKA

FRANK V. KELTY
Mayor

cc: Unalaska City Council
Governor Knowles
Alaska Congressional Delegation
Representative Carl Moses
Senator Lyman Hoffman

Alaska Marine Conservation Council
Box 101145, Anchorage Alaska 99510
(907) 277-5357 • (fax) 277-5975
amcc@akmarine.org • www.akmarine.org

November 12, 1998

Rick Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue
Anchorage, Alaska 99501

Re: The Decline of the Steller Sea Lions

Dear Chairman Lauber,

Steller sea lions have declined 50 to 80% in the last 30 years from the central Gulf of Alaska westward throughout the Aleutian Islands. Their decline has coincided with declines in fur seals, harbor seals, and some marine birds. Major changes in the oceanic realm of the North Pacific have occurred as climatic conditions have shifted in the last two to three decades. Coinciding with these changes has been the substantial and significant build-up in capacity and intensity of Alaska's groundfish fisheries. While many factors were likely involved in the initial decline of the sea lions, today, scientists believe that nutritional stress related to prey abundance and availability is likely the reason for the decline today. Changes in the prey base can be related to climatic shifts, commercial fishing, or both (Merrick, et al 1987, Trites and Larkin 1992, NRC 1996).

Commercial fish populations and the populations of marine life associated with them in intricate food webs of the ocean fluctuate through time in response to many environmental factors. Changes in the ocean environment induced by changing climatic conditions are significant. Different influences occur from either atmospheric high-pressure states or atmospheric low-pressure states (Springer, 1998). A question remains as to whether or not commercial fisheries could affect important prey for marine mammals such as the Steller sea lions. Fisheries alone may not be sole factor influencing availability of prey for sea lions. Absent in much of the discussion of sea lion decline is the level of synergistic influence from these elements. Synergism is defined as " the joint action of agents…that when taken together increase each other's effectiveness." A question that has been asked is, "is the decline in Steller sea lions due to a regime shift *or* commercial fishing? A better question might be, "are the sea lions declining due to a regime shift *and* commercial fishing? The synergistic effects of commercial fisheries and naturally induced changes in the marine ecosystem are poorly understood. Commercial fisheries are what we as humans have direct and immediate control.

The Alaska Marine Conservation Council (AMCC) has testified before the NPFMC to restructure the pollock fisheries to mitigate fisheries' impacts to both the pollock stock and to the ecosystem. In a single species context, we have questioned the prudence of extracting huge amounts of pollock biomass in concentrated areas and time, and during spawning season. Prior to 1980, there was virtually no exploitation on spawning aggregations of pollock. Today, the pollock stocks of the Bering Sea are systematically disappearing, and intense fishing pressures continue. Associations between the eastern Bering Sea "stock", the western Bering Sea "stock", the Aleutian Basin "stock", the Aleutian Islands "stock", and the northern Bering Sea "stock" are poorly understood. But in the 1990's, a number of these stocks are in significant decline or have disappeared. What *are* the real effects of our fishing behavior in the context of the ecosystem?

Bellwether for an ecosystem in trouble? Canary in the coal mine?

Steller sea lions are major predators in the North Pacific. They have existed on Earth for about three million years. Geologically speaking, the last two million years is called the "Quaternary Period". During the Quaternary, major climatic fluctuations have occurred. There have been significant glacial periods, and very significant inter-glacial periods, induced by global climatic changes. Cooling global temperatures were capable of growing huge ice sheets and glaciers that carved through mountains and across continents. Lowered sea levels exposed large landmasses. Warmer periods contracted the ice sheets and raised sea level. There were many glacial and inter-glacial periods in the last two million years of the Earth's history (Flint, 1971). Today we see just vestiges of many glaciers, and greatly reduced ice sheets. Yet the sea lions have endured these extreme climatic shifts through time. Today, drastic declines in their population draw them closer to the brink of extinction in the North Pacific. Yes, in our lifetimes we see evidence of climatic change. No doubt such changes have occurred in the last several decades as they have in the distant past. What is different today?

Never before have human activities in the ocean environment developed and grown to such proportions such as industrialized fishing has today. All animal populations on earth go through cyclic fluctuations in a complex dance of predator-prey relationships and environmental change. While extinction of various populations has occurred in the past, a relevant question exists today, "is human activity accelerating the rates of extinction?" The fact that we have an Endangered Species Act (ESA) reflects the depth of discussion and concern about this question. Now in the North Pacific, it compels us to evaluate our fishing practices, and ensure they are in accordance with the law. Climatic or environmental changes have played a role, but it is our imperative to look at our own behavior in fisheries to ensure we mitigate any effects from them that may harm or impede the recovery of the sea lion. Although there are numerous facets to the story of pollock and sea lions that fishery managers should consider:

- Changes in food web components have likely occurred many times throughout the history of sea lions and other marine mammals and birds. Oily fish such as capelin, herring, and sandlance do not dominate the food base today. A less oily fish such as pollock is in relative high abundance today compared to the former. The fact remains, however, pollock is a major component of what is available now to numerous predators.

- Pollock in the North Pacific is an important forage food for at least 11 other marine mammal species, 13 species of seabirds, and 10 species of fish (Frost and Lowry, 1986). Pollock may be especially important in the sea lion's diet in winter due to the seasonal availability during its spawning time. "...it seems likely that the removals of large quantities of groundfish, particularly pollock, have had some impact on local availability of food for sea lions especially in winter months. The effects of these removals would presumably be more severe on juveniles than adults and on females rather than males" (Trites and Larkin, 1992). Roe-bearing pollock likely have a higher nutritional value that non-roe bearing pollock, are highly aggregated, and may provide important food to pregnant and lactating females during winter when metabolic demands are at their highest.

- The absolute abundance of pollock in the North Pacific is not known; even today our most reliable survey data goes back only to the 1970's. Fishery surveys and reports prior to the 1970's were very scant, and in no way could they compare to the level assessment we conduct today. Even today, many questions and much uncertainty surround the absolute accuracy in fishery stocks. How can we possibly compare the numbers between today and over thirty years ago?

- Despite few observations, it is unlikely that pollock suddenly appeared on Earth, in the North Pacific in the 1960's. In fact, the few accounts we do have, such as fur seal data from the 1800's and Japanese information from the 1930's, the presence of pollock has been noted. In a report on the fisheries of the Pacific coast of the United States in *1892*, it was stated:

  "The fishing grounds [in Alaska] are believed capable of furnishing an unlimited amount of cod." Also, "According to Bean (a Fish Commission ichthyologist) the *Alaska pollock* is one of the best baits known for cod." (Collins, 1892)

- There is much discussion today regarding the nutritional value of pollock, with the suggestion that sea lions are suffering from malnutrition since oily fish such as herring, sandlance, and capelin are no longer as abundant as they were prior to the 1970's. The reason for the decline in oily fish is correlated with a significant "regime shift". Yet, was it *only* an environmental regime shift inducing changes in these fish populations? According to Springer (1992), there were links of overfishing to other primary Steller sea lions forage:

> "Rockfish (*Sebastes* spp.) historically were common in diets of sea lions in the Aleutian Islands (Thorsteinson and Lensink, 1958). Stocks of the most abundant of these species, Pacific ocean perch (*S. alutus*), collapsed during the 1960s in the eastern Bering Sea and Aleutian Islands because of *overfishing* (emphasis added) (Ito, 1989) just before sea lions began to decline. Reduced stocks of rock fish might have been responsible for the declines, or might have contributed to an overall reduction in prey. Likewise, by the early 1970s commercial fishing had reduced herring (*Clupea harengus*) in the eastern Bering Sea to only 10-15% of its biomass ten years earlier (Wespestad and Fried, 1983), and this, too, might have been a factor in the decline of sea lions."

- Pollock numbers may have increased in the mid-1980's relative to the 1970's, but our knowledge of population levels in the 1960's and before is extremely limited. As stated earlier, we know that large-scale fisheries on pollock increased exponentially during the 70's and 80's, and that overfishing took its toll on stock components around the Bering Sea which have diminished or disappeared in a relatively brief period of the last ten years.

Today, the composition of species of the North Pacific may well be the result of regime shifts *and* disruption by commercial fisheries. We must remember that the way we conduct our fisheries interacts with whatever natural changes are occurring. As we look to the Steller sea lion moving towards the brink of extinction, we must ensure our behavior does not carry them over the brink---

We have an imperative to manage our fisheries as if the ecosystem matters; yet we often fall short of definitive action, wringing our hands in a lack of understanding for what an ecosystem approach really means. In the face of the many uncertainties surrounding sea lion-fishery interactions, the best choice we can make is to err on the side of conservation. With the level and intensity of the pollock fisheries unprecedented in time, now coinciding with a significant decline in a major predator such as the Steller sea lion, a clarion call to *pull back* rings through the ecosystem. We must act in the face of uncertainty, and recognize that our tools of measure currently employed may not be capable of giving us the answers we seek. In this case, the Steller sea lion may well be the canary in the coal mine.

We are concerned about the consequences new management measures may have on our communities, but what is good for the sea lion may well be good for the long-term health of the fishery. We need solutions that allow for a viable fishery and Steller sea lion recovery.

Sincerely,

Francine Bennis
Project Coordinator

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ECOSYSTEM OVERFISHING:
Background on Steller Sea Lions and the Pollock Fishery

November 1998

Steller Sea Lion Decline

In 1997 the northwestern population of Steller sea lions (from Cape Suckling in the Gulf of Alaska west through the Aleutian Islands) was listed as *endangered* under the federal Endangered Species Act (ESA). The species has declined by over 80 percent during the last 30 years. Prior to the decline. Alaska was home to 75% of the world's population. The number of haulouts and rookeries with more than 200 animals has dropped by 50% since 1960. After rookeries are vacated. the population is fragmented and the likelihood of extinction increases. Unless this decline is arrested, scientists say the population may be extinct in 65-100 years. Surveys last summer showed a continued decline in the Gulf of Alaska and Bering Sea. Alaska's Regional Director for the National Marine Fisheries Service summarized the predominant view of scientists: "The leading hypothesis for the decline is lack of food availability."

Impact of Industrialized Fisheries

Pollock and Atka mackerel trawl fisheries are concentrated within areas designated as *critical habitat* for Steller sea lions by marine mammal biologists at the National Marine Fisheries Service (NMFS). See map. Research shows that these two fish are important prey for Steller sea lions. Scientists also determined that sea lions are most vulnerable to food stress during fall and winter months when prey is most scarce. Fishing pressure, which reduces prey availability in this sensitive time of the year, is likely to impede the Steller sea lions' ability to recover from precipitous decline.

This year NMFS adopted management measures to reduce the impact of the Atka mackerel fishery on the ability of Steller sea lions to feed successfully in the winter months. Now NMFS is considering ways to restructure the pollock fishery to better accommodate sea lion foraging needs for these reasons:

- The pollock fishery is largely concentrated within Steller sea lion critical habitat. During 1992-1997, 50-70% of the Bering Sea fishery took place within critical habitat. Fifty to 90% was taken from critical habitat in the Gulf of Alaska.
- The "A" season for pollock, which occurs in January and February, targets roe-bearing females that school into large aggregations where Steller sea lions feed. Roe-bearing pollock are highly nutritious and especially important to female sea lions who are pregnant or still nursing pups.

(over)

- Pollock itself has declined by 50 percent of its peak in the mid-1980s in the Bering Sea. Some regional stocks of the Bering Sea pollock population have virtually disappeared due to past overfishing in international waters (Donut Hole), the Bogoslof Island area and westward along the Aleutian Islands. That means fishing effort has focused on a much smaller area near sea lions. Yet the allowable catch for pollock has remained virtually the same – over one million metric tons (2 billion pounds) per year.

- The no-trawl zones established in 1991 around all rookeries give no protection to winter haulouts and the extent of important foraging areas.

Endangered Species Act (ESA)

The ESA requires that NMFS determine whether or not the pollock fishery is jeopardizing the continued existence of the Steller sea lion or if it adversely affects the marine mammals' critical habitat. Once the agency makes that finding, they are required to develop "reasonable and prudent alternatives" to how the fishery may operate while mitigating impacts on the endangered species. NMFS must make these decisions on a biological basis. The law does not require scientific proof of direct links between the fisheries and Steller sea lion decline. Rather, the agency must err on the side of caution and take action if there is strong evidence of a link.

AMCC's Perspective

- The decline of Steller sea lions is a warning sign that fisheries management needs to be restructured to be more compatible with the whole ecosystem. Although natural fluctuations and global influences (such as El Nino and climate change) affect the ecosystem, fisheries management is one factor over which we have direct and immediate control. Science may never answer our questions to everyone's satisfaction but we must take action for conservation in the face of uncertainty. We must err on the side of caution to prevent the extinction of Steller sea lions.

- NMFS should spread the pollock fishery out in area and extend fishing effort over a longer time period to reduce fishing pressure inside Steller sea lion critical habitat during the winter months.

- The only way to have a truly "sustainable" fishery is to have a healthy ecosystem. Measures, that spread out the fishery and reduce the impact of the fishery on spawning pollock aggregations will benefit sea lions *and* provide greater assurance of long-term health of the fishery.

- Senate Bill 1221 recently passed by Congress addresses allocation of pollock between factory trawlers and shoreside catcher vessels. The bill does not prescribe how the fishery must operate to meet conservation needs. Without making those management decisions governing *how* the pollock fishery may be conducted, conservation for Steller sea lion recovery will not be served.

FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL
North Pacific Fishery Management Council

Please check applicable box(es):

- ☐ Bycatch Reduction
- ☒ BSAI Groundfish FMP
- ☐ GOA Groundfish FMP
- ☐ BSAI Crab FMP
- ☐ Scallop FMP
- ☐ Habitat Areas of Particular Concern (HAPC)

Date: August 13, 1998

Name of Proposer: Alaska Marine Conservation Council
Address: Box 101145, Anchorage, Alaska 99510
Telephone: 907-277-5357

Brief Statement of Proposal:

To address ecosystem and fishery-specific concerns stemming from removals in the "A" season of the Eastern Bering Sea (EBS) pollock fishery, this proposal calls for the analysis of options to restructure the Eastern Bering Sea pollock fishery to reduce fishing pressure during "A", or roe-bearing pollock season:

- **Reduce the pollock harvest in the "A" season to no more than 10, 20, 22.5, or 30% of the total quota.**

  Sub-option: Reduce the annual harvest rate during "A" season. The annual harvest rate has averaged between 17 and 23% in the last 8 years. In 1998 it is roughly 20% (quota/exploitable biomass). This sub-option would lower this rate during the "A" season to 10%. For example, the harvest quota in 1998 is 1.19 mmt of an estimated 6.1 mmt exploitable biomass. The "A" season is allocated 45% of the annual quota or 535,5000 metric tons in 1998. In this sub-option, reducing the harvest rate to 10% during the "A" season translates to a reduction in "A" season harvest from 535,500 mt to 274,000 mt ((.10 x 6.1 mmt) x .45 = 274,500 mt). The "B" season harvest would remain unchanged from the annual harvest rate.

- **Break up the "A" season in time: redistribute the fishery through temporal closures to allow for greater prey availability for marine mammals. Options include: 1) open the fishery for one week, then close for one week; 2) 10 days on/10 days off; 3) 14 days on/14 days off.**

- **Reduce the levels of pollock catches in designated sea lion winter foraging grounds. Without closing out entire 60 nm radius determined to encompass winter forage grounds, we suggest that there be a maximum tonnage of pollock allowed to be extracted from these waters. The suggested maximum for the "A" season pollock harvest in critical sea lion habitat is the percentage of total of the pollock harvest removed in 1977: 10% or roughly 100,000 mt of pollock. The remainder of the quota could still be taken from outside of sea lion winter foraging range.**

Objectives of Proposal (What is the problem?):

The Eastern Bering Sea pollock population is roughly half of what it was in the mid-1980's. During this peak recorded in recent history, the mid-1980's' high of EBS pollock coincided with abundant levels of those stocks designated as the Aleutian Basin stock, the Bogoslof area stock, and the Western Bering Sea. The precise association between these "stocks" is not well understood today. However, it is not prudent to conduct an intensive fishery concentrated on a spawning aggregation of fish whose population is in a decline and whose adjacent stocks and/or populations are in decline or have disappeared (i.e. Bogoslof, Aleutian Basin, and Western Bering Sea Sea).

A precautionary measure for the EBS pollock fishery is to restrict or minimize the level of intense fishing on spawning aggregations. An extensive analysis of spawner-recruit relationships concludes that the size of spawning populations influences the number of recruits produced. Most often, high spawner abundance contributes to high recruitment, and low spawner abundance is most often associated with low recruitment. (Myers and Barrowman, 1996). "The failure to recognize the need to conserve spawning biomass is a principal reason for the disastrous collapse of the formerly great cod fisheries in Eastern Canada" (Hutchings and Myers, 1994; Myers et al. 1996,1997). The words may ring ominous for a fellow gadid, pollock, as we continue to apply intense fishing pressure on its spawning biomass as the population numbers continue their decline in the 1990's.

Pollock has been found to be a major prey item of the endangered Steller sea lion, and it is also preyed upon by at least 10 other species of marine mammals, 13 species of seabirds, and 10 species of fish (Frost and Lowry 1986). The western population of Steller sea lion may be an important barometer of ecosystem change. At the present time, pollock *are* an integral part of a complex food web of the North Pacific. Nutritional stress from lack of available prey is considered a major factor in sea lion decline. Undoubtedly there are significant environmental influences playing some role in the decline of sea lions and harbor seals, along with several marine birds and fishes. We must look to ourselves to insure that human activities do not impede the recovery of various marine populations. This proposal is one way to include ecosystem considerations into the design of a fishery.

Groundfish fisheries of the North Pacific have undergone unprecedented growth in capacity and technological efficiency in the last thirty years. The Bering Sea pollock fishery has developed into the world's biggest single species fishery. Prior to 1980, very little of this fishery occurred during winter months. In the last ten years, this fishery has intensified its harvest in area and time to coincide with critical foraging habitat of sea lions during winter months when metabolic demands are at an all-time high and the proximity and access to a roe-bearing (high nutrition) prey is crucial. In the Gulf of Alaska, NMFS' recognition that pollock is important forage for sea lions in the fall and early winter resulted first in a seasonal distribution of the fishery quota, and then recently resulted in an adjustment in the percentage of the seasonal allocation.

The Catcher Vessel Operating Area (CVOA) of the Bering Sea overlaps and is juxtaposed to a large area designated as critical habitat for Steller sea lions. While it is unknown what the harvest rate during pollock A season in the CVOA is, recent analysis indicates that localized harvest rates here during the B season may be as high as 46%, and the rate of decline in area pollock may be as high as 81% in the last three years (Fritz, NPFMC, 1998). This measured level of decline in pollock abundance during the "B" season is reason for concern. It also suggests that we should look more closely at the rate of pollock removals in the concentrated area and time of the "A" season, especially as it overlaps in area and time of foraging of Steller sea lions in winter months.

Rather than debate the reasons for the initial decline of sea lions, let us look to what is contributing to or exacerbating the sustained decline and impeding recovery of the population. If prey availability is acknowledged as important to the recovery of the western population of Steller sea lion, then we must be certain that we do what we can to minimize human influence on this availability. The absolute number of prey is important in a predator's foraging success, but it is not the only factor to be considered. "The availability of pollock to these consumers depends on the size structure of pollock populations, *their areal and temporal distributions, and the area and temporal distribution of the consumers.*" (NMFS, 1998).

Need and Justification for Council Action (Why can't the problem be resolved through other channels?):

The Council is responsible for the management of the pollock fishery. Voluntary reductions in the quota or in fishing time and area are unlikely. The Council and NMFS have a responsibility to take into account the protection of marine ecosystems when establishing yields from a fishery (definition of OY) and to ensure that no federal actions impede the recovery of an endangered species.

Foreseeable Impacts of Proposal (Who wins, who loses?):

The marine ecosystem and Alaskan coastal people who rely upon it for their cultural, economic, and spiritual sustenance will benefit. The heavily overcapitalized pollock fleet that relies on a roe product will have to adjust to a more sustainable approach in fishery exploitation.

Are there Alternative Solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

This proposal seeks to minimize impacts of an intensive fishery on roe-bearing pollock during critical foraging periods of the endangered Steller sea lion. There are many alternatives that are more constraining to the pollock fishery. However, this proposal offers a range of alternatives that would allow the fishery to continue with a foundation of an ecosystem approach in harvest strategies.

Supportive Data & Other Information (What data are available and where can they be found?):

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Fritz, L. 1998. NMFS, Projections of Pollock Catches and Estimations of B-Season Harvest Rates Inside and Outside of the Catcher Vessel Operating Area (CVOA) along with Trends in Pollock Catches in Steller Sea Lion Critical Habitat in the Bering Sea/Aleutian Islands Region (Inshore/Offshore3 document)

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Magnuson-Stevens Fishery Conservation and Management Act, 1996

Myers, R.A., and Barrowman, N.J. 1996. Is fish recruitment related to spawner abundance? Fishery Bulletin, 94:707-724.

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North Pacific Fishery Management Council, November, 1996. Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions.

Signature:

Gary Stevens

Land Use, Resources & Economic Development __5__

Introduced by: AML Board and Alaska Conference of Mayors

Date: November 7, 1998

A RESOLUTION OF THE ALASKA MUNICIPAL LEAGUE

RESOLUTION 99-

A RESOLUTION REQUESTING MITIGATION OF PROPOSED STELLER SEA LION PROTECTION MEASURES IN THE GULF OF ALASKA AND BERING SEA

WHEREAS, the National Marine Fisheries Service ("NMFS") is currently in the process of rendering a Biological Opinion pursuant to the Endangered Species Act to determine whether the Gulf of Alaska and Bering Sea groundfish fisheries are jeopardizing the continued existence of endangered Steller sea lions through their fishing practices; and

WHEREAS, NMFS officials recently issued a paper outlining proposed regulatory actions termed Reasonable and Prudent Alternatives ("RPAs") to mitigate any jeopardy to the Steller sea lion population caused by the fishing industry, including greatly expanding the number of "no fishing" buffer areas in the Gulf and Bering Sea fisheries; and

WHEREAS, the proposed buffer areas include all rookeries and haulout areas since the early 1960s where 200 or more Steller sea lions have been observed, even though many such areas have had no significant resident Steller sea lion population in decades; and

WHEREAS, the proposed RPAs would cripple the Alaska groundfish industry, adversely impact Alaskan small boat fishermen, dramatically reduce the amount of fish available to Alaskan shorebased processors, and adversely affect fishery-dependent coast communities; and

WHEREAS, the best available scientific information does not support a determination that the fishing industry presents jeopardy to the Steller sea lion population; and

WHEREAS, the NMFS has decided that access to pollock is the reason for the continued decline but has produced no analysis to substantiate this belief; and

WHEREAS, the rookeries showing the least decline in Steller sea lions are rookeries where both Atka Mackerel and pollock are available to the resident Steller sea lions, and Richard Merrick, in a peer reviewed and published paper "Diet Diversity of Steller Sea Lions (*Eumetopias jubatus*) and Their Population Decline in Alaska: A Potential Relationship", suggests that sea lions require more than one species available to recover; and

WHEREAS, NMFS scientists have acknowledged publicly and in writing that the agency does not know what is causing the decline in Stellar sea lion populations, yet is determined to pursue regulation of the Alaskan fishing industry in spite of this fact; and

WHEREAS, NMFS has not undertaken any concerted research activities to prove or disprove whether the RPAs in the Gulf of Alaska, which have been in existence since 1992, have effectively addressed the decline in the resident Steller sea lion populations; and

WHEREAS, the scope of the proposed closures will virtually eliminate the pollock fisheries on which Cordova, Seward, Kodiak, Sand Point, King Cove, Dutch Harbor and Akutan depend and affect the State in the loss of employment and general fund raw fish tax;

NOW, THEREFORE, BE IT RESOLVED that the Alaska Municipal League calls upon the Alaska Congressional Delegation, the Governor of the State of Alaska, the Alaska State Legislature, and the Secretary of Commerce to urge the National Marine Fisheries Service to (1) refrain from any additional regulation of the industry unless jeopardy is proven thorough a scientific research program; (2) if jeopardy is proven, reduce the scope of the proposed RPAs to only those rookeries and haulout areas which had resident Steller sea lion populations of 200 or more animals within the last eight years; (3) adopt seasonal restrictions, rather than year-round restrictions, to reflect the fact that the Steller sea lion populations do not inhabit all rookeries or haulouts on a year-round basis; and (4) develop a research program designed specifically to determine the effectiveness of such RPAs.

Approved by full quorum of Alaska Municipal League members on 11/18/98 in Fairbanks, Alaska

CHAPTERS 5 AND 6

EXCERPTED FROM

BSAI/GOA AMENDMENTS 51
INSHORE/OFFSHORE 3 EA/RIR/IRFA

Dated August 26, 1998

5.0 CATCHER VESSEL OPERATIONAL AREA

This chapter describes the location and composition of pollock harvests in relation to the Catcher Vessel Operational Area (CVOA), and how they may change under the alternatives and options being considered in I/O3. Projected impacts are considered on the catcher/processor fleet, motherships, and catcher vessels. Though pollock fisheries are described in and around special Steller sea lion areas, the impacts on Steller sea lions are described in the environmental assessment in Chapter 6.

5.1. Pollock Catch Distribution and Composition for 1991-1996

This section provides information on pollock harvests and fishing effort inside and outside the CVOA during the A and B seasons of 1991, 1994, and 1996. The composition of the catch is described in terms of pollock length and mean individual weight. Harvest rates are compared for the three above years with the 1997 B-season fishery.

5.1.1 Data Sources and Methods

Observer data were used to summarize pollock fishery catch distribution, CPUE, and pollock size distribution by fishery sector inside and outside the CVOA in the A and B seasons of 1991, 1994, and 1996. Only data collected on the Eastern Bering Sea (EBS) shelf were considered; data from the Aleutian Islands (areas 540-543) and the Bogoslof districts (area 518) were excluded. A target species was assigned to each haul that was sampled by observers for species composition based on the groundfish species or species group that comprised the largest fraction of all of the groundfish caught in the haul. Only data from pollock target fisheries were included in this analysis. The fishery sectors considered were catcher processors (observer mode 1), catcher boats for shoreside processing plants (observer mode 3), and motherships (observer mode 2). A haul assigned a mode of 1 was done by a catcher-processor that both caught and processed the catch from that haul; this group consists solely of offshore vessels. The catch from a haul assigned a mode of 3 was delivered to a shoreside plant for processing, and as such, can be assigned entirely to the inshore group. The mothership sector in the observer summaries provided is a mixture of both offshore and inshore data. All data contained in the following summaries are representative of each sector's performance based on observer sampling.

Observer data were summarized for each season, A and B, based on the opening and closing dates of the entire pollock fishery in 1991 and each sector in 1994 and 1996 in Table 5.1:

Table 5.1 Opening and Closing Dates for Pollock Fisheries in 1991, 1994 and 1996

	A-Season		B-Season	
Year	***Offshore***	***Inshore***	***Offshore***	***Inshore***
1991	January 1 - February 22		June 1 - September 4	
1994	Jan 20 - Feb 18	Jan 20 - Mar 2	Aug 15 - Sep 24	Aug 15 - Oct 4
1996	Jan 26 - Feb 26	Jan 20 - Mar 2	Sep 1 - Oct 17	Sep 1 - Oct 17

Source: NMFS Alaska Region Bulletin Board (NMFS F/AKR home page on the Internet).

"True" mothership opening and closing dates were set equivalent to the inshore sector's dates. Catch-per-unit-effort was defined as the total pollock catch (metric tons=mt) divided by the total hours trawled summed over all sampled hauls in each sector-season cell. Similarly, mean individual pollock weight (in kg) was calculated as the total pollock catch weight divided by the total estimated number of pollock caught in all sampled hauls in each sector-season cell. Pelagic and bottom trawls were considered separately and only pelagic trawl data are reported for CPUE, mean weight, and length-frequency. However, data on catch distribution (charts and percent inside and outside of the CVOA) include both bottom and pelagic trawl-caught pollock. Charts of pollock fishery trawl locations include the Bogoslof area for 1991, but these data were not included in CPUE or mean pollock weight calculations nor pollock length-frequency summaries.

Pollock population-at-length estimates inside and outside of the CVOA were available from bottom trawl and hydroacoustic-midwater trawl surveys conducted in 1991, 1994, and 1996. These surveys were conducted in summer. Population-at-length estimates by region in the eastern Bering Sea are not available for any other season.

Important Note: The CVOA used in these analyses is 163° W to 168°W south of 56°N and north of the Alaskan peninsula and Aleutian Islands, as originally defined in the 1992 BS/AI FMP Amendment 18. CVOA was reduced in 1995 by moving the western boundary eastward by ½° longitude to 167°30'W. Consequently, the size of the CVOA used to characterize its impact on the 1996 fishery is slightly larger than that actually enforced that year. As shown in Figures 5.2 and 5.6 the deleted area was not used extensively during the A- or B-seasons of 1996 by any fishery sector.

5.1.2 A-Season Fisheries

In 1991 and 1994, 96-100% of the observed EBS shelf A-season pollock was caught within the CVOA by each sector (Figures 5.1 and 5.2). The CVOA percentage dropped to 46-75% in 1996, as all sectors utilized areas north and west of the CVOA along the 100 m contour. Ice could have constrained the fishery more in 1991 and 1994 than in 1996, since the extent of the ice edge was over 2° latitude (120 nautical miles) further south in mid-March of 1991 and 1994 than in 1996.

Latitude of Southern Extent of Ice Edge Along Meridian:

Year	*165°W*	*170°W*
1991	56.5°N	57.0°N
1994	56.5°N	57.0°N
1996	58.8°N	59.5°N

Source: National Ice Center

The last year that the Bogoslof district, to the southwest, was open was in 1991, and approximately 50% of the A-season pollock catch came from that area, primarily by offshore catcher-processors (Figure 5.2).

In 1991, the average pollock CPUE of catcher-processors during the A-season was 72% greater inside the CVOA than outside the CVOA on the EBS shelf (Figure 5.3). In the A-season of 1994, catcher processor CPUE was 107% greater inside the CVOA than outside, while that of catcher boats was 67% greater. In 1996, the spatial CPUE relationship reversed: the average CPUEs of catcher processors and catcher boats were 48% and 122% greater outside the CVOA than inside, respectively. These data should not be used to make firm conclusions regarding spatial differences in CPUE because of the small size of the sample available from outside the CVOA in 1991 and 1994 and differences in the southern extent of ice.

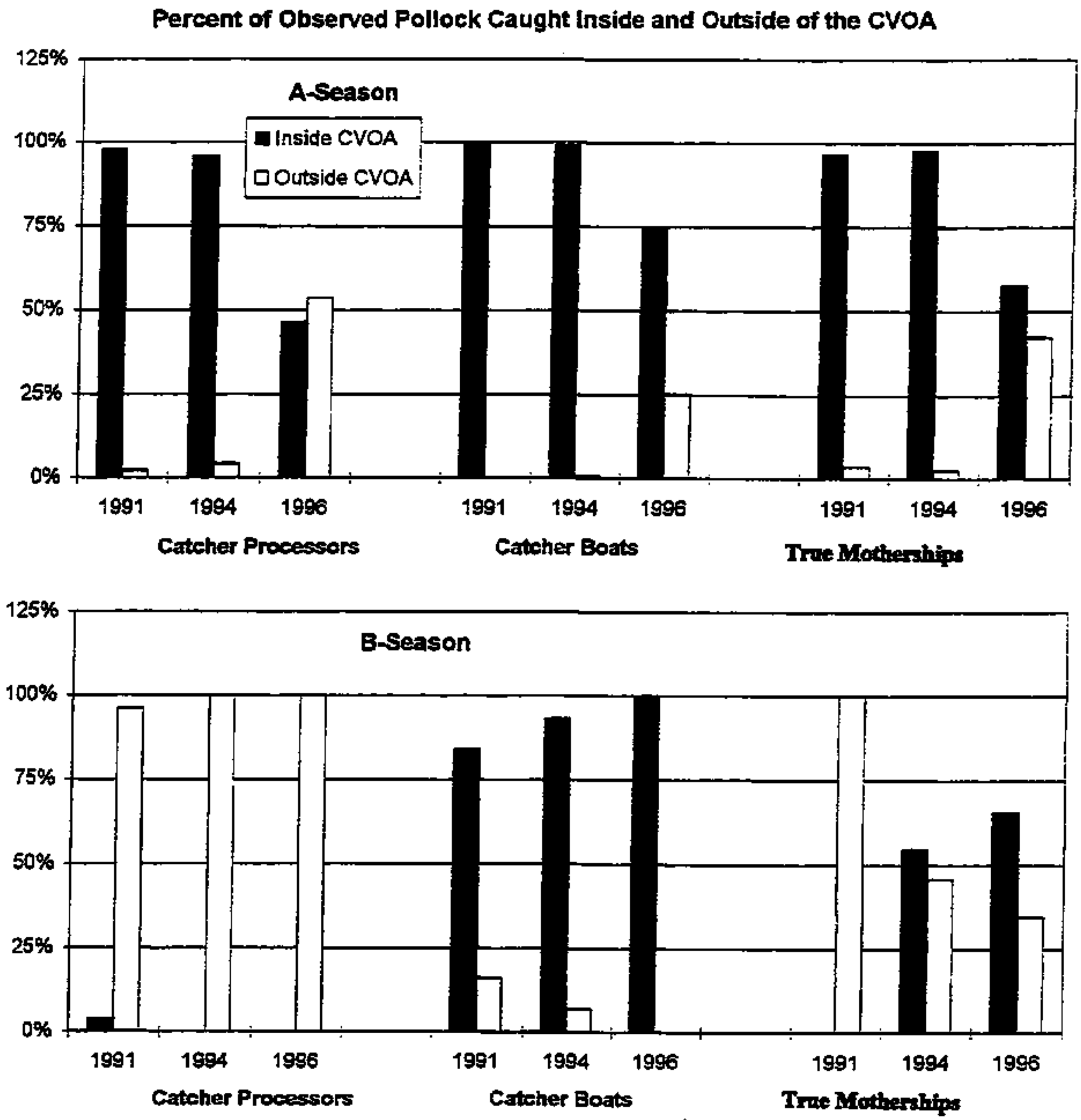


Figure 5.1 Observed pollock catch distribution by season, sector and area by pollock fisheries on the eastern Bering Sea shelf in 1991, 1994, and 1996. Aleutian Islands and Bogoslof data were excluded.

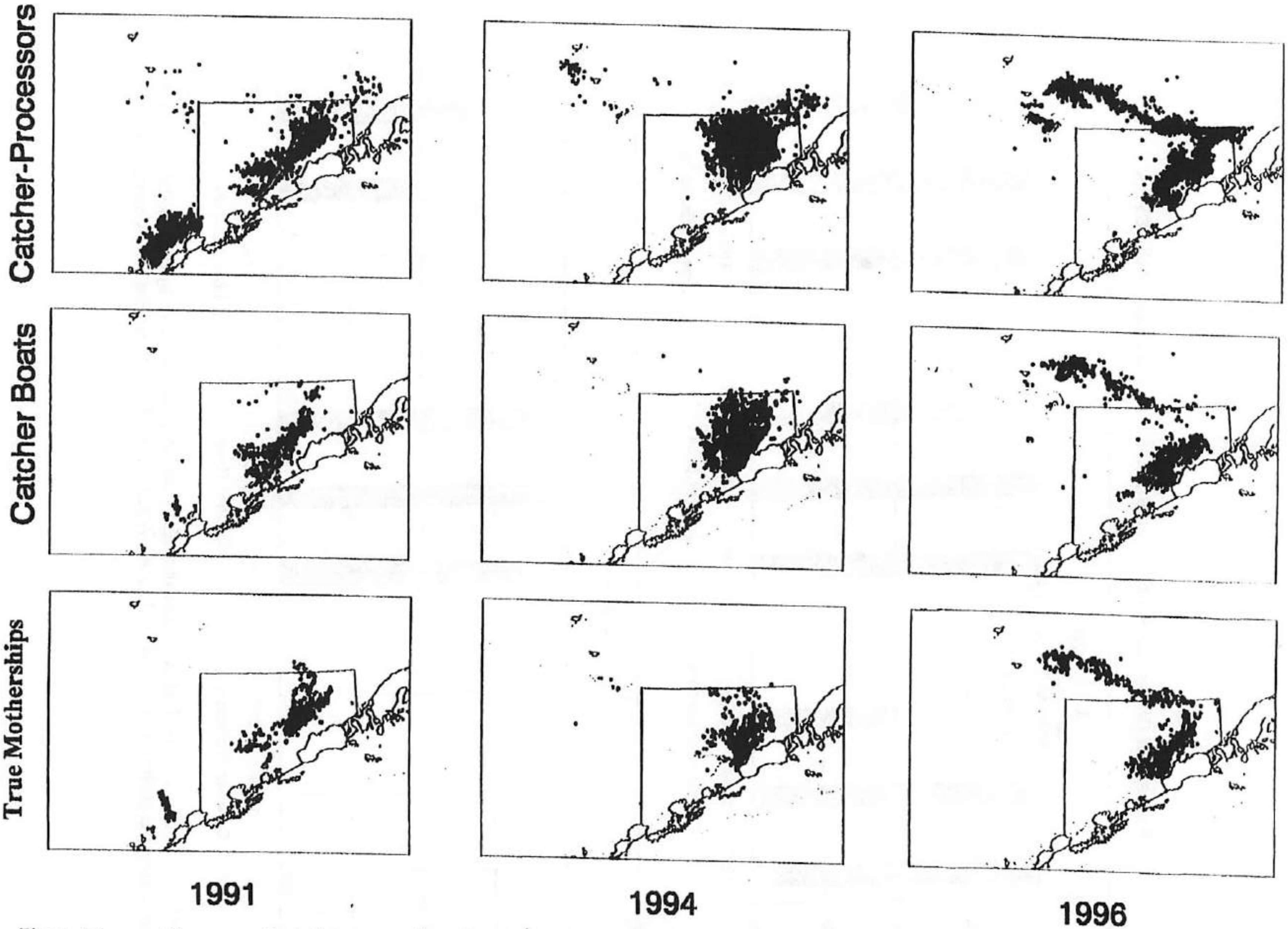


Figure 5.2 Observer pollock fishery trawl locations in the A-seasons of 1991, 1994, and 1996 by catcher processor (top), catcher boats (middle), and true motherships (bottom) inside (red) and outside(blue) of the CVOA. Dept contour=200 m.

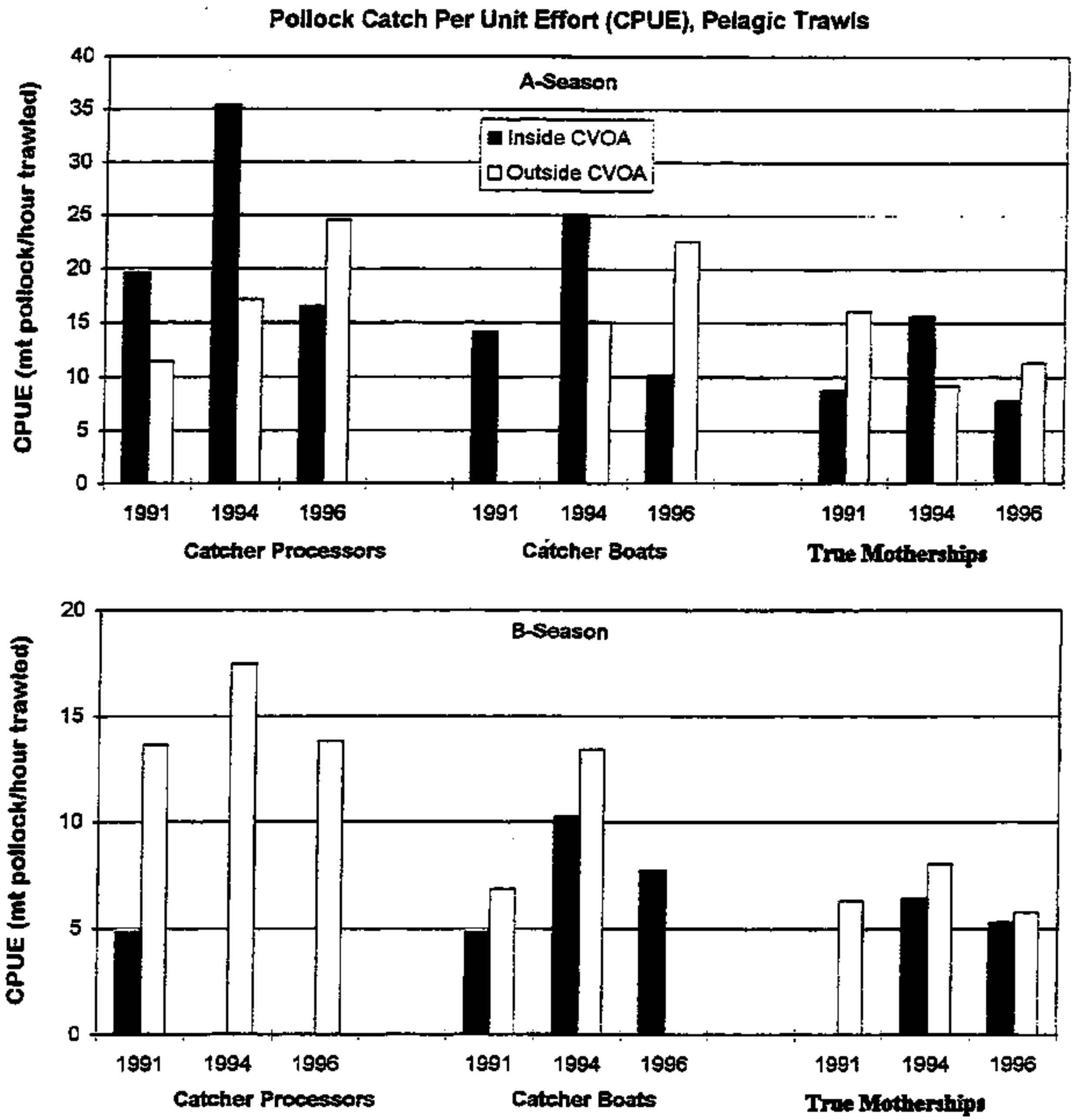


Figure 5.3 Pollock CPUE by season, sector and area by pollock fisheries on the eastern Bering Sea shelf in 1991, 1994, and 1996. Aleutian Islands and Bogoslof data were excluded.

Pollock caught by the fishery were generally larger and more uniform in size within the CVOA than outside on the EBS shelf during the A-seasons of 1991, 1994 and 1996 (Figures 5.4 and 5.5). This is most clearly evident in 1996 when the modal length and mean individual weight of pollock caught by each sector outside of the CVOA was 4-6 cm smaller and 0.2 kg lighter than inside of the CVOA. In 1991 and 1994, modal lengths were similar, but there were a greater percentage of pollock < 40 cm in length outside of the CVOA than inside (see table 5.2 below), and mean individual weight tended to be lighter (Figure 5.5):

Table 5.2 Percent of Pollock < 40 cm in Length in A-Season Fishery Samples

	Catcher Processors		Catcher Boats		"True" Motherships	
Year	***Outside CVOA***	***Inside CVOA***	***Outside CVOA***	***Inside CVOA***	***Outside CVOA***	***Inside CVOA***
1991	21%	5%		5%	2%	5%
1994	9%	4%	3%	3%	7%	2%
1996	6%	1%	11%	1%	5%	1%

5.1.3 B-Season Fisheries

The CVOA became operational in the B-season of 1992 and has been an exclusive inshore operational area each B-season since. In 1991, the last year that catcher-processor effort distribution was unconstrained by the CVOA, the offshore sector caught approximately 96% of its B-season pollock outside of the CVOA across a broad section of the outer shelf from the Pribilof Islands to the edge of the EEZ (Figures 5.1 and 5.6). In 1994, most of the catcher processor effort was concentrated north of the CVOA in the middle shelf and to a lesser extent west and north of the Pribilof Islands. However, in 1996, catcher processors worked exclusively north of the CVOA and west of St. Matthew Island, and not in the area west of the Pribilof Islands. Catcher boats caught about 84% of their B-season pollock in the CVOA in 1991, and this percentage increased to 100% in 1996 as the distribution of their B-season effort contracted (Figures 5.1 and 5.6).

Pollock CPUE was greater outside than inside of the CVOA in each of the paired comparisons available for the three years and fishery sectors (Figure 5.3). Pollock size, however, tended to be larger and more uniform inside than outside of the CVOA (Figures 5.5 and 5.7). Furthermore, pollock < 40 cm in length were more commonly encountered outside than inside the CVOA. This occurred even when there was a large, widely distributed incoming yearclass, which occurred in 1991 with the incoming 1989 yearclass as evidenced by the mode in the high 20 cms in all length-frequency samples (Figure 5.7) and the high percentages of pollock < 40 cm, particularly inside of the CVOA:

Table 5.3 Percent of Pollock < 40 cm in Length in B-Season Fishery Samples

	Catcher Processors		Catcher Boats		"True" Motherships	
Year	***Outside CVOA***	***Inside CVOA***	***Outside CVOA***	***Inside CVOA***	***Outside CVOA***	***Inside CVOA***
1991	20%	10%	10%	12%	18%	
1994	13%		5%	1%	21%	1%
1996	19%			1%	15%	0%

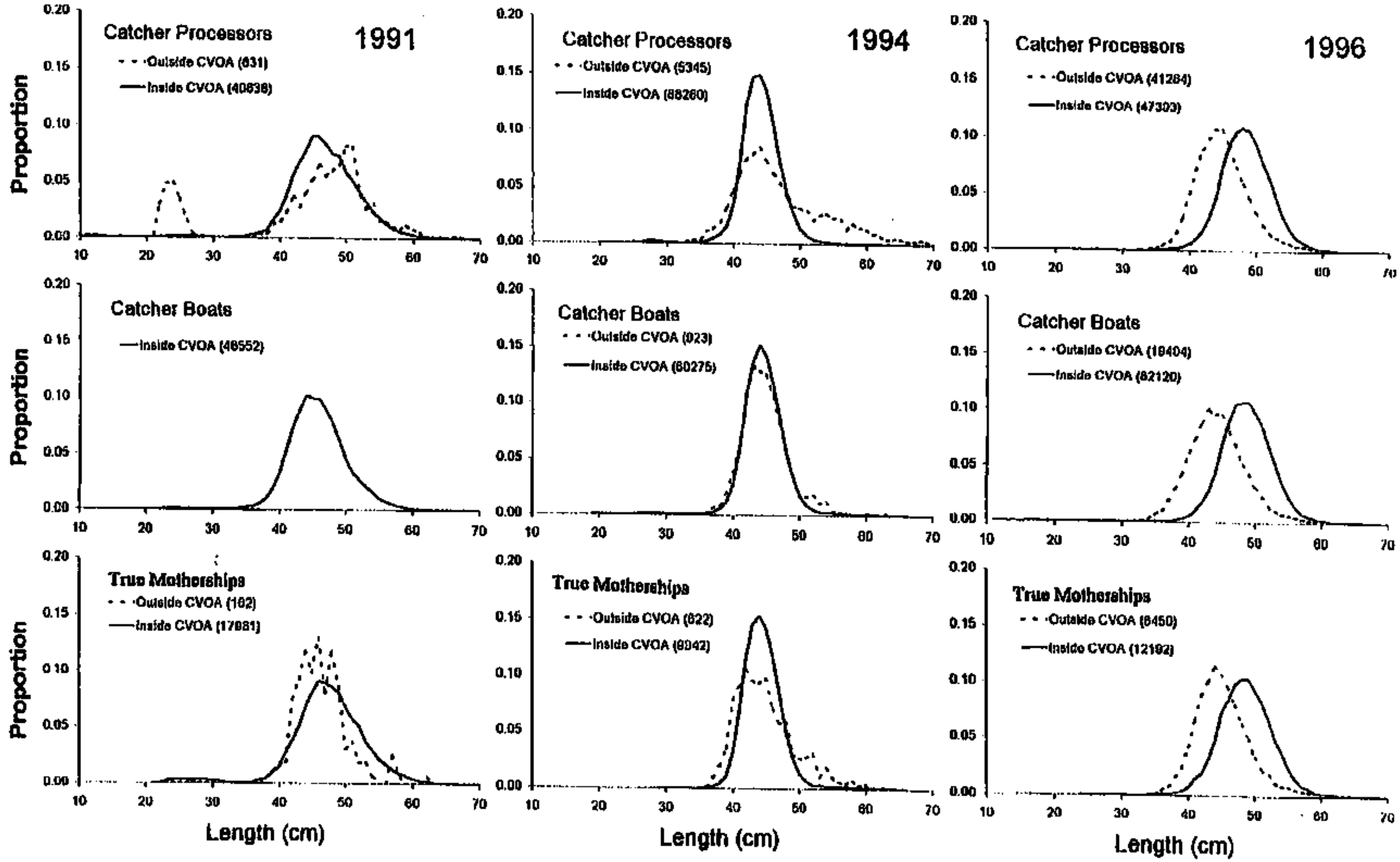
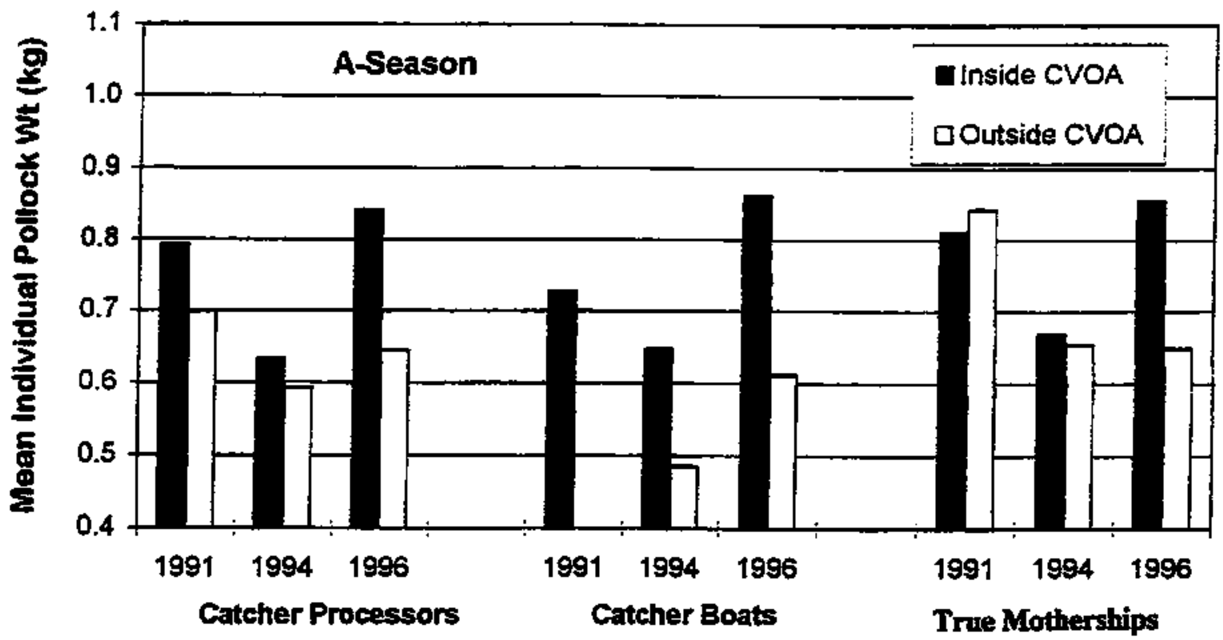


Figure 5.4 Pollock length-frequency from samples collected aboard offshore catch processors (top), onshore catcher boats (middle), and mixed true motherships (bottom) in the A-season of 1991 (left), 1994 (middle), and 1996 (right) inside and outside of the CVOA (number of pollock measured in legend).

Mean Individual Pollock Weight - Pelagic Trawls



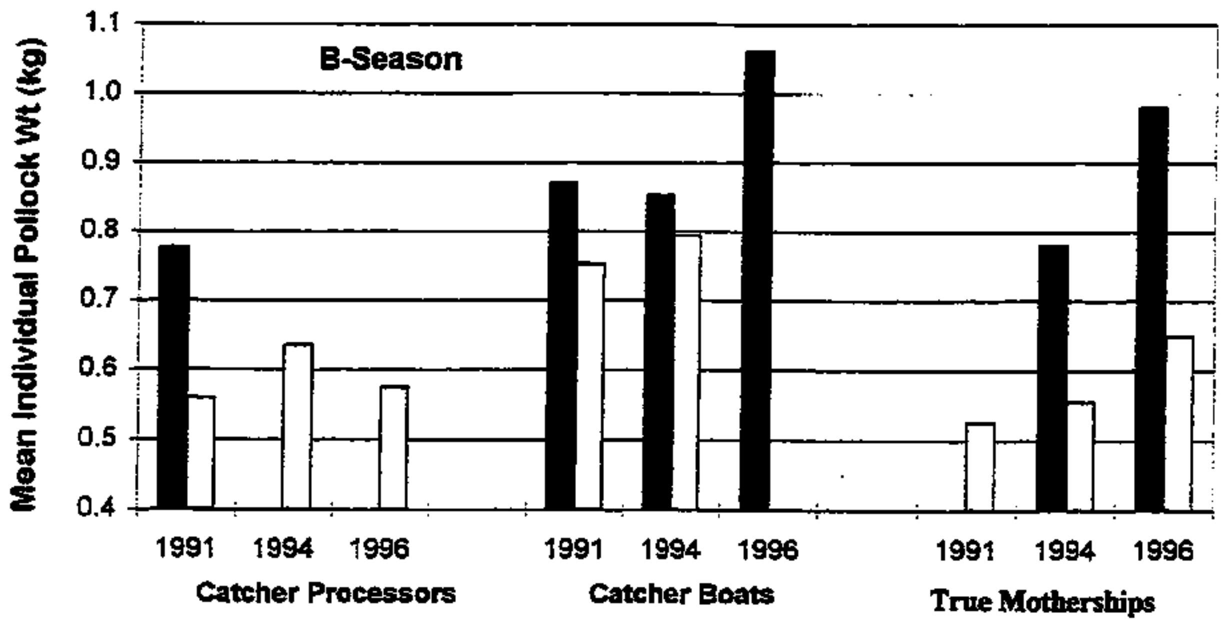


Figure 5.5 Mean individual pollock weight by season, sector and area by pollock fisheries on the eastern Bering Sea shelf in 1991, 1994, and 1996. Aleutian Islands and Bogoslof data were excluded.

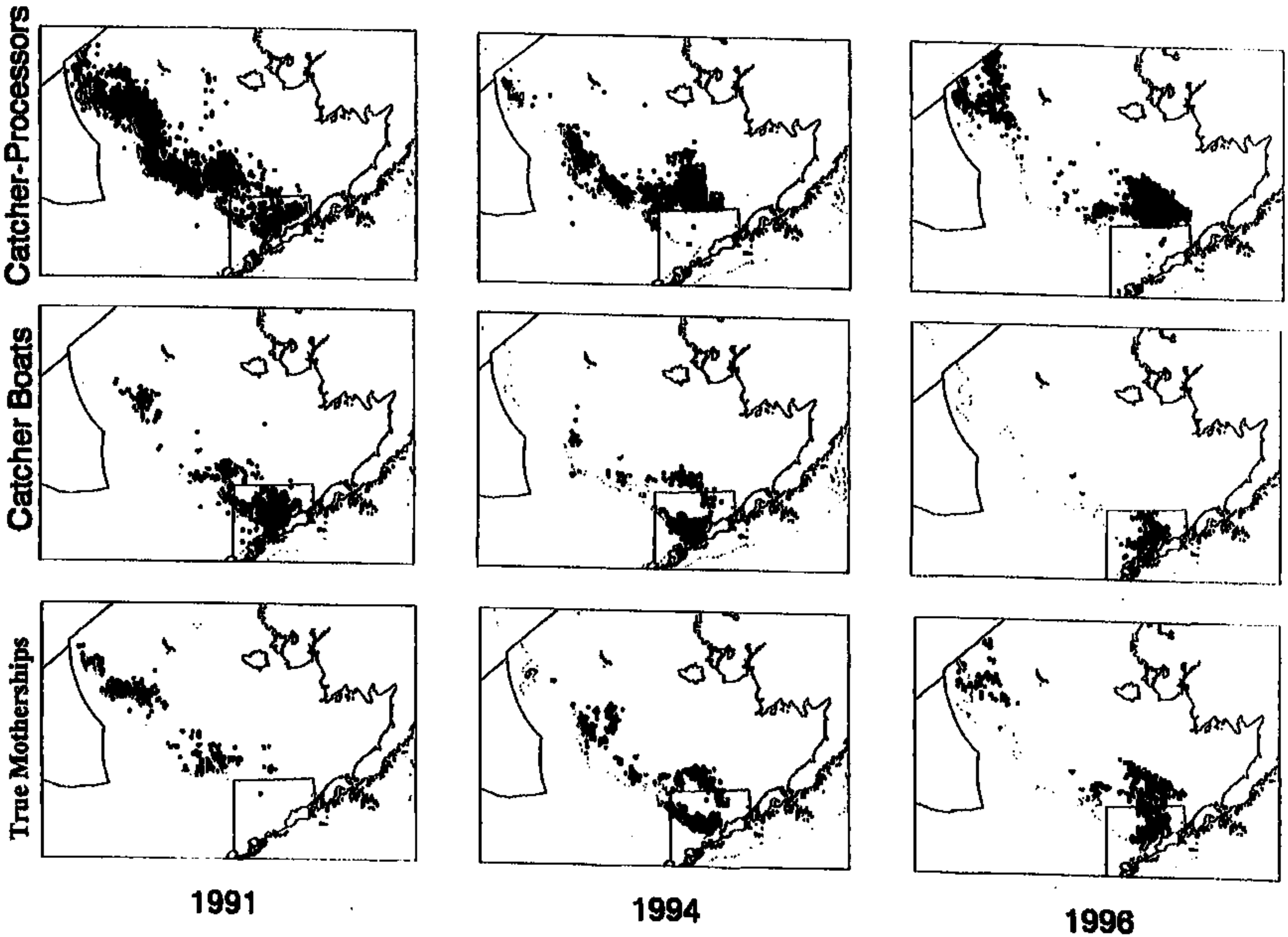


Figure 5.6 Observer pollock fishery trawl locations in the B-seasons of 1991, 1994, and 1996 by catcher processor (top), catcher boats (middle), and true motherships (bottom) inside (red) and outside(blue) of the CVOA. Dept contour=200 m.

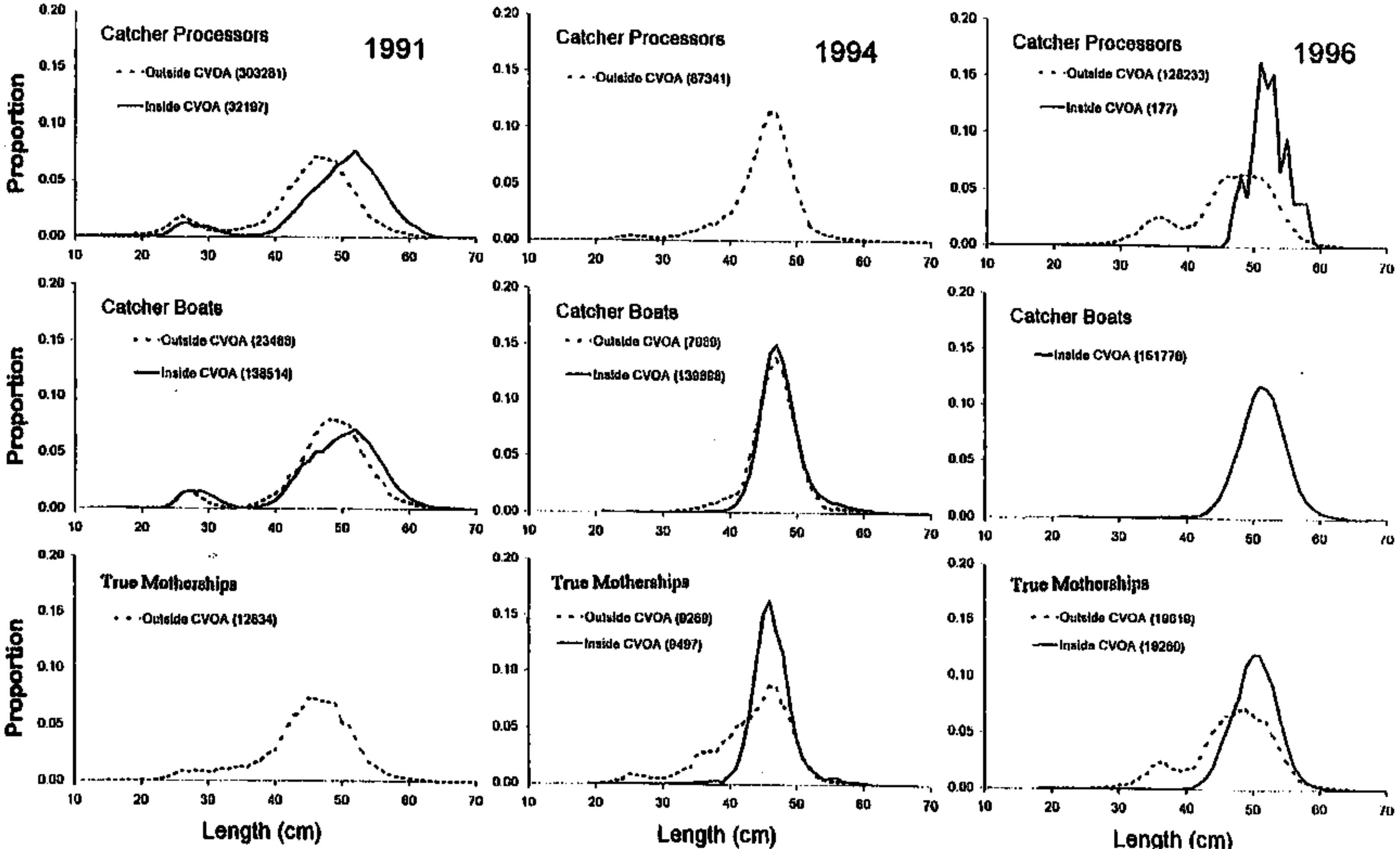


Figure 5.7 Pollock length-frequency from samples collected aboard offshore catch processors (top), onshore catcher boats (middle), and mixed true motherships (bottom) in the B-season of 1991 (left), 1994 (middle), and 1996 (right) inside and outside of the CVOA (number of pollock measured in legend).

5.1.4 Survey Biomass Distributions

Bottom trawl and echo-integration/midwater trawl (EIMWT) surveys of the pollock population were conducted in the summers of 1991, 1994 and 1996. The EIMWT estimate is from the surface to within 3 m of the bottom, while the bottom trawl estimate is for the bottom 3 m; hence the two estimates can be summed to estimate the total pollock population. Pollock population estimates by length in three regions for each of the three years are presented in Figure 5.8. The three regions are: the CVOA, east of 170°W outside of the CVOA (equivalent to INPFC Area 51 outside of the CVOA), and west of 170°W (equivalent to INPFC Area 52). Data east of 170°W from the 1991 EIMWT survey could not be separated into areas inside and outside of the CVOA. Therefore, in Figure 5.8 and in the Table 5.4 below, the 1991 CVOA data are from the bottom trawl survey only; for the area labeled as "East of 170°W, Outside of the CVOA", this includes both areas inside and outside of the CVOA east of 170°W for 1991.

Table 5.4 Pollock Population Estimates and Percentages < 40 cm in Length by Area for the 1991, 1994, and 1996 Combined Bottom Trawl and EIMWT Surveys of the Eastern Bering Sea Shelf

	CVOA		East of 170°W Outside of CVOA		West of 170°W	
Year	***Pollock Population ($x10^9$)***	***% < 40 cm***	***Pollock Population ($x10^9$)***	***% < 40 cm***	***Pollock Population ($x10^9$)***	***% < 40 cm***
1991	7.3[1]	1.1[1]	60.1[2]	62.2[2]	104.8	68.9
1994	18.7	2.1	32.7	23.3	116.1	68.8
1996	7.7	9.2	31.8	24.1	88.8	68.8

[1] For 1991, data for the CVOA is bottom trawl only. These data are included in the total for the area east of 170°W for 1991.

[2] For 1991, data for the area east of 170°W, outside of the CVOA is actually for the entire area east of 170°W including the CVOA, both midwater and bottom.

In each of the three summers surveyed, about 2/3 of the pollock population by numbers was located west of 170°W, but over 2/3 of those encountered each year were < 40 cm in length. In the summers of 1994 and 1996, the CVOA contained only 11% and 6%, respectively, of the eastern Bering Sea pollock population, but small pollock were generally absent.

5.1.5 B-Season Harvest Rates: 1991-1997

B-season pollock harvest rates were analyzed spatially by estimating pollock abundances and catches in three areas and four years. The three areas chosen were: (1) the CVOA, (2) east of 170°W outside of the CVOA, and (3) west of 170°W (Figure 5.9). The years 1991, 1994, 1996, and 1997 were chosen because combined bottom trawl-hydroacoustic surveys of the pollock population were conducted each summer. The following method was used to calculate areal harvest rates (shown in Figure 5.10):

- The distribution of survey estimates of age 3+ pollock biomass (30+ cm in length) in each area and year was used to apportion the stock assessment model (Wespestad et al. 1997) estimate of total eastern Bering Sea age 3+ biomass by area and year. This yielded estimates of age 3+ pollock biomass by area for each of the 4 years.

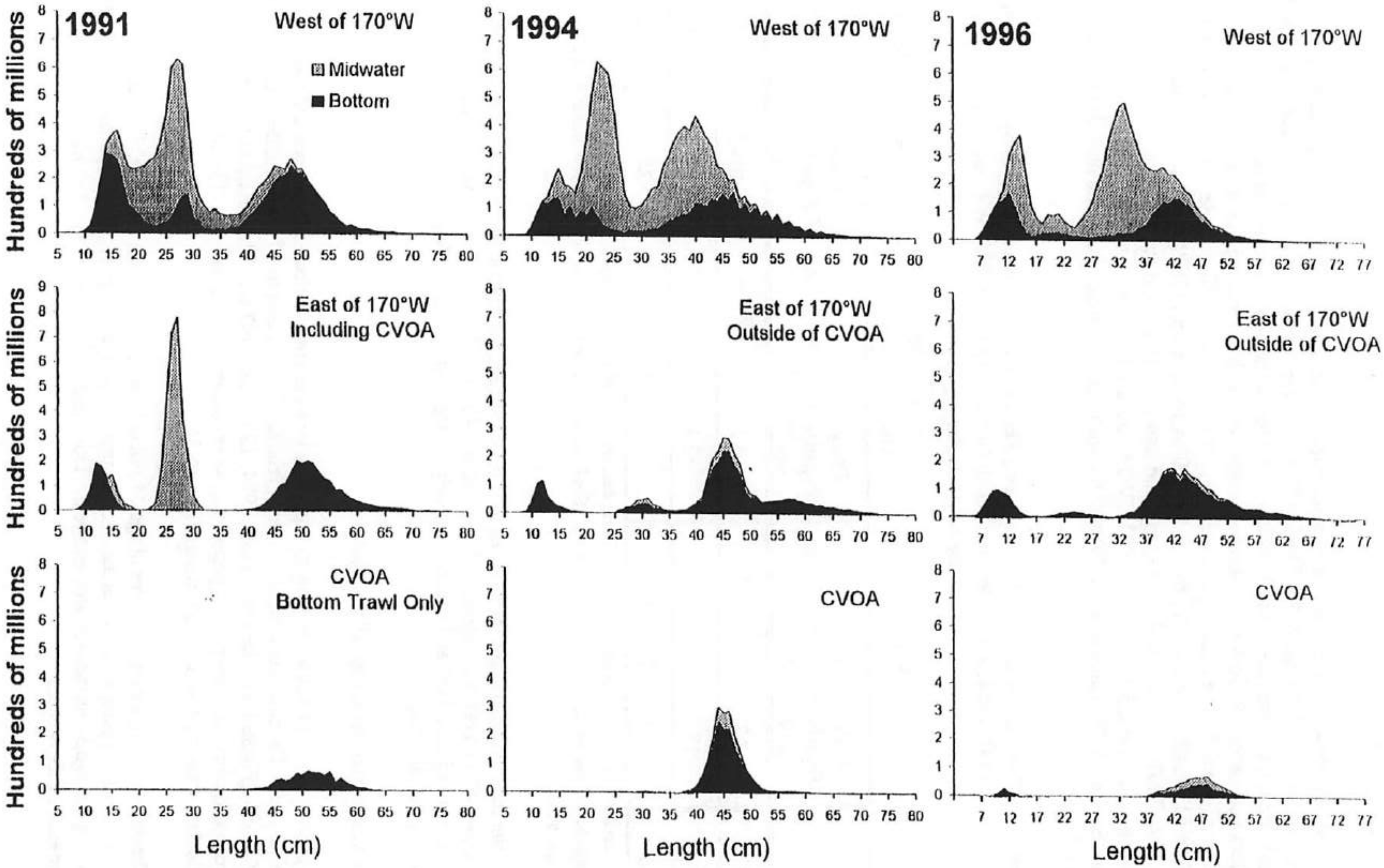


Figure 5.8 Pollock populations at-length estimates from the hydroacoustic-midwater (Midwater) and bottom trawl surveys conducted on the eastern Bering Sea shelf in 1991 (left), 1994 (middle), and 1996 (right). Population estimates are provided for the CVOA (bottom), east of 170 degrees W out side of the CVOA (middle), and west 170 degrees W (top). The 1991 midwater data east of 170 degrees could not be split inside and outside of the CVOA.

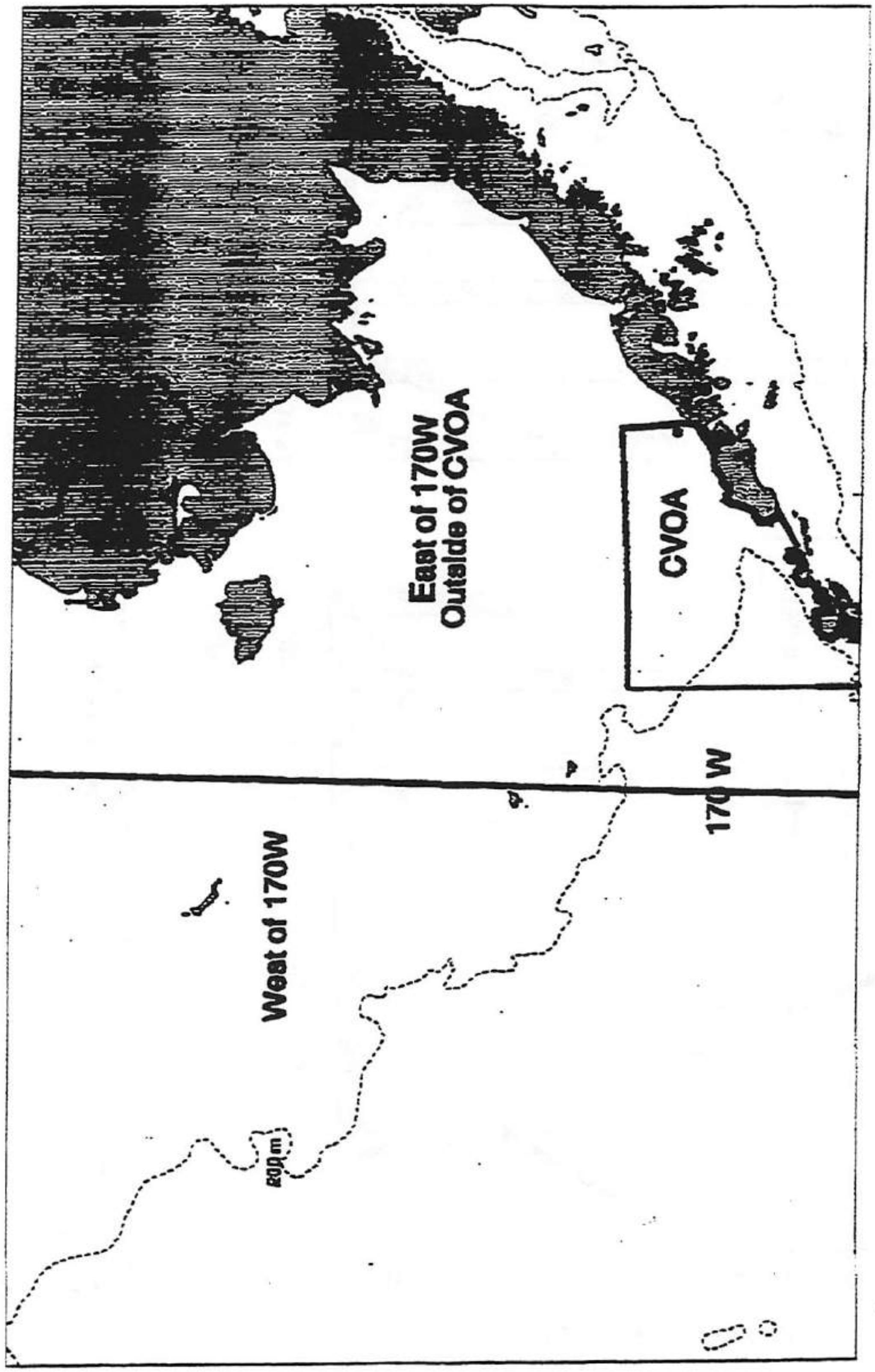


Figure 5.9 Areas of the eastern Bering Sea shelf used in the spatial analysis of pollock harvest rates.

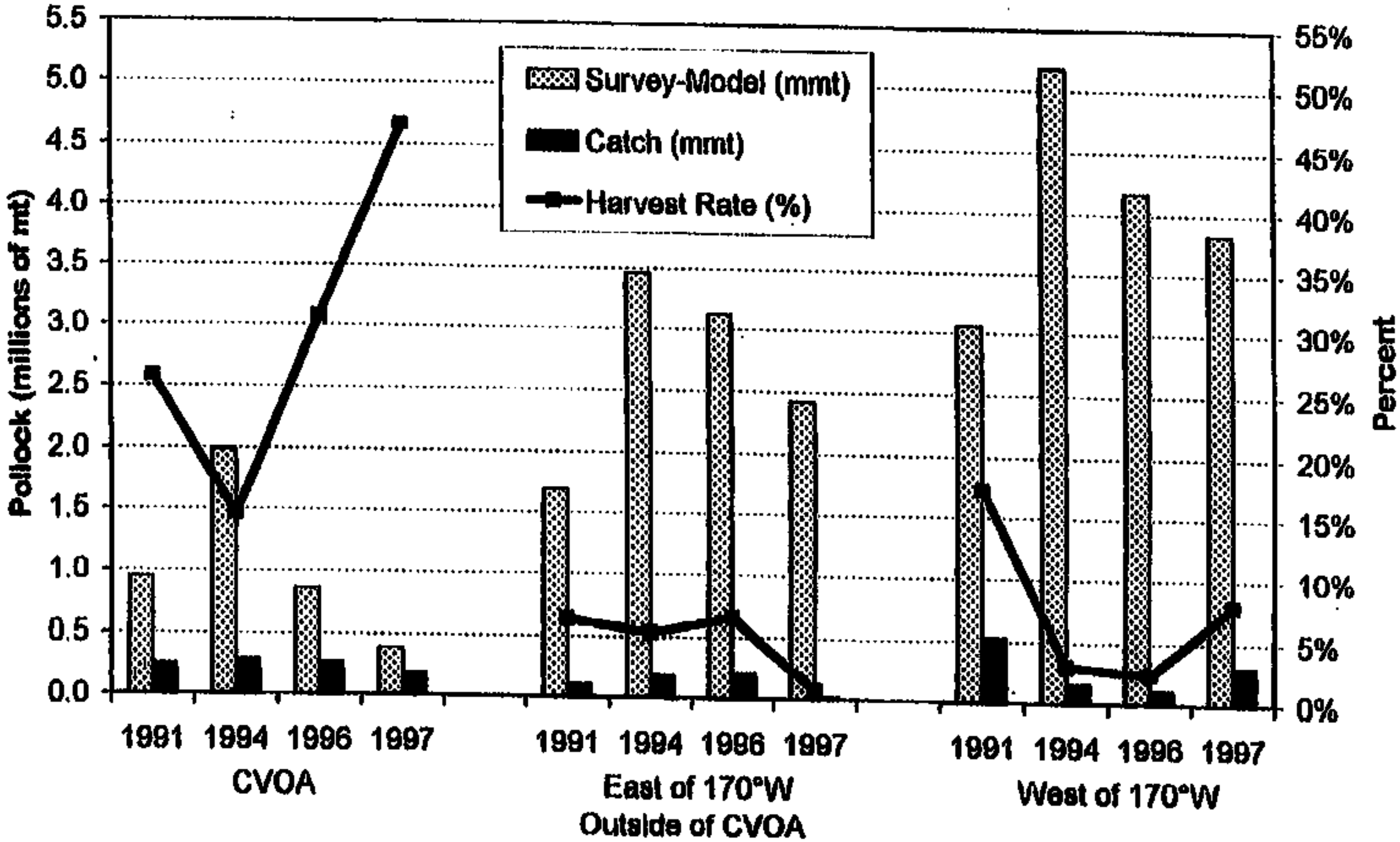


Figure 5.10 Distribution of age 3+ pollock biomass (millions of mt) from the combined bottom trawl and hydroacoustic surveys and the 1997 stock assessment, commercial catches of pollock (millions of mt) from observer and blend data, and pollock harvest rates (% caught) by area in the B-seasons of 1991, 1994, 1996, and 1997.

- Observer estimates of B-season pollock catch distribution by sector (offshore, "true" mothership, and inshore), area, and year were used to apportion the blend estimates of B-season pollock catch by sector and year to each area. This yielded estimates of B-season pollock catch (almost entirely composed of pollock age 3 years and older) by area for each of the 4 years.
- Harvest rates were calculating using the ratio of catch to biomass by area.

Harvest rates of age 3+ pollock have been higher in the CVOA than in either of the other two areas analyzed in the eastern Bering Sea (Figure 5.10). For each of the four years, harvest rates in the CVOA ranged from a low of 15% in 1994 to 47% in 1997, while in the other two areas, only one of the eight annual harvest rate estimates was greater than 10% and three were less than 5%. Furthermore, data suggest that harvest rates within the CVOA increased in 1996 and 1997 (when they were 31% and 46%, respectively) relative to 1991 and 1994 (when they were 26% and 15%, respectively). Total eastern Bering Sea survey/model age 3+ pollock biomass declined 38% from 1994 to 1997, but this decline was not evenly dispersed among each of the three areas. The decline was most acute in the CVOA, where pollock biomass declined 81% from 1994 to 1997, while in the other areas east and west of 170°, the decline was only 30% and 26%, respectively.

5.1.6 Pollock Catches in Steller Seal Lion Critical Habitat

The western stock of Steller sea lions, located west of Cape Suckling (147°W) including the Bering Sea and Aleutian Islands, was recently (1997) reclassified as endangered under the Endangered Species Act. Much of the CVOA is designated as Steller sea lion critical habitat or is closed to trawlers in an effort to spatially segregate trawl fisheries from sea lions (Figure 5.11). Trawl exclusion zones that overlap with the CVOA surround sea lion rookeries on the following islands (from east to west in Figure 5.9):

Table5.5 Trawl Exclusion Zones Around Steller sea lion rookeries that overlap with the CVOA

Rookery Island	*10 nm Annual Trawl Exclusion Zone*	*20 nm A-Season Trawl Exclusion Zone*
Sea Lion Rock	X	X
Ugamak Island	X	X
Akun Island	X	X
Akutan Island	X	X
Bogoslof Island	X	

The cause of the decline in the population of the western stock of Steller sea lions is not known. While there are a large number of possible causes including disease and predation, reduced food availability resulting from climate change and/or fisheries appears to be the most likely. Despite efforts to reduce interactions between groundfish fisheries and Steller sea lions, the population continues to decline and pollock removals from designated critical habitat in the Bering Sea/Aleutian Islands (BS/AI) increased 45% between 1991 and 1995 (Figure 5.12) (Fritz et al.1995; Fritz and Ferrero, in press). Pollock harvests from critical habitat in the BS/AI come chiefly from the southeast Bering Sea foraging area which extends from 164°-170°W north of the Aleutian Islands and overlaps considerably with the CVOA. In 1996, pollock harvests from critical habitat declined to 1991 levels primarily because of the increased use of areas outside of the CVOA during the A-season (Figure 5.2).

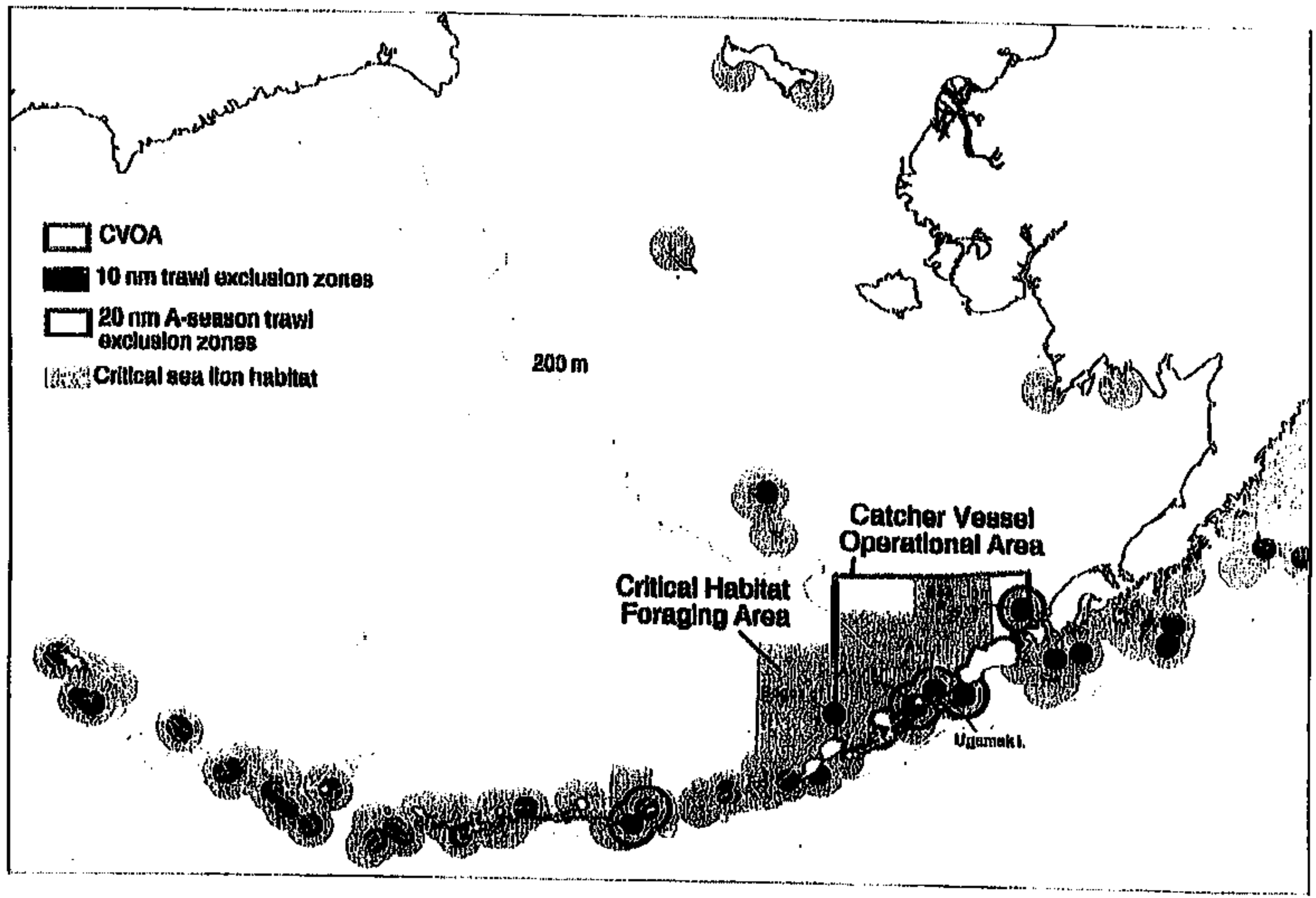


Figure 5.11 Location of the Catcher Vessel Operational Area (red line) in relation to Steller sea lion critical habitat and trawl exclusion zones around rookeries in the Bering Sea and Aleutian Islands.

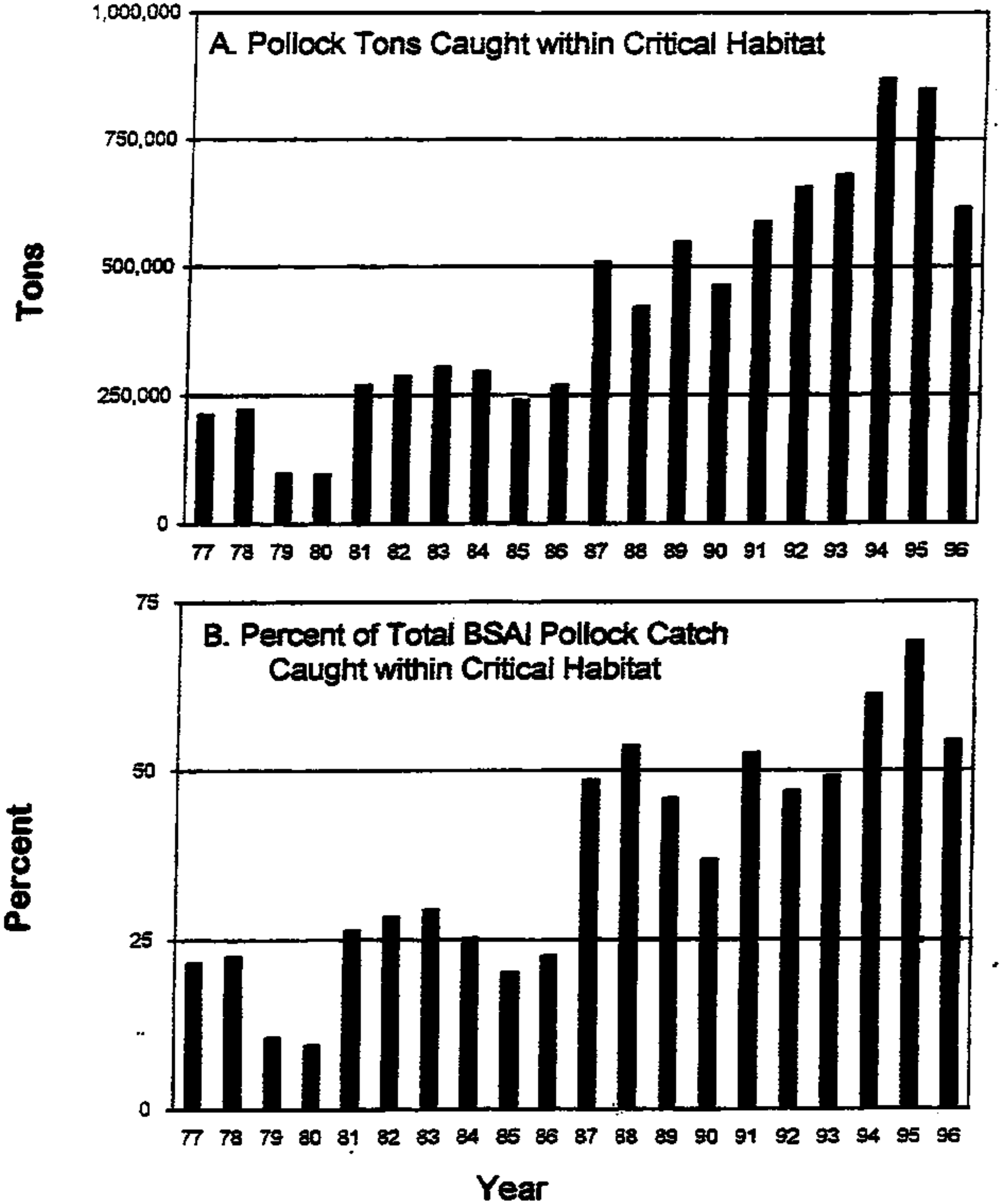


Figure 5.12 Pollock fishery effort within Steller sea lion critical habitat in the Bering Sea/Aleutian Islands region.

5.2 Projected Changes under the CVOA Alternatives

This section describes how the fishery may change under the various CVOA alternatives. Projections are made of pollock catches and harvest rates inside and outside the CVOA, and within Steller sea lion critical habitat. Actual impacts on Steller sea lions will be described in the environmental assessment in Chapter 6.

5.2.1 Estimation Procedures

Pollock catches inside and outside the CVOA were estimated using the following criteria and conditions:

- Eastern Bering Sea pollock TAC=1.1 million mt;
- A:B season split is 45%:55%;
- fishery sectors (offshore, motherships, inshore) are allocated percentages of the pollock TAC according to the Sector Allocation Alternatives 1-4 and Status Quo:

	Sector Allocation Alternatives				
Sector	1	2	Status Quo	3	4
Offshore	70	60	55	50	40
Motherships	5	10	10	10	15
Inshore	25	30	35	40	45

- fishery sectors are excluded from fishing in the CVOA by season according to the CVOA Alternatives 1-3 and Status Quo (SQ) (Y=can fish in the CVOA; N=cannot fish in the CVOA). Note that in the A-season, the SQ and Alternative 3 are the same, and in the B-season, the SQ and Alternative 1 are the same.

	A-Season CVOA Alternatives				B-Season CVOA Alternatives			
Sector	SQ	1	2	3	SQ	1	2	3
Offshore	Y	N	N	Y	N	N	N	Y
Motherships	Y	Y	N	Y	Y	Y	N	Y
Inshore	Y	Y	Y	Y	Y	Y	Y	Y

- two types of A-season pollock fishery distribution patterns, one in which each sector caught the vast majority of its allocation within the CVOA (the 1994 pattern: cold year), and one in which each sector caught significant amounts of pollock outside of the CVOA (the 1996 pattern: warm year):

Percent of A-Season Pollock Caught Inside and Outside of the CVOA

	1994		1996	
Sector	Inside	Outside	Inside	Outside
Offshore	95.5%	4.5%	46.7%	53.3%
"True" Motherships	99.5%	0.5%	65.5%	34.5%
Inshore	99.4%	0.6%	74.1%	25.9%

- pollock fishery distribution patterns observed in the B-season of 1996 were used to estimate B-season catch distributions under each CVOA alternative, except for the offshore sector under CVOA alternative 3 (no CVOA). In this single instance, two scenarios were run: (1) data were used from 1991, the most recent year when the offshore sector could fish in the CVOA; and (2) the distribution of "true" motherships in the B-season of 1996 was used to estimate the catch distribution of the offshore fleet. As the table below shows, the percentages inside and outside resulting from the two scenarios are very different (NA=not applicable):

Percent of B-Season Pollock Caught Inside and Outside of the CVOA

	1991		1996	
Sector	Inside	Outside	Inside	Outside
Offshore	4.0%	96.0%	0%	100%
"True" Motherships	NA	NA	99.6%	0.4%
Inshore	NA	NA	97.1%	2.9%

- if a sector could not fish inside the CVOA, it was assumed it could catch its entire allocation outside the CVOA. If a sector could fish in the CVOA, it was assumed it would have the same catch distribution inside and outside of the CVOA as it had in the A-seasons of 1994 and 1996, and the B-seasons of 1996 and 1991 (offshore sector, CVOA alternative 3 only).

Is should be noted that CVOA impacts were discussed in the I/O1 and I/O2 analyses, and some of that discussion is used here. However, the CVOA options under I/O3 are much broader. They include restricting catcher processors from operating in the CVOA during the A-season as well as the B-season, and doing away with the CVOA entirely. Additionally, catcher vessels delivering to the catcher processor or "true" mothership sectors may be restricted from operating in the CVOA during the A-season and/or B-season, in addition to the status quo. Finally, the Council considered options that would exclude catcher vessels longer than 155' LOA or catcher vessels 125' LOA and longer from the CVOA in the A-season and/or B-season.

To provide the reader some indication of the hold capacity of catcher vessels, Figure 5.13 had been included. This figure shows a comparison of catcher vessel length to hold capacity. Each of the 119 catcher vessels that were reported fishing in the 1996 pollock target fisheries are included in this figure. The hold capacity information was taken from the 1996 CFEC Vessel Permit file. Twenty-nine of the catcher vessels reported a hold capacity of zero in the CFEC file. This maybe the result of not filling out the field on the permit or not having useable hold capacity.

The information in Figure 5.13 shows that none of the catcher vessels less than 125' report a hold capacity greater than 12,500 cubic feet. However, six vessels greater than 125' reported hold capacities of 20,000 cubic feet or larger.

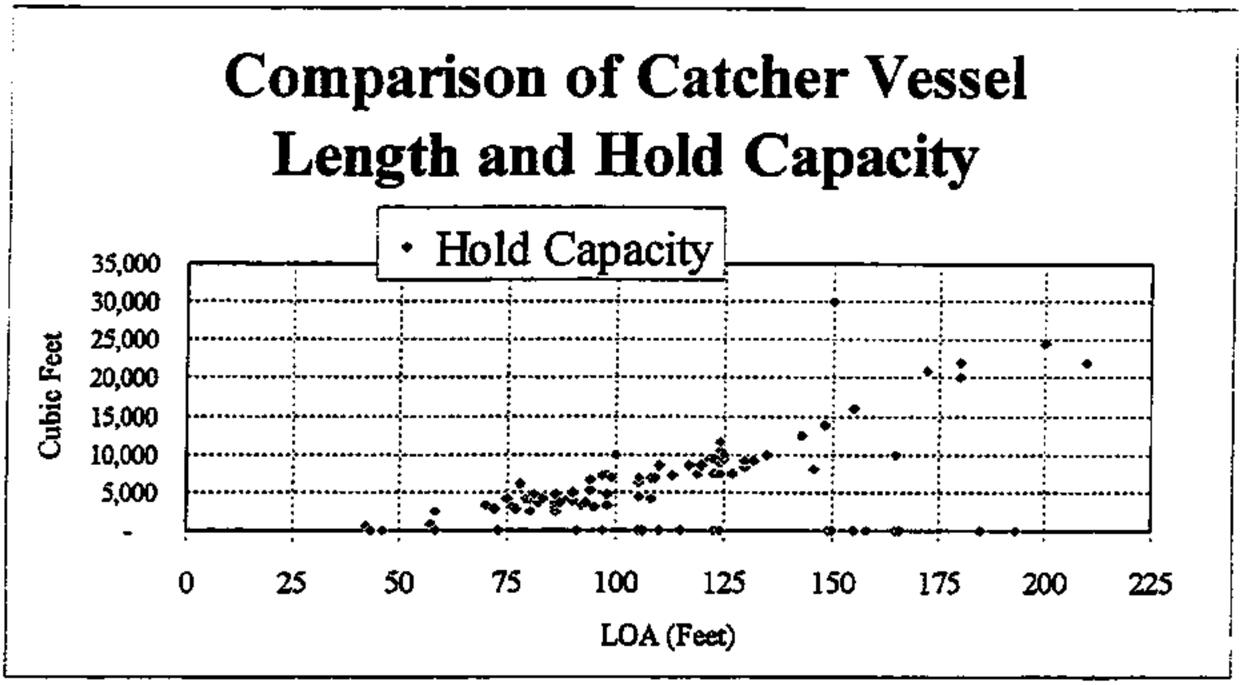


Figure 5.13. Catcher Vessel Length and Hold Capacity

5.2.2 Impacts on Catcher/Processors

Higher Cost for Fuel. Additional costs could result if catcher/processors have to run further to fishing grounds. However this cost is likely to be incremental because catcher/processors make generally less than 10 runs to and from an in-season port such as Dutch Harbor. Additionally, although fuel expenses are thought to be a significant portion of operating cost, much of this likely occurs in daily operations rather than in running to and from port.

Fish Finding Costs. If catcher/processors are forced into areas they did not fish in past years they may need to spend more time determining where fish aggregations are located. However, the incremental increase in costs may be small because aggregations of pollock are notoriously dynamic, and fish finding costs occur regardless of where one is fishing. Also, catcher processors did harvest more pollock outside the CVOA in 1996. This experience outside the CVOA may also tend to lessen their search costs in future years.

Length of Fish. Smaller fish are more expensive to process because filleting machines are constrained by the number of fish they can handle per unit of time. It appears, from data presented above, that fish are generally smaller outside than inside the CVOA. However, this trend was more pronounced in 1996 than earlier years. And the 1996 pollock size distribution inside and outside the CVOA could change in the future.

Greater Variance in the Length of Fish. The I/O2 analysis stated that the more variance in the size of fish, the less the product recovery rate in general. This occurs because filleting machines are set for an average fish size; therefore the more variance around the mean, the less consistent the fillets will be. Again referring to the figures presented earlier that show the length-frequency samples for 1996, the shape of the curves is similar inside and outside the CVOA. The same shape indicates that the variation in pollock lengths were about the same inside and outside the CVOA during 1996. However, this was not the case during the 1994 fishery when fish inside the CVOA were more uniform in size than those outside.

Higher CPUEs Outside CVOA. The offshore catcher processor sector experienced higher CPUEs outside the CVOA than inside during the 1996 A-season. However, during the 1991 and 1994 A-season their CPUE was higher inside the CVOA. This switch may also be linked to the location of the ice edge in those years.

Harvesting Roe Bearing Pollock. Preventing catcher processors from operating in the CVOA during the A-season raises questions about their ability to harvest quality roe bearing pollock outside the CVOA. Given that catcher processors received about $13,300/mt for pollock roe in 1996, reducing their ability to harvest/process a quality roe product would likely lead to negative economic impacts on their operations.

Until 1996, catcher processors harvested over 90% of their A-season pollock inside the CVOA. In 1996 the split was closer to a 53% outside the CVOA and 47% inside. One possible explanation for more pollock being harvested outside of the CVOA has to do with the location of the ice edge. Since predicting the location of the ice edge in future years is not possible, we cannot determine if ice will be a problem in the future. However, forcing catcher processors into areas close to the ice edge could raise safety as well as efficiency issues.

Summary of CVOA Alternatives for the Catcher Processor Sector. Since the majority of fishing effort for the catcher processor sector took place outside the CVOA during the 1996 A-season and in 1991, prior to implementation of the CVOA, one can assume it was more profitable for those vessels to operate there. Otherwise they would have operated at a higher rate inside the CVOA. Some individual vessels probably would find it more profitable to operate inside the CVOA. Those vessels will likely experience higher costs if forced to fish outside of the CVOA during the A-season, in years similar to 1996. In years where almost all of the catch was taken inside the CVOA, due to factors such as ice, pollock size, pollock roe maturity, or stock abundance, the catcher processors would likely be disadvantaged even more if forced to fish outside.

A sub-option would reserve 9-15% of the catcher processor allocation for harvest by catcher vessels. It is the analysts' assumption that the catcher processors choosing to buy pollock from catcher vessels will have the option of processing that fish inside or outside of the CVOA, and that the catcher vessels harvesting the pollock can fish inside or outside the CVOA, under the current system. If the CVOA definition changes such that "true" motherships are not allowed to process pollock harvested from within the CVOA, we will then assume that catcher processors acting as motherships would be required to abide by the same rules. In other words, "true" motherships and catcher processors acting as motherships will be treated the same under any of the CVOA alternatives.

5.2.3 Impacts on "True" Motherships

"True" mothership operations would face many of the same issues discussed for the catcher processors, if forced out of the CVOA during the A-and/or B-season. Perhaps they would experience even greater problems, because they have been more dependent over time on the CVOA. This is especially true in recent B-seasons, as catcher processors have been excluded from the CVOA since 1992 and "true" mothership have continued to operate inside. Additionally, catcher vessels delivering to "true" motherships would likely experience higher fuel costs due to increased running time to and from port. If "true" mothership operations are allowed to take deliveries from catcher vessels fishing inside the CVOA, that added flexibility would give them an advantage over industry sectors forced to operate outside of the CVOA. During years like 1991 and 1994 when almost all of the A-season harvest occurred inside the CVOA, it would be greater advantage than in years like 1996 when more catch was taken outside of the CVOA.

5.2.4 Impacts on Inshore Sector

Options that would allow additional effort to enter the CVOA during the B-season could potentially have adverse impacts on the Inshore sector. Recall the concerns expressed when the CVOA was initially considered. One point focused on the catcher processor fleet operating in the waters near the shoreplants and harvesting those fish first and moving on to the schools farther away from the plants. This would in turn force catcher vessels to fish farther away from the plants, increasing the harvest costs, and perhaps reducing the quality of the pollock they deliver.

Options that would reduce fishing effort close to the processing plants during the A-season would also likely benefit the Inshore sector. The figures presented earlier in this chapter that show trawl locations in the 1996 A-season reveal that catcher processors and catcher vessels often work in the same general locations. Forcing the catcher processors outside the CVOA would result in less direct competition between them. However, recall the discussion in the catcher processor section, that talks about the negative impacts that sector might incur.

In addition to these issues, the Council added options (in April 1998) which could limit the amount of catch in the CVOA by certain categories of catcher vessels (>155' or >125'). While such options could be used to mitigate sea lion concerns, they would likely impose negative operational impacts on these catcher vessels.

5.3 Effects of TAC Allocations on CVOA Catches

Table 5.1 contains the projected A and B-season pollock catches (in mt) inside and outside of the CVOA for each sector allocation and CVOA alternative combination. Figure 5.14 shows the percent change in A season, B season, and annual pollock catches within the CVOA under each sector allocation and CVOA alternative combination relative to the base year of 1996. While it has been noted that there are two different recent patterns of A-season fishery distribution, only the 1996 pattern will be discussed further for simplicity.

5.3.1 Alternative 2: Status Quo

Keeping the current CVOA definition would result in no change in the projected fishing patterns inside and outside of the CVOA. If catcher processors were excluded from fishing pollock inside the CVOA during both the A and B-seasons, the catch inside the CVOA is projected to decrease by 23% (from 554,628 mt to 426,111 mt). Excluding both the catcher processors and the catcher vessels delivering to "true" motherships would reduce the catch in the CVOA by 40% (to 333,558 mt). Forcing either of these sectors outside of the CVOA during the A-season could cause economic hardships. During bad ice years, for example, this may even force vessels to take additional risks and fish close to the ice or perhaps even forgo harvesting the pollock while roe is prime to avoid the ice.

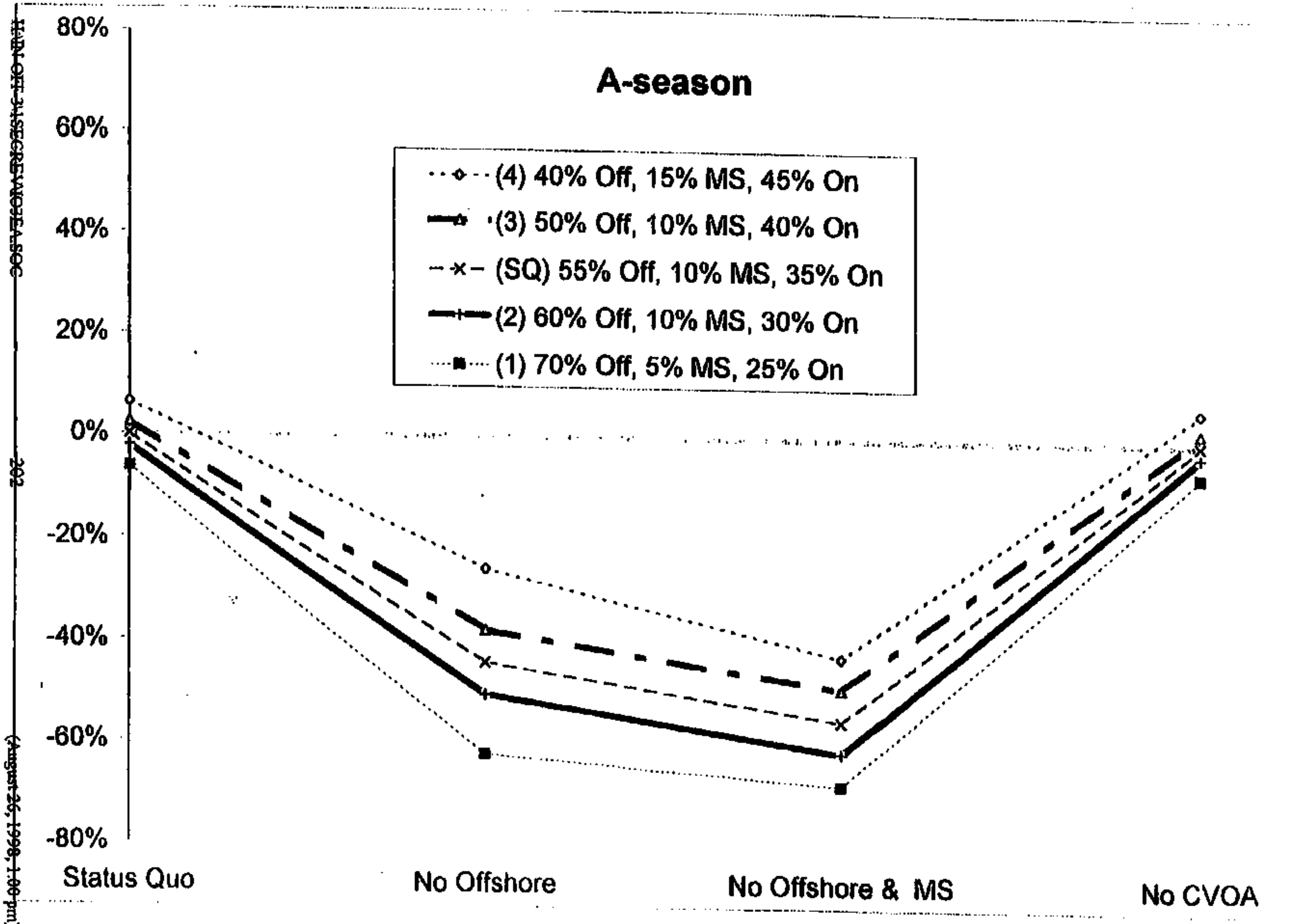

A-season
(4) 40% Off, 15% MS, 45% On
(3) 50% Off, 10% MS, 40% On
(SQ) 55% Off, 10% MS, 35% On
(2) 60% Off, 10% MS, 30% On
(1) 70% Off, 5% MS, 25% On
80%
60%
40%
20%
0%
-20%
-40%
-60%
-80%
Status Quo
No Offshore
No Offshore & MS
No CVOA

Figure 5.14

Table 5.1 Estimated pollock catches inside and outside of the CVOA under each sector allocation and CVOA alternative. 1996 sector distributions were used for all projections, except for the B-season, offshore, No CVOA (2 methods were used).

Pollock TAC assumed to be 1.1 million mt; A:B season split assumed to be 45%:55%.

CVOA Alternative

Sector Allocation Alternative 2: Status Quo

	Status Quo		No Offshore		No Offshore, No MS		No CVOA 1991 Used for Offshore, B		No CVOA 1998 MS Used for Offshore B	
	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA
1. A-season										
Offshore C/P	128,517	146,483	-	275,000	-	275,000	128,517	146,483	128,517	146,483
True MS	32,771	17,229	32,771	17,229	-	50,000	32,771	17,229	32,771	17,229
Inshore	129,665	45,335	129,665	45,335	129,665	45,335	129,665	46,335	129,665	46,335
Total	290,953	209,047	162,436	337,564	129,665	370,335	290,953	209,047	290,953	209,047
2. B-Season										
Offshore C/P	-	330,000	-	330,000	-	330,000	13,356	316,644	328,805	1,195
True MS	59,783	217	59,783	217	-	60,000	59,783	217	59,783	217
Inshore	203,892	6,108	203,892	6,108	203,892	6,108	203,892	6,108	203,892	6,108
Total	263,675	336,325	263,675	336,325	203,892	396,108	277,031	322,969	592,480	7,520
3. Annual	554,628	545,372	426,111	673,889	333,558	766,442	567,984	532,016	883,433	216,567
	0%		-23%		-40%		2%		59%	

Sector Allocation Alternative 3(C): 50% Offshore Catcher Processors, 10% True Motherships, 40% Inshore

	Status Quo		No Offshore		No Offshore, No MS		No CVOA 1991 Used for Offshore, B		No CVOA 1998 MS Used for Offshore B	
	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA
1. A-season										
Offshore C/P	116,834	133,166	-	250,000	-	250,000	116,834	133,166	116,834	133,166
True MS	32,771	17,229	32,771	17,229	-	50,000	32,771	17,229	32,771	17,229
Inshore	148,189	51,811	148,189	51,811	148,189	51,811	148,189	61,811	148,189	61,811
Total	297,793	202,207	180,960	319,040	148,189	351,811	297,793	202,207	297,793	202,207
2. B-Season										
Offshore C/P	-	300,000	-	300,000	-	300,000	12,142	287,858	298,913	1,087
True MS	59,783	217	59,783	217	-	60,000	59,783	217	59,783	217
Inshore	233,020	6,980	233,020	6,980	233,020	6,980	233,020	6,980	233,020	6,980
Total	292,802	307,198	292,802	307,198	233,020	366,980	304,944	295,056	591,716	8,284
3. Annual	590,596	509,404	473,762	626,238	381,209	718,791	602,738	497,262	889,509	210,491
	6%		-15%		-31%		9%		60%	

Table 5.1 Estimated pollock catches inside and outside of the CVOA under each sector allocation and CVOA alternative. 1996 sector distributions were used for all projections, except for the B-season, offshore, No CVOA (2 methods were used).

Pollock TAC assumed to be 1.1 million mt; A:B season split assumed to be 45%:55%.

CVOA Alternative

	Status Quo		No Offshore		No Offshore, No MS		No CVOA 1991 Used for Offshore, B		No CVOA 1998 MS Used for Offshore B	
	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA
Sector Allocation Alternative 3(A): 70% Offshore Catcher Processors, 5% True Motherships, 25% Inshore										
1. A-season										
Offshore C/P	163,567	186,433	-	350,000	-	350,000	163,567	186,433	163,567	186,433
True MS	16,385	8,615	16,385	8,615	-	25,000	16,385	8,615	16,385	8,615
Inshore	92,618	32,382	92,618	32,382	92,618	32,382	92,618	32,382	92,618	32,382
Total	272,571	227,429	109,004	390,996	92,618	407,382	272,571	227,429	272,571	227,429
2. B-Season										
Offshore C/P	-	420,000	-	420,000	-	420,000	16,999	403,001	418,479	1,521
True MS	29,891	109	29,891	109	-	30,000	29,891	109	29,891	109
Inshore	145,637	4,363	145,637	4,363	145,637	4,363	145,637	4,363	145,637	4,363
Total	175,529	424,471	175,529	424,471	145,637	454,363	192,527	407,473	594,008	5,992
3. Annual	448,099	651,901	284,532	815,468	238,256	861,744	465,098	634,902	866,578	233,422
% change	-19%		-49%		-57%		-16%		56%	
Sector Allocation Alternative 3(B): 60% Offshore Catcher Processors, 10% True Motherships, 30% Inshore										
1. A-season										
Offshore C/P	140,200	159,800	-	300,000	-	300,000	140,200	159,800	140,200	159,800
True MS	32,771	17,229	32,771	17,229	-	50,000	32,771	17,229	32,771	17,229
Inshore	111,142	38,858	111,142	38,858	111,142	38,858	111,142	38,858	111,142	38,858
Total	284,113	215,887	143,913	356,087	111,142	388,858	284,113	215,887	284,113	215,887
2. B-Season										
Offshore C/P	-	360,000	-	360,000	-	360,000	14,570	345,430	358,696	1,304
True MS	59,783	217	59,783	217	-	60,000	59,783	217	59,783	217
Inshore	174,765	5,235	174,765	5,235	174,765	5,235	174,765	5,235	174,765	5,235
Total	234,548	365,452	234,548	365,452	174,765	425,235	249,118	350,882	593,244	6,756
3. Annual	518,660	581,340	378,460	721,540	285,907	814,093	533,231	566,769	877,357	222,643
	-6%		-32%		-48%		-4%		58%	

Status Quo Sector Allocation Alternative 2: 55% Offshore Catcher Processors, 10% True Motherships, 35% Inshore

Table 5.1 Estimated pollock catches inside and outside of the CVOA under each sector allocation and CVOA alternative. 1996 sector distributions were used for all projections, except for the B-season, offshore, No CVOA (2 methods were used).

Pollock TAC assumed to be 1.1 million mt; A:B season split assumed to be 45%:55%.

CVOA Alternative

	Status Quo		No Offshore		No Offshore, No MS		No CVOA 1991 Used for Offshore, B		No CVOA 1996 MS Used for Offshore B	
	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA	Inside CVOA	Outside CVOA
Sector Allocation Alternative 3(D): 40% Offshore Catcher Processors, 15% True Motherships, 45% Inshore										
1. A-season										
Offshore C/P	93,467	106,533	-	200,000	-	200,000	93,467	106,533	93,467	106,533
True MS	49,156	25,844	49,156	25,844	-	75,000	49,156	25,844	49,156	25,844
Inshore	166,713	58,287	166,713	58,287	166,713	58,287	166,713	58,287	166,713	58,287
Total	309,336	190,664	215,869	284,131	166,713	333,287	309,336	190,664	309,336	190,664
2. B-Season										
Offshore C/P	-	240,000	-	240,000	-	240,000	9,713	230,287	239,131	869
True MS	89,674	326	89,674	326	-	90,000	89,674	326	89,674	326
Inshore	262,147	7,853	262,147	7,853	262,147	7,853	262,147	7,853	262,147	7,853
Total	351,821	248,179	351,821	248,179	262,147	337,853	361,535	238,465	590,952	9,048
3. Annual	661,157	438,843	567,690	532,310	428,860	671,140	670,870	429,130	900,288	199,712
	19%		2%		-23%		21%		62%	

Two projections were calculated under a no CVOA scenario. In this case the CVOA would be revoked, and catcher processors would no longer be restricted to fishing outside of the CVOA during the B-season. The first projection used the 1991 catcher processor catch distribution, inside and outside the CVOA during the B-season, to estimate catcher processor effort inside the CVOA. Results from that projection indicated that catch inside the CVOA would increase by 2% to 567,984 mt. The other projection used the inside and outside catch rates for catcher vessels delivering to "true" motherships during the 1996 B-season. In this case the catch rates inside the CVOA increased by 59% to 883,433 mt. The use of these two methods basically represent the expected bounds of catch that would occur if the there were no restrictions on who could fish inside the CVOA. This also illustrates the variability, and therefore uncertainty with which we are able to predict.

5.3.2 Alternative 3(A): 70% Offshore Catcher Processors, 5% "True" Motherships, 25% Inshore

Under the current CVOA definition this alternative would result in 19% less pollock being harvested from inside the CVOA. Catcher processors would still be restricted from fishing inside the CVOA during the B-season, but they would be granted 70% of the available BS/AI pollock TAC. The reduction results from the vessels that are allowed to fish inside the CVOA during the "B" being allocated less pollock. If the offshore catcher processors were excluded from the CVOA during both the A and B-seasons the harvest inside the CVOA is projected to drop 49% to 284,532 mt. Restricting both the catcher processors and the "true" motherships would reduce the harvest by 57% to 238,256 mt.

The two projections under the no CVOA alternative result in a 16% reduction and 56% increase, respectively. This once again points out the difference in the amount of fish harvested by catcher processors inside the CVOA during the 1991 B-season, and the catcher vessels delivering to "true" motherships during the 1996 B-season.

5.3.3 Alternative 3(B): 60% Offshore Catcher Processors, 10% "True" Motherships, 30% Inshore

Alternative 3(B) allocates 5% more of the BS/AI TAC to catcher processor, and reduces the allocation inshore by the same amount. If the CVOA is not altered the projected harvests from inside the CVOA would decrease by 6% from the status quo levels. Excluding catcher processors from fishing in the CVOA during both the A and B-seasons would reduce the catch inside by 48%. Both these reductions are smaller than under alternative 3(A) simply because catcher processors are allocated less pollock.

Dropping the CVOA regulations altogether would result in a 4% decrease in pollock catch inside the current boundaries, using the 1991 catcher processor rates. However, if the 1996 "true" mothership rates were used in the projection, the catch inside the CVOA would increase 58%. All of the difference in these two projections is the result of the 1991 rate being about 96% outside the CVOA and the 1996 rate being about 99% inside the CVOA.

5.3.4 Alternative 3(C): 50% Offshore Catcher Processors, 10% "True" Motherships, 40% Inshore

Alternative 3(C) allocates 5% more of the BS/AI TAC to the Inshore sector and 5% less to catcher processors. The allocation to the "true" mothership sector remains the same as the status quo. This allocation, in conjunction with the various CVOA alternatives tend to increase the harvest of pollock inside the CVOA. The only options that reduce the catch inside are those that exclude the catcher processors (15% decrease) and catcher processors and "true" motherships (31% decrease) from operating within the CVOA. The status quo CVOA option results in a projected 6% increase in catch inside. The two estimates of no CVOA result in an estimated 9% increase (1991 catcher processor rates) and a 60% increase (1996 "true" mothership rates)

5.3.5 Alternative 3(D): 40% Offshore Catcher Processors, 15% "True" Motherships, 45% Inshore

This alternative results in higher catches inside the CVOA in all but one case. When both the catcher processors and "true" motherships are excluded from operating in the CVOA during both the A and B-seasons the catch inside decreases by 23%. If only the catcher processors were excluded during both seasons, the catch inside the CVOA is projected to increase by 2%. Catches under the status quo CVOA are predicted to increase by 19% under this TAC allocation. With no CVOA, the catch inside the current CVOA boundaries are expected to increase between 21% and 62%. A 62% increase means that over 900,00 mt would be harvested from the CVOA.

5.3.6 Alternative 6: Council's Preferred Alternative (61% Offshore and 39% Inshore)

The Council's preferred alternative shifts more pollock inshore where it can be harvested inside the CVOA during the B-season. However, the Council also restricted the catcher vessels delivering to the offshore sector from operating inside the CVOA during the B-season. This measure was taken to increase the stability in the offshore sector. Information provided in chapter three of this document shows that the "true" mothership sector has increased their share of the offshore quota between 1991 and 1996. This measure was viewed as a way to keep the amount of pollock processed by the "true" motherships and catcher processors in the offshore sector relatively stabile. It was not viewed as a Stellar sea lion issue.

Some members of the Council were concerned that the "true" mothership sector's processing had increased over the years considered in this study. Because of this increase, the Council concluded that neither the catcher vessels delivering to "true" motherships nor offshore catcher processor operations should be allowed to harvest pollock inside the CVOA during the B-season. This change will force all vessels harvesting pollock from the offshore quota to compete in the same areas during both the A and B-seasons.

The Council also indicated that they plan to address the issue of Stellar sea lions in a more comprehensive fashion outside of the I/O3 context, as soon as adequate information is developed. That being said, the result of this action also reduces the maximum amount of the BS/AI pollock TAC that can be harvested from the CVOA to about 66% (not including CDQ harvests). This is well below the 72.5% that is currently allowed.

5.3.7 Comparison of Roe Recovery Rates

In April 1998, after reviewing the initial draft of this document, the Council requested staff to explore the possibility of comparing roe recovery rates inside and outside the CVOA. Consultation with NMFS biologists and managers indicates that this cannot be done with any confidence in the validity of such comparisons. The reasons are summarized as follows: (1) for at-sea processors, weekly processor reports have product weight and calculated catch based on PRRs. Using the blend data or the observer data catch weight as the denominator will be confounded by timing mismatches between these data sets which could skew comparisons; (2) for inshore vessels, fish tickets provide estimates of catch by ADF&G area, but matching catch from inside/outside with only that roe recovered from inside/outside will be very difficult, if not impossible; (3) for both sectors, the number of 'clean' weeks (where a vessel fished inside/outside for the entire week) is small, and tended to be near the end of the 'A' season - differences in roe maturity as the season progresses would further confound any such comparisons.

5.4 CVOA Summary and Conclusions

The CVOA boundaries used in this analysis were 163°W to 168°W south of 56°N and north of the Alaskan peninsula and the Aleutian Islands. This area represents the CVOA before the western boundary was moved from 168°W to 167°30'W in 1995. Consequently the data used to represent the CVOA in 1996 are from an area slightly larger than the actual CVOA that year.

During 1991 and 1994 over 96% of the observed EBS pollock catch, during the A-season was harvested inside the CVOA. In 1996 each sector harvested between 46-75% of their A-season pollock from inside the CVOA. One possible explanation for this shift in effort is that the ice edge was over 120 nautical miles further north in mid-March of 1996, when compared to 1991 and 1994.

The CPUE was between 67-107% greater inside the CVOA during the 1991 and 1994 A-seasons. In 1996 the trend reversed and CPUE was 48-122% greater outside the CVOA depending on the sector. Firm conclusions should not be drawn from these data because of the small sample sizes outside the CVOA during 1991 and 1994, and the changes in the location of the ice edge.

Pollock were generally larger and more uniform in size inside the CVOA during the 1991, 1994 and 1996 A-seasons. This was most evident in 1996 when pollock were on average 4-6 cm smaller and 0.2 kg lighter outside the CVOA.

Pollock catch by catcher vessels during the B-season increased from about 84% in 1991 to 100% in 1996. Catcher processors harvested about 96% of their B-season pollock outside the CVOA during 1991. That was the last year they were allowed to fish inside the CVOA during the B-season. Since that time, 100% of the catcher processor harvest has taken place outside the CVOA.

CPUE was greater outside the CVOA for each year 1991, 1994, and 1996. However, the pollock that were harvested tended to be larger and of more uniform size inside the CVOA. This is also reflected in the pollock population estimates. The number of pollock inside the CVOA ranged from 18.7×10^9 in 1994 to 7.7×10^9, but only 2.1 and 9.2% of those pollock were less than 40 cm, respectively. Outside the CVOA numbers of pollock were much greater, but so was the percent of pollock less than 40 cm.

The general conclusions drawn from this analysis are that:

- Increased pollock allocations to the offshore sector leads to less pollock catch in the CVOA relative to the status quo;
- During the A-season, excluding the offshore sectors (CVOA alternative 1), and offshore and "true" mothership sectors (CVOA alternative 2) from the CVOA yields *reductions* in A-season CVOA pollock catches;
- During the A-season, no combination of allocation alternative or CVOA alternative leads to *increases* in A-season CVOA pollock catch greater than 6%;
- Predicting B-season removals from the CVOA under the No CVOA alternative is highly speculative regardless of the allocation alternative, and depend considerably on how the offshore fleet is distributed.
- In the B-season and for CVOA alternatives 1, 2, and status quo, *reductions* in CVOA pollock catches are predicted for those sector allocation alternatives that *increase* the offshore sector's allocation (except for the combination of sector alternative 3(C) and CVOA alternative 2);

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6.0 ENVIRONMENTAL ASSESSMENT

6.1 NEPA Requirements

An Environmental Assessment (EA) is required by the National Environmental Policy Act of 1969 (NEPA) to determine whether the action considered will significantly impact the human environment. An Environmental Impact Study (EIS) must be prepared if the proposed action may reasonably be expected to: (1) jeopardize the productive capability of the target resource species or any related stocks that may be affected by the action; (2) allow substantial damage to the ocean and coastal habitats; (3) have a substantial adverse impact on public health or safety; (4) affect adversely an endangered or threatened species or a marine mammal population; or (5) result in cumulative effects that could have a substantial adverse effect on the target resource species or any related stocks that may be affected by the action. An EA is sufficient as the environmental assessment document if the action is found to have no significant impact (FONSI) on the human environment.

6.2 General Discussion

The original SEIS prepared for Amendment 18/23 addressed overall biological impacts, impacts to the human environment, and marine mammal implications of the proposed actions. The action currently contemplated is a continuation of the existing allocations, or altered allocation percentages, for a specified time period. Potential impacts relative to NEPA are expected to be consistent with those previously predicted. Nothing in the examination of the current fisheries leads the analysts to any differing conclusions, with respect to environmental impacts. Total removals of the pollock and Pacific cod resources are controlled by the setting of total allowable catches (TAC), and their monitoring has been enhanced recently to guard against overruns. Allocations between industry sectors will not change total removals from the stocks, and may provide an extra margin of safety against overruns by further partitioning the TACs.

Prohibited species catch (PSC) such as crab, herring, and halibut are controlled as necessary and appropriate by extensive management measures in the BS/AI and in the GOA, including closed areas, PSC quotas, bycatch disincentive programs, and authorizations to the NMFS Regional Director to limit bycatch and close areas. Bycatch rates of all prohibited species are very low in the directed BS/AI pollock fisheries, for all sectors involved, though bycatch of salmon remains an issue for the mid-water pollock fisheries. Measures to control the bycatch of salmon have been implemented by the Council since approval of the original inshore/offshore allocations and are currently under review by the Council. The Council's preferred alternative is not anticipated to change PSC or biological impacts on bycatch species, though there may be changes in fishing patterns that will need to be monitored by the Council.

Marine mammals have direct and indirect interactions with commercial fisheries. Direct interactions include shooting, harassment, disturbance, and entanglement in fishing gear or gear debris. Indirect effects include commercial fisheries related reductions in prey species for marine mammals. The Council's preferred alternative is not expected to measurably increase the direct impacts on marine mammals. Though the Council decision to allocate pollock and Pacific cod between inshore and offshore users could increase vessel traffic to and around coastal communities, the Council and NMFS have established protective buffer zones around major sea lion rookeries and walrus haul outs to minimize disturbance. Shooting and harassment also are banned. Should future problems be identified, establishment of traffic lanes or other measures could be implemented to reduce these interactions. Evidence from previous analyses suggests that the creation of the CVOA, which excludes offshore processing vessels from the area for the pollock B season, likely suppressed harvest rates and total removals of pollock from critical habitat areas, compared to what would have occurred in the absence of the CVOA.

Trophic interactions and the potential for fisheries to degrade the prey available to marine mammals are currently issues of great concern. There are no data available that give conclusive evidence that the pollock fisheries are negatively impacting sea lion populations. Studies of sea lion pups in 1991 show that they generally appear healthy and without signs of anemia or malnutrition. The Council's preferred alternative for to the inshore/offshore preemption problem will not change how harvest quotas are set for the pollock resource. The quotas will continue to be set taking into account a variety of factors including the potential for impacts on marine mammal populations. These considerations, used in combination with existing restrictions on fishing operations such as buffer zones and restrictions on the amount of pollock that may be taken by quarter and area, will provide protection for sea lion populations. Section 7 consultations by NMFS during consideration of the original Amendments 18/23 or Amendments 38/40 concluded that the groundfish fisheries are unlikely to jeopardize the continued existence and recovery of any endangered or threatened species under the jurisdiction of NMFS. However, catch patterns may be impacted by changes currently proposed for the CVOA, which may in turn hold implications for Steller sea lion considerations. These are discussed below.

6.3 Overview of Steller Sea Lion Considerations

The Council's list of alternatives specifically requests the identification and examination of potential 'ecological' implications to the proposed reapportionment of TAC among the several sectors. Most of this type of consideration relates to pollock fishing patterns in the CVOA, and more specifically to the potential impacts to sea lions of existing or future CVOA catch patterns. NMFS has several concurrent initiatives under way with regard to Steller sea lion issues, with the net result being a broad consideration of current management measures, aside from the specific implications of the I/O3 allocation issue. Nevertheless, this EA specifically addresses the sea lion implications of the current inshore/offshore alternatives and options. NMFS Protected Resources Management Division (PRMD) and National Marine Mammal Laboratory scientists have reviewed the preceding analyses with the intent of attempting to identify for the Council any alternatives or suboptions which hold adverse (or positive) implications for Steller sea lions.

While this assessment may not provide definitive guidance in terms of an 'optimal allocation', it is intended to at least address the alternatives in a general fashion, and be able to flag any alternatives that appear to be unreasonable choices in terms of Steller sea lion implications; i.e., for which we are unable to make a Finding of No Significant Impact (FONSI). In April 1998, NMFS issued guidance to the Council that, whatever alternative/options are chosen, they should not result in a 'proportional' increase in pollock removals from the CVOA (which overlaps considerably with the critical habitat area for sea lions). Clarification of the baseline for defining 'proportional' has been provided by NMFS, and is explained in the following sections. Now that a Council decision has been made, a more formal 'Section 7 Consultation' will occur relative to the specific alternative chosen.

Implications of I/O3 attributable impacts, e.g., impacts on Steller sea lions caused by lesser or greater fishing activity in the CVOA, would ideally be addressed in a comprehensive impact analysis. Such ecological impacts could result in "losses" to some individuals and/or groups, some of which might be expressed in the form of nonmarket impacts. These are largely beyond our current capability to measure, but may be referenced in the analysis, if appropriate. Ecological, or 'ecosystem', impacts beyond Steller sea lion issues are even more difficult to project, and are likely beyond the scope of the analysts' ability to predict.

6.4 Effects of the CVOA and Gulf of Alaska Allocation Alternatives on Marine Mammals

Natural histories of marine mammals inhabiting the Bering Sea and neighboring North Pacific Ocean waters were summarized in the analyses for Amendments 18/23 and 38/40; by reference, those entire summaries are incorporated here. Since the 1995 analysis for amendments 38/40, new research information has become available on some marine mammals (Steller sea lions, harbor seals, northern fur seals, and killer whales) that frequent the CVOA and/or Gulf of Alaska (GOA). That new information is summarized below. After those updates, the question of fishery impacts within the CVOA and in the GOA is addressed.

6.4.1 Steller sea lion life history

Movements and distribution: Steller sea lions are found predominately from shore to the edge of the continental shelf, but are not uncommon in waters several thousand meters deep. During the breeding season (summer), adult Steller sea lions (ages 4+) are generally located near shore and near rookeries. Juveniles (1-3 year olds) are less tied to the rookeries during summer, but are often found at nearby haulouts. After the breeding season, sea lions may disperse widely, such that rookeries that were populated in the summer may be vacated in winter. In the Bering Sea, sea lions have been most often sighted over shelf waters from Unimak Pass northward and near the Aleutian Islands. On the shelf, sightings are clustered in the southeastern Bering Sea (including the CVOA). The sighting data, however, has not been standardized by effort and cannot by itself be used to determine relative importance of certain areas to Steller sea lions. Nevertheless, population distribution prior to the decline and more recent telemetry data indicate that the southeastern Bering Sea shelf is an important foraging area for sea lions. This information led to the designation of the Eastern Bering Sea foraging area as critical habitat.

Diet and Foraging: In 13 studies summarized by NMFS (1995), walleye pollock ranked first in importance as a prey item for Steller sea lions in 11 studies, and second in the remaining two. Other prey consumed off Alaska were Pacific cod, Atka mackerel, salmon, octopus, squid, Pacific herring, capelin, sand lance, flatfishes, and sculpins. Most of the prey are schooling fish, many of which are commercially exploited. Juvenile sea lions tend to eat smaller fish than adults. Consequently, the overlap in the size distribution of their food with commercial fisheries may be less than that of adults.

Sea lion pups (less than 1 year old) are more restricted than adults in their foraging range, both vertically and horizontally (Merrick and Loughlin 1997). By their sixth month (January), pups were able to range more than 300 km in a trip, but most of their trips offshore were brief (< 1 day), and most of their dives were shallow (<10 m) and short (< 1 min). In summer, adult females with pups foraged close to shore (usually < 20 km) and to shallow depths (most < 30 m), while in winter, they ranged much farther (some > 500 km offshore) and dove to greater depths (often > 250 m).

Evidence obtained from scats (feces) collected on rookeries in the GOA and Aleutian Islands region indicate that pollock and Atka mackerel are important prey items for Steller sea lions, but the evidence also indicates that diet diversity may be as important as particular prey type. Merrick et al. (1997) examined scats from sites throughout the region, developed indices of prey diversity based on those scats, and then correlated the observed diversity to population trends at those sites. The results indicated that population trends worsened as diet diversity decreased.

The value of roe-bearing versus non-roe-bearing pollock: The relative value of any prey depends on at least three factors. First, the nutritional characteristics of the prey tissues (in terms of caloric and nutritional content) must determine, in part, the relative value of the prey. Different species of prey, and prey of the same species but different age, size, or physiological condition have different nutritional content. Presumably, pollock have greater nutritional value, both in terms of calories and nutrients, when they are bearing roe. Therefore, it is reasonable to expect that consumption of roe-bearing pollock may be an advantage to sea lions.

Second, the relative value of a prey type must also depend on the energetic costs of capturing, consuming, and digesting the prey. It is likely that the aggregation of roe-bearing pollock leads to a reduction in sea lion energetic costs associated with foraging. The aggregation of roe-bearing pollock appears to be relatively predictable in, for example, Shelikof Strait or the southeastern Bering Sea, which supports the idea that these are important foraging areas for sea lions.

Third, the relative value of prey depends, in part, on the nutritional needs of the predator. Roe-bearing pollock are available at the end of the winter season when sea lions are likely to be in their worst condition. The added nutritional value of roe-bearing pollock may be essential for sea lions, particularly reproductive females, to regain good condition. Roe-bearing pollock may also be a particular benefit to young sea lions, with less developed foraging skills and relatively greater nutritional demands for growth and thermoregulation.

These arguments, which are more theoretical than scientifically demonstrated, all suggest that the availability of roe-bearing pollock may be of particular benefit to Steller sea lions. However, the argument that pollock may provide better prey when they are roe-bearing does not lessen the potential value of pollock during the remainder of the year. Sea lions eat pollock throughout the year. Therefore, our best information suggests that pollock are an important prey throughout the year, but that pollock in roe-bearing condition may provide a particular advantage to sea lions for the reasons listed above.

Critical life history stages and critical seasons: Steller sea lions, like other pinnipeds, probably face their most critical transition during the post weaning phase. The strategy for most pinnipeds involves a period of nursing when the pup gains relatively large amounts of weight (i.e., increasing three- or four-fold or more) to provide a large energy store to sustain the pup after weaning and as it learns to forage on its own. The length of time of the nursing period varies considerably for different pinnipeds, from days to months or even several years, depending on a number of factors such as climate, environmental conditions, location of birth, vulnerability of the adult female to predators, annual reproductive rate, and so on. The development of essential and sufficient foraging skills may also take months or years.

For Steller sea lions, births peak in early June and virtually all births in a year have occurred by the end of that month. For at least the next four months, pups nurse and gain considerable weight. Weaning may be abrupt (i.e., the pup is abandoned and all suckling stops) or may occur over a prolonged period (that is, the pup continues to nurse in spite of its physical development and the development of foraging skills, and the resulting energy demands placed on the adult female). The process of weaning for Steller sea lions is poorly understood due to the often inaccessible locations where births occur, the highly variable length of the nursing period, and the fact that many (if not most) pups are weaned in their first winter. Pups may wean as early as four months of age, and most pups have probably been weaned by the next birthing season, if not sooner (York et al. 1996). Some pups may nurse longer, which makes the most sense if the adult female is not pregnant or does not give birth and therefore may have more energy to direct to her pup.

Due to the chronology of pupping, nursing, and weaning, many pups may be weaned in the winter months; i.e., October through March or April. Therefore, many pups may face the critical transition to independence during a period when environmental conditions may be the most harsh; sea surface conditions worsen, prey availability decreases, and winter weather conditions increase energy requirements to thermoregulate (Merrick and Loughlin 1997). A precise or quantitative description of the increased energy costs associated with winter months is not possible at this time, but the period from October to March or April is likely the most critical period of the year for pups and juveniles.

The reproductive cycle of Steller sea lions may also result in stress to adult females during the winter period. Parturient females may lose considerable weight and condition during the nursing period, when they may also be pregnant. Delayed implantation probably reduces the metabolic demands of pregnancy during the period when the female is nursing, but implantation must occur sometime during winter months when, again, environmental conditions are most harsh. Merrick and Loughlin (1997) found that adult females studied in winter months did not increase their overall foraging effort compared to adult females studied in summer months. This may be because they reduce their energy demands when they wean their pups. But it is also likely that sea lions do not maintain a steady body condition throughout the year, but rather experience periods of relatively good condition and other periods when their condition may be poorer. Perez and Mooney (1986) estimated that metabolic demands may be 60% greater for lactating versus non-lactating female fur seals, so lactation may reduce considerably the condition of an adult female.

If condition varies throughout the year, and winter imposes increased demands that may lead to a decline in body condition, then the remainder of the year may also be important in that it provides an essential period for sea lions to recover and achieve good condition prior to the next winter. Therefore, while it is important to recognize that sea lions may be most vulnerable to harsh winter conditions, their ability to withstand those conditions may depend, in part, on the availability of prey during the rest of the year. Winter is probably the most demanding period, but other times of the year are also important.

Listing status: Steller sea lions were listed as threatened under the Endangered Species Act by emergency rule in April 1990 after a significant (-64%) decline in their population size in Alaska between the mid 1960s (or possibly earlier) through 1989. From 1989 to 1994, the decline continued (another 24%), with most losses in southwest Alaska (western and central GOA, Bering Sea, and Aleutian Islands). The status review completed by NMFS in 1995 was part of the process of considering a reclassification of their listing to endangered. In 1997, the species was split into two populations (to the east and west of 144°W longitude); the status of the eastern stock was left as threatened, while the western stock was reclassified as endangered.

Population viability: Population viability analyses (Merrick and York 1994) predict that the western stock will be reduced to very low levels (< 10 animals) within 100 years if 1985-94 trends persist. Times to extinction were consistent when the population model used aggregate counts on rookeries from the Kenai Peninsula to Kiska Island (63 years to extinction), or individual trends for each of the 26 rookeries in the area (95 years). If trends from 1989-94 were used, neither type model (aggregate versus individual rookery) predicted extinction of the western population, but the decline would continue and could result in as few as 3,000 adult females within 20 years, at which time individual rookeries would disappear. The results of this modeling exercise, combined with continued declines in pups counts, prompted the Recovery Team to recommend a change in listing status for the western population.

Counts were conducted in 1996 from SE Alaska through Attu Island in the western Aleutian Islands. Between 1994 and 1996, the overall count at trend sites decreased by 7.8% (nonpups). In the Aleutian Islands region, these counts were up by 1.1%, and in the eastern Aleutian Islands the count was up by 6.6%. However, the Kenai-to-Kiska trend decreased by 4.6%.

In 1997, counts were conducted from Kenai Peninsula through the eastern Aleutian Islands to determine if trends observed from 1994 to 1996 continued. In the eastern Aleutian Islands, the counts were down by 4.9% at all 40 sites counted, and 13.2% at the ten trend sites. Thus, the most recent counts indicate that the decline is continuing.

Management Actions Taken by NMFS and NPFMC: The record of specific Steller sea lion conservation management actions taken by NMFS and the NPFMC since the 1990 listing includes:

- Creation of 3-nautical-mile (nmi) radius no-entry buffer zones around all sea lion rookeries west of 150° W longitude (April 1990);

- Prohibition of shooting at or near sea lions and reductions in the number of sea lions that could be killed incidental to commercial fishing (April 1990);

- Spatial allocations, and conditions on temporal allocations of pollock TAC in the GOA (June 1991);

- Creation of year-round 10-nmi radius trawl fishery exclusion zones around all rookeries west of 150°W longitude, and 20-nmi radius trawl fishery exclusion zones around 6 rookeries in the eastern Aleutian Islands during the BS/AI pollock A-season (June 1991, January 1992, and January 1993);

- Publication of a final recovery plan for the species written by the recovery team for NMFS (December 1992);

- Designation of critical habitat under the ESA in April 1993 (58 FR 17181). Specific areas designated as critical habitat were (1) all rookeries and major haul outs (where greater than 200 sea lions had been counted, but where few pups are present and little breeding takes place), including a) a zone 3,000 feet (914 m) landward and seaward from each site east of 144°W longitude (including those in Alaska, Washington, Oregon and California); and b) a zone 3,000 feet (914 m) landward and 20 nmi (36.5 km) seaward of each site (36 rookeries and 79 haul outs) west of 144°W longitude where the population had declined more precipitously and where the former center of abundance of the species was located; and 2) three aquatic foraging regions within the core of the species' range;

- Splitting of the species into eastern and western populations and changing of the listing status of the western population to endangered (May 1997); and

- Protection of forage fish from directed fishing (April 1998).

The rationale behind each management action was outlined in each Federal Register notice announcing the action. The shooting prohibition, reduction in incidental take mortality and creation of no-entry zones around rookeries were enacted to limit potential for direct human-related mortality, and had only minor impact on groundfish fisheries in the BS/AI and GOA. Spatial-temporal allocations of pollock TAC in the GOA, and creation of trawl-exclusion zones around rookeries were promulgated as part of the ESA Section 7 consultation for the 1991 GOA pollock TAC specifications. In that document, NMFS reviewed and presented data which showed that (1) pollock is a major component of the sea lion diet; (2) sea lions collected near Kodiak Island in the 1980s were lighter, had smaller girths and thinner blubber layers than sea lions from the same area collected in the 1970s; and (3) the pollock fishery had become increasingly concentrated in time and in areas thought to be important to sea lions. NMFS concluded that the spatial and temporal compression of the pollock fishery in the 1980s in both the GOA and BS/AI could have created localized depletions of Steller sea lion prey, which in turn could have contributed to or exacerbated the decline of the sea lion population (5 June 1991). Much of the area in which the pollock fisheries (and other groundfish trawl fisheries; e.g., Atka mackerel and Pacific cod) became spatially compressed is designated as critical habitat for Steller sea lions (Fritz 1993abc). Estimated removals of pollock from Steller sea lion critical habitat in the BS/AI region have increased from between 250,000-300,000 mt from 1981-1986 (between 20-30% of total BS/AI pollock landings) to between 410,000-870,000 mt in 1987-96 (35-69% of total landings). Much of this increase in pollock landings from critical habitat came from the eastern Bering Sea foraging area, which overlaps considerably with the CVOA. The species was split into two stocks based largely on genetics information (Bickham et al. 1996). Finally, certain forage fish were removed from the "other" category of the BS/AI-FMP and protected from directed fisheries, to ensure that these potential prey for marine mammals and other predators were not depleted.

Pacific harbor seals

Harbor seals are found in all coastal areas of the GOA and are widely distributed in nearshore habitats of the Bering Sea (Pitcher, 1980a; Calkins, 1986; Frost and Lowry 1986). They are generally thought of as a coastal, non-migratory species, although individuals are occasionally observed as far as 100 km offshore (Pitcher, 1980a).

Only limited information is available on the diet of harbor seals in Alaska. Pitcher (1980a; b) reported that the harbor seal diet in the GOA was composed of at least 27 species of fish, as well as cephalopods (both octopi and squids) and shrimp in 269 stomachs analyzed. The seven principal prey were (in order of frequency of occurrence): pollock (21%), octopus (17%), capelin (9%), herring (6%), Pacific cod (6%), flatfishes (5%), and eulachon (5%). There were some significant regional differences in the harbor seal diet throughout the GOA. Octopus, capelin and Pacific cod were more important components of the diet in the Kodiak area, while pollock was the principal prey in the Prince William Sound area. Fewer data are available on harbor seal food habits in the Bering Sea (16 stomachs analyzed by Lowry et al., 1986 from animals collected in Bristol Bay). Herring and capelin were the principal components of the diet of harbor seals in Bristol Bay.

Little information is available on the size composition of fish in the diet of harbor seals compared with Steller sea lions and northern fur seals. Pitcher (1981) found that harbor seals collected from the same area and during the same period as Steller sea lions consumed smaller pollock (mean length of pollock ingested by harbor seals = 19.2 cm; for Steller sea lions, 29.8 cm). This suggests a low overlap in body size between pollock harvested by the fishery and those ingested by harbor seals.

Recent trends in abundance vary markedly for different harbor seal populations in Alaska and the North Pacific. The central and western GOA stock may have decreased recently by as much as 90% (Pitcher 1990) since the 1970s. Populations in other portions of the range may be more stable (southeast Alaska) or increasing (British Columbia; Olesiak et al. 1990). The decline in harbor seals in the central and western GOA has not been explained.

The Bering Sea stock of harbor seals was surveyed in 1991 (Bristol Bay and the northern side of the Alaskan Peninsula), 1994 (the Aleutian Islands), and 1995 (northern side of the Alaskan Peninsula and Bristol Bay/Togiak NWR). The total mean count for 1991 survey was 9,324 seals, with 797 from Bristol Bay and 8,527 from the north side of the Alaskan peninsula (Loughlin 1992). The sum of the mean counts from the 1994 Aleutian survey was 2,056 (NMFS unpublished), yielding a total mean count for all three areas of 11,380. The 1995 counts were 7,785 (cv = 0.044) for the northern side of the Alaskan Peninsula, and 955 (cv = 0.071) for Bristol Bay. These numbers indicate a decline of harbor seals in this area of about 40% since the 1970s.

Northern fur seals

The northern fur seal is a migratory species, returning to the Bering Sea (both Pribilof Islands and Bogoslof Island) in summer to breed. For the remainder of the year, fur seals are distributed throughout the North Pacific Ocean. From May to December, seals forage in and transit through the CVOA and, during August and September, this region is particularly important for pregnant and lactating females, juveniles and departing adult males. Recent studies of fur seal pup migration indicate that newly weaned migrating pups move through and may reside in the CVOA during the period from November to February (Ragen et al. 1995).

The most recent estimate for the number of northern fur seals in the North Pacific Ocean is approximately 1,000,000, down approximately 20% from the 1.25 million estimated in 1974, and perhaps as much as 60% from the numbers observed in the early and mid 1950s. Since a short period of apparent increase in the early 1970s, counts declined sharply in the late 1970s and then began to stabilize in the 1980s. Northern fur seals are listed as depleted under the MMPA because the population has declined to less than 50% of the estimated size in the 1950s. The St. George population, which is closest to the CVOA, declined until approximately 1990 and stayed at about the same level until 1996, when it showed a moderate increase. The larger St. Paul Island population has been stable since 1980.

Important known sources of mortality over the past four decades include direct killing and entanglement in marine debris. From 1956 to 1974, over 300,000 adult females were killed in land-based and pelagic harvests. Many of those females had nursing pups, which also must of succumbed from starvation. The killing of these animals accounts for a large portion of the decline observed in northern fur seals after the mid 1950s (York and Hartley 1981). When the harvest was ended, the population appeared to start a recovery in the early and mid 1970s, but then declined further into the 1980s and eventually reached a period of apparent stability at a much reduced level. One possible (partial) explanation for the continued decline in the late 1970s and 1980s is mortality from entanglement in marine debris associated with commercial fishing (Fowler 1985; Fowler et al. 1994). Entanglement monitoring programs conducted on the Pribilof Islands throughout the 1980s and 1990s have found that trawl netting is a significant component of entanglement debris found on northern fur seals (Fowler et al. 1994). While harvests of females and entanglement in fishing gear have contributed to the decline in the size of the population since the 1950s, there is also evidence that the carrying capacity of the North Pacific and Bering Sea for fur seals changed substantially in that period (NMFS 1993). The apparent change in carrying capacity may reflect a natural oceanographic phenomenon, or the impact of intense fishing, or both.

The diet of the northern fur seal in the GOA and the Bering Sea has been studied at least since the mid 1950s and has been summarized by Kajimura (1984) and Perez and Bigg (1986). In 1,800 stomachs from fur seals collected in the Bering Sea from 1960-1974, pollock was a principle prey species, but it occurred in less than 25% of the samples (Kajimura 1984, Perez and Bigg 1986). In contrast Sinclair et al. (1996) found that juvenile walleye pollock were present in approximately 80% of fecal and gastrointestinal samples obtained from the Bering Sea between 1981 and 1990.

In the GOA, data exist for the months of February-July, and indicate a varied diet composed primarily of herring, Pacific sand lance, capelin, squid and pollock. In the Bering Sea, data exist for the months of June-October, and also reveal a varied diet of small schooling fish and squid. Pollock composed a larger percentage of the diet in the Bering Sea (35% of diet volume) than in the GOA (5%) and Atka mackerel comprised between 10-20% of the diet in the Bering Sea during June. Foraging occurs to depths up to 200 m over both shelf and pelagic waters (Kajimura 1984; Loughlin et al. 1987; Gentry et al. 1986; Goebel et al. 1991).

The data for northern fur seals, although obtained primarily from females, suggest that they ingest smaller fish than Steller sea lions. Perez and Bigg (1986) reported that fur seals collected in the North Pacific Ocean ingested primarily 1-2 year-old pollock (total range of 4-40 cm; n = 1,721 pollock from 71 stomachs). Sinclair et al. (1994) reported that juvenile pollock (especially 0- and 1-year-old fish) are the principle prey of lactating fur seals. In addition, the relative strength of pollock year classes is reflected in the fur seal diet, so that pollock from strong year classes show up with markedly higher frequency as the year class ages (Sinclair et al. 1994). The largest fish consumed by northern fur seals in the collections of Perez and Bigg (1986) (n > 3,000 fish) was a 41-cm salmon. Pollock and Atka mackerel fisheries primarily catch fish (target species) larger than 30 and 35 cm, respectively (Hollowed et al. 1991; Lowe 1991; Wespested and Dawson 1991). Consequently, the overlap between fisheries takes and the preferred fish sizes of northern fur seals may be low, a conclusion also reached by Swartzman and Haar (1983).

Killer Whales

One of the most common marine mammal/fishery interactions in the Bering Sea is between longline fishing vessels (particularly those targeting on sablefish or Greenland turbot) and killer whales. While this proposal does not deal with longline vessels, it should be noted that the area where interactions are most frequent is a triangular-shaped area from Unimak Pass to the Pribilof Islands to Seguam Pass, much of which also overlaps with the CVOA (Yano and Dahlheim 1995.) The shelf edge from Unimak Pass to the Pribilof Islands also has a preponderance of the killer whale sightings in the platform of opportunity sighting data, particularly in May-December, but the preponderance may simply reflect the distribution of sighting effort. Interactions between killer whales and trawlers have not been as frequent as with longliners in the area. Killer whale populations off Alaska are thought to be stable, and they probably number in the many hundreds of animals, not in the many thousands. This estimate is based on sighting information and surveys conducted in the 1980s, and replicate surveys conducted in 1992 and 1993 by NMFS.

6.4.2 Interactions between the Pollock Fishery and Marine Mammals within the CVOA

Walleye pollock comprises the largest portion of groundfish occurring in the Bering Sea. Pollock is consumed by marine fishes (including cannibalistic pollock), human fisheries, marine birds, and marine mammals. The availability of pollock to these consumers depends on the size structure of pollock populations, their areal and temporal distributions, and the areal and temporal distribution of the consumers. The amount of pollock taken by each consumer type must vary annually, but Livingston (1993) estimated that marine fishes consumed the largest portion (principally ages 0-1), followed by human fisheries (age 3+), marine birds (ages 0-1), and marine mammals (ages 1+).

The amount of pollock taken by fisheries is determined by a complex stock assessment and TAC-setting process that uses the best available commercial and scientific information on both the fish stocks and the fishery. TAC-setting is done conservatively, in recognition of the fact that maintenance of a healthy ecosystem requires allowance of unfished biomass sufficient to support other consumers (e.g., marine birds and mammals). In addition to the conservative TAC-setting process, areal and time closures have been imposed to disperse fishing effort and prevent competition between various sectors of the fishery. The CVOA and associated allocation regimen was originally established as a mechanism for limiting competition between inshore vessels and offshore factory trawlers. These dispersion measures also benefit other marine consumers by preventing localized depletions of prey.

The CVOA encompasses waters known to be important for Steller sea lions and northern fur seals, and likely to be important (at least in part) for harbor seals. Given the current understanding of foraging patterns by these marine mammals, it is not possible to demonstrate, with certainty, that these species do or do not compete with fisheries for pollock. However, the potential for competition could be exacerbated given the recent (1994 to 1997) 81% decline in the summer CVOA pollock biomass estimate, and the recent (also 1994 to 1997) tripling in summer pollock harvest rates by the fishery in the CVOA.

The CVOA overlaps considerably with the eastern Bering Sea foraging area designated as part of Steller sea lion critical habitat in 1993. The overlap is not total and management's primary concern is with the effect of the fishery within areas designated as critical habitat. Nevertheless, in the absence of fishery management measures that distinguish between these two areas, the effects of fishing activities within the CVOA may be indistinguishable from those within Steller sea lion critical habit (the eastern Bering Sea foraging area). Because of the extensive degree of overlap (Fig. 5.11), pollock catches from the CVOA and Steller sea lion critical habitat are closely correlated in both the A- and B-seasons (Figs. 6.1 and 6.2; Table 6.1; Fritz 1993c).

Table 6.1. Observed catches of pollock (in mt) and percent of seasonal observed pollock caught in the Catcher Vessel Operational Area (CVOA) and in Steller sea lion critical habitat. There is considerable overlap in CVOA and critical habitat; therefore, much of the observed catch in each area is the same. Observed percent distribution was used to estimate total catches in each area (Est. Catch).

		A-Season			B-Season			Annual		
Year	Area	Observed	Percent	Est. Catch	Observed	Percent	Est. Catch	Observed	Percent	Est. Catch
1992	CVOA	155,572	47%	229,325	226,411	46%	334,525	381,983	46%	563,850
	Critical Habitat	173,283	53%	255,433	243,927	50%	360,405	417,210	51%	615,838
	Total for Season			485,274			727,911			1,213,185
1993	CVOA	180,488	49%	307,023	224,369	50%	381,217	404,857	50%	688,241
	Critical Habitat	204,285	56%	347,504	236,192	53%	401,305	440,477	54%	748,809
	Total for Season			622,680			761,053			1,383,733
1994	CVOA	324,363	91%	582,431	190,221	43%	334,976	514,584	64%	917,407
	Critical Habitat	302,936	85%	543,956	208,482	47%	367,133	511,418	64%	911,089
	Total for Season			639,943			782,152			1,422,095
1995	CVOA	358,657	93%	553,076	215,566	49%	359,593	574,223	70%	912,669
	Critical Habitat	345,113	89%	532,190	213,450	49%	356,063	558,563	68%	888,253
	Total for Season			597,238			729,957			1,327,195
1996	CVOA	193,001	57%	315,298	188,978	49%	329,690	381,979	53%	644,988
	Critical Habitat	187,663	56%	306,578	189,131	49%	329,957	376,794	52%	636,534
	Total for Season			549,828			672,012			1,221,840
1997	CVOA	235,359	77%	396,850	125,327	36%	224,054	360,686	55%	620,904
	Critical Habitat	228,024	75%	384,482	125,405	36%	224,194	353,429	54%	608,676
	Total for Season			512,230			626,058			1,138,288

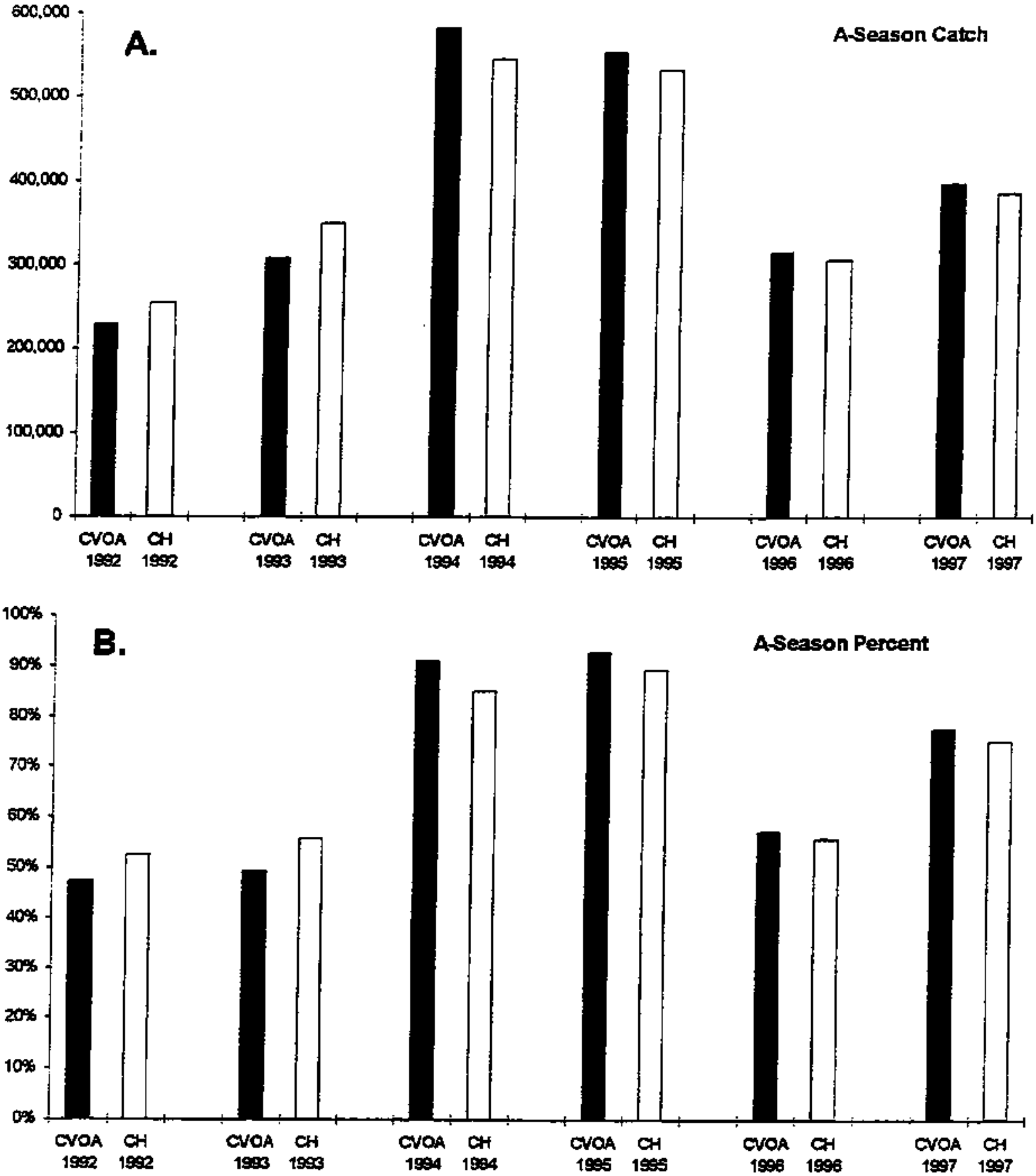

Figure 6.1 A-season catches (A; in mt) of pollock in the BS/AI in 1992-97 in the Catcher Vessel Operational Area (CVOA) and in Critical Habitat (CH) for the Steller sea lion. Percent of total A-season BS/AI pollock catch is shown in B.

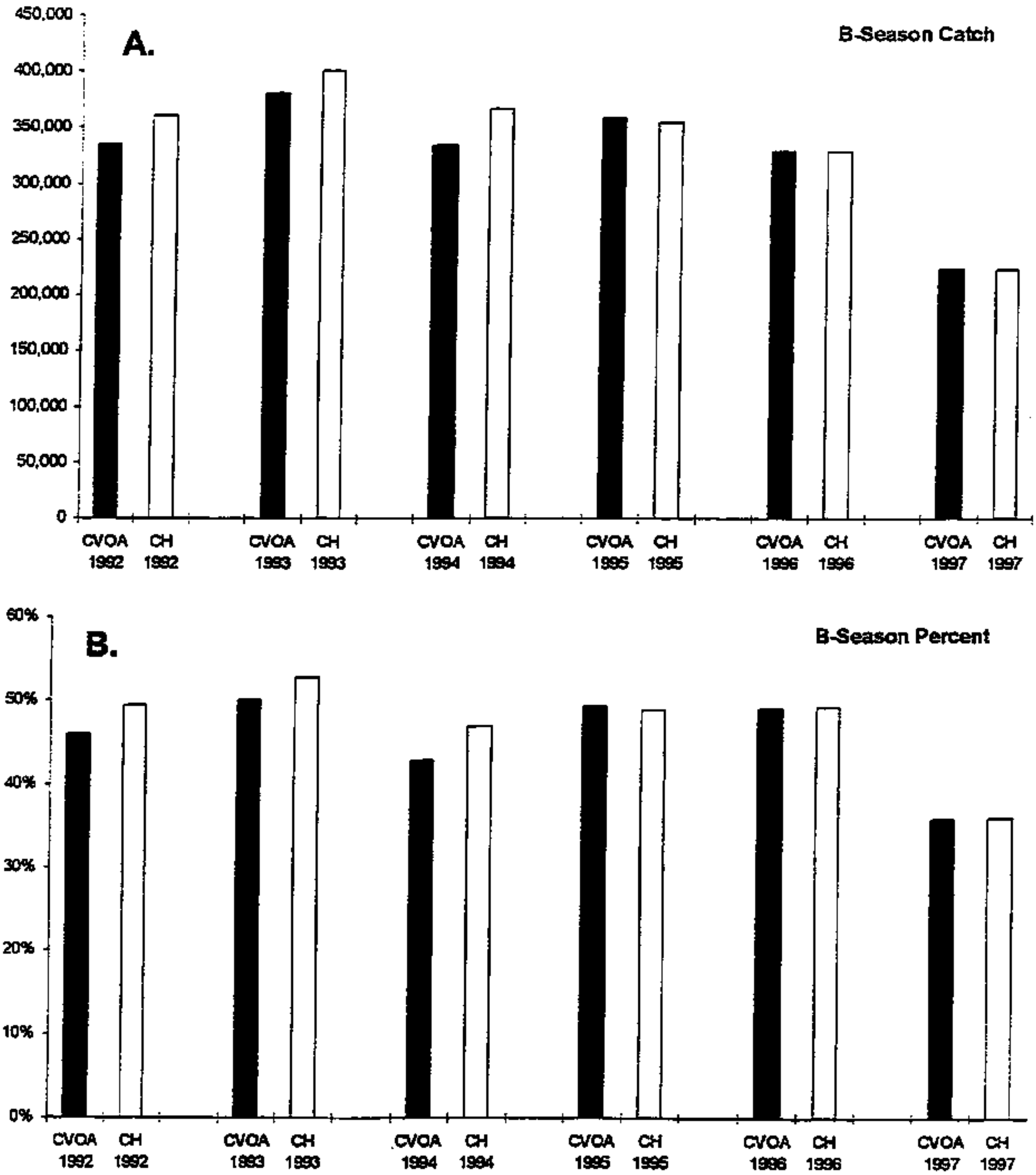

Figure 6.2 B-season catches (A; in mt) of pollock in the BS/AI in 1992-97 in the Catcher Vessel Operational Area (CVOA) and in Critical Habitat (CH) for the Steller sea lion. Percent of total B-season BS/AI pollock catch is shown in B.

Fritz (1993c) compiled pollock catches from critical habitat in the first quarter from 1977-1992. Pollock removals from critical habitat during the first part of the year increased from negligible levels in the late 1970s to over half a million mt in the mid 1990s. Pollock removals from critical habitat were less than 50,000 mt annually during the first quarters of 1977-1985, but varied from 1986-1991 (i.e., 75,000 mt in 1989 to almost 450,000 mt in 1987). While A-season pollock catch from both the CVOA and critical habitat increased from about 240,000 mt in 1992 to 320,000 mt in 1993, the percent of total A-season BS/AI catches from those areas remained at about 50%. In 1994 and 1995, A-season pollock removals from the two areas increased to between 530,000 and 580,000 mt, or about 85-93% of the total A-season removals in those years. Areas outside of the CVOA and critical habitat were used by the A-season fishery in 1996 and 1997, resulting in decreases in both magnitude and percent removals compared with 1994 and 1995. However, approximately 75% (almost 400,000 mt) of the A-season pollock were removed from the CVOA or critical habitat in 1997.

During the B season, pollock removals from the CVOA and critical habitat ranged between 330,000-400,000 mt from 1992-1996, which represented approximately 50% of the B-season catch each year (Fig. 6.2). B-season catches from the CVOA and critical habitat dropped to about 220,000 mt in 1997, about one-third of the B-season BS/AI pollock landings.

About 10-30% of total annual pollock catch came from the CVOA or critical habitat from 1977-86. This percent reached 50% in 1992-93, increased further to 65-70% in 1994-95, and then decreased to just over 50% in 1996-97 (Figure 6.3).

6.4.3 Effects of Sector Allocation and the CVOA alternatives on marine mammals

The various sector allocation and CVOA alternatives could affect pollock removals from the CVOA in the following manner. First, increases in the inshore sector's allocation will likely lead to greater pollock removals from the CVOA and critical habitat. Second, exclusion of various fishing sectors from the CVOA during the A-season will likely decrease pollock removals from the CVOA and critical habitat. The exclusion of the offshore sector from the CVOA in the A season would likely result in the greatest reduction in pollock removals. Third, under the No CVOA alternative, B-season pollock catch from the CVOA is difficult to predict and depends on the scenario to distribute offshore effort during the season. If both the offshore vessels and "true" motherships are excluded, then CVOA B-season catch of pollock will likely be reduced.

Increases in pollock catch outside the CVOA would tend to increase catches of small, young pollock (< 40 cm in length). Growth of pollock is slower to the north and west along the outer shelf in the eastern Bering Sea (Wespestad et al. 1997). Therefore, while more smaller pollock may be caught, many of these would be in the same yearclass as those caught to the southeast in the CVOA. Also, age 1-3 pollock tend to be distributed more to the northwest than to the southeast in the Eastern Bering Sea, and actions which would increase effort in these areas would lead to greater removals of juvenile pollock. However, selectivity of age 1 and 2 pollock by the fishery is very low (5% or less; Wespestad et al. 1997). On the average, pollock fisheries in the eastern Bering Sea have caught only about 2% of the 2-year-old pollock each year (Fritz 1996). Therefore, while increases in effort north and west of the Pribilof Islands (outside of Steller sea lion critical habitat) would lead to higher catches of young pollock, it is not expected that this would significantly affect either the yearclass size of pre-recruit pollock or the availability of pollock to sea lions.

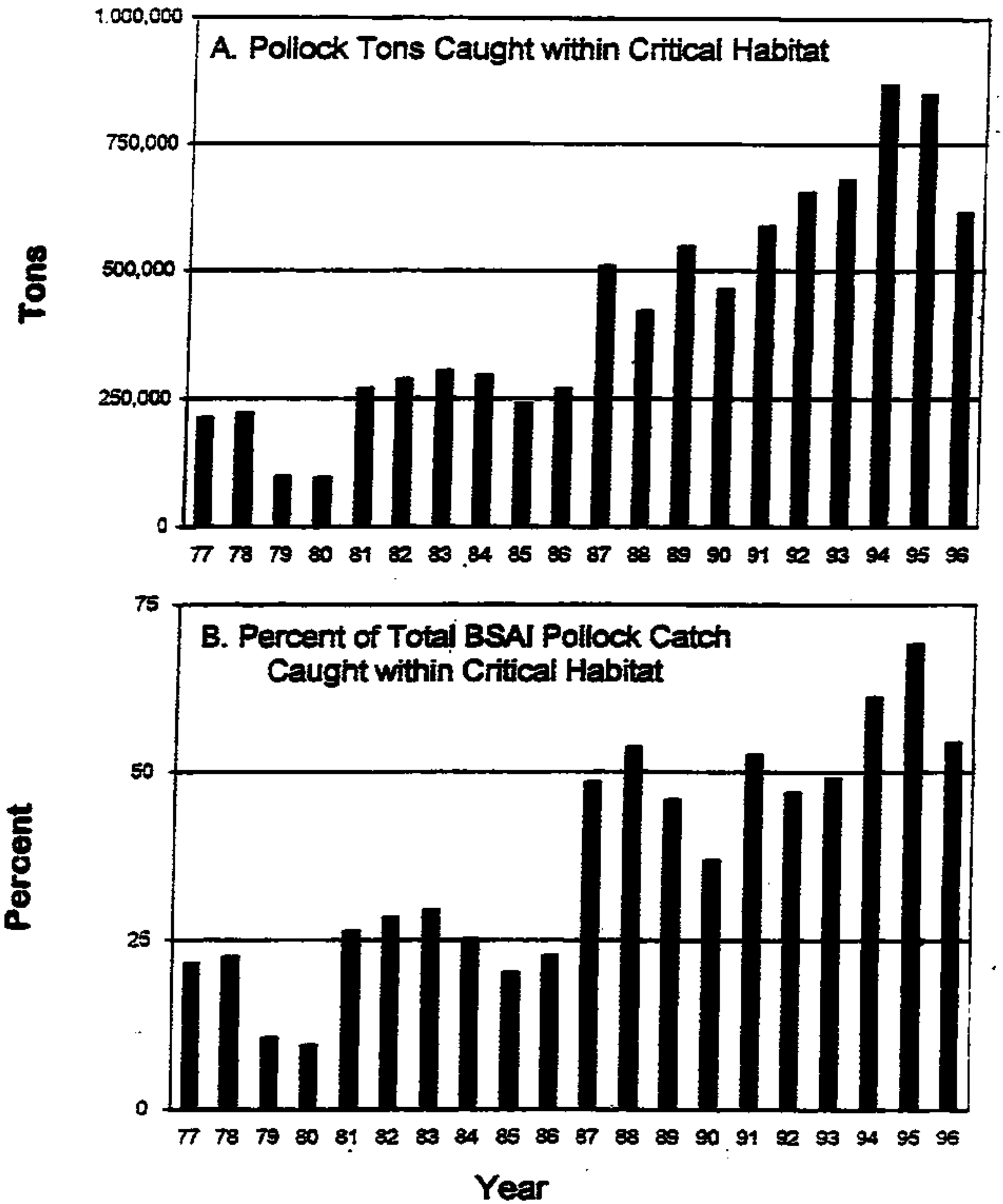

Figure 6.3 Pollock fishery effort within Steller sea lion critical habitat in the Bering Sea/Aleutian Islands region.

The chosen combination of sector allocation and CVOA alternatives should not increase the potential for competition between the fishery and Steller sea lions. Certain combinations under consideration could result in a larger proportion of the pollock TAC being removed from the CVOA and, therefore, from Steller sea lion critical habitat. In turn, this could only increase the potential for detrimental competition. The guideline suggested to prevent such an increase is that the chosen combination not increase (relative to the status quo) the proportion of the total annual TAC that could be taken from the CVOA (and overlapping critical habitat). Under the status quo, the proportion that could be taken from the CVOA (maximum) is determined on the basis of 1) A:B season apportionments, 2) inshore:offshore:"true" mothership allocations, 3) allowance for all CDQ fishing in the CVOA, 4) allowance for all "true" mothership fishing in the CVOA during the B season, and 5) the assumption that no more than 9% of the offshore allocation during the B season could be taken by catcher vessels in the CVOA.

6.4.4 Maintaining Current Levels of CVOA Pollock Removals

Because of marine mammal concerns, NMFS has advised the Council that they cannot support any Inshore/offshore alternatives that proportionally increase pollock harvests from the CVOA. NMFS has also provide guidance on the percentage of catch that they have determined to be the baseline, and therefore should not be exceeded under an Inshore/offshore allocation.

The bottom right hand corner of Table 6.1 shows how NMFS determined that 72.5% of the BS/AI pollock harvest could have been taken from the CVOA during 1996/97. That percentage was calculated using the following assumptions:

1. The inshore, "true" mothership, and catcher processor sectors processed 35%, 10%, and 55% of the BS/AI TAC, respectively, in 1996.

2. Nine percent of the pollock processed by catcher processors was harvested by catcher vessels, and all the catcher vessel's catch could be harvested inside the CVOA.

3. All of the pollock harvested by catcher processors during the B-season was taken outside the CVOA, and all the catcher processors catch in the A-season could be taken inside the CVOA.

4. All harvests by catcher vessels delivering to the inshore and "true" mothership sectors, in both the A-season and the B-season, could be taken from the CVOA.

5. The pollock TAC was split for a 45% harvest in the A-season and a 55% harvest during the B-season.

Using 72.5% as the maximum harvest allowed from the CVOA, it is possible to run different scenarios to determine if they exceed that level. Table 6.2 provides an example that shows the harvest percentage allowed in the CVOA if the Inshore sector's allocation was increased to 40% and the catcher processors allocation was decreased to 50%. The bottom right hand corner of that table shows the increased allocation Inshore would result in 75% of the TAC being allowed to be taken from the CVOA. This exceeds the maximum allowed by 2.5%. Therefore if this basic allocation alternative were selected, additional measures to reduce catch in the CVOA would need to be implemented. Several methods could be employed to keep the maximum percentage under 72.5%. For example, certain sizes of catcher vessels could be required to fish outside the CVOA at given times of the year. The catcher vessels delivering to certain processing sectors could be required to fish outside the CVOA. The A-season and B-season splits could be altered. Finally, a percentage of the catcher processor harvest in the A-season could be reserved for outside the CVOA only.

Changing the basic allocation so that 5% more pollock was issued to the catcher processor sector, and 5% less to the Inshore sector, would result in 70% of the TAC harvest being allowed inside the CVOA. This is under the 72.5% baseline so no additional measures would not be required. In fact, because only the catcher processor sector is currently restricted from operating inside the CVOA, any increase in their allocation would be acceptable in terms of staying under the 72.5% inside the CVOA (so long as the A-season and B-season splits are not changed).

Table 6.2 Percent of Pollock Harvest Allowed in the CVOA: Based on 100% of Non-CDQ Allocation

	Inshore	True MS	CPs	Total
Overall Allocation	35.0%	10.0%	55.0%	100.0%
Allocation to Catcher Vessels <125' LOA	42.0%	98.0%	9.0%	n/a
Allocation to Catcher Vessels 125-155' LOA	38.5%	1.0%	0.0%	n/a
Allocation to Catcher Vessels >155' LOA	19.5%	1.0%	0.0%	n/a
A-season %	45%	45%	45%	45%
B-season %	55%	55%	55%	55%
A-season: % of CP Catch Allowed In CVOA	n/a	n/a	100%	
A-season: % of <125' CV Catch Allowed In CVOA	100%	100%	100%	
A-season: % of 125'-155' CV Catch Allowed In CVOA	100%	100%	100%	
A-season: % of >155' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of CP Catch Allowed In CVOA	n/a	n/a	0%	
B-season: % of <125' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of 125'-155' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of >155' CV Catch Allowed In CVOA	100%	100%	100%	
Total % Catch Allowed in CVOA During the A-season	15.8%	4.5%	24.8%	45.0%
Total % Catch Allowed in CVOA During the B-season	19.3%	5.5%	2.7%	27.5%
Total % Catch Allowed in the CVOA	35.0%	10.0%	27.5%	72.5%

Table 6.3 Percent of Pollock Harvest Allowed in the CVOA: Based on 100% of Non-CDQ Allocation

	Inshore	True MS	CPs	Total
Overall Allocation	40.0%	10.0%	50.0%	100.0%
Allocation to Catcher Vessels <125' LOA	42.0%	98.0%	9.0%	n/a
Allocation to Catcher Vessels 125-155' LOA	38.5%	1.0%	0.0%	n/a
Allocation to Catcher Vessels >155' LOA	19.5%	1.0%	0.0%	n/a
A-season %	45%	45%	45%	45%
B-season %	55%	55%	55%	55%
A-season: % of CP Catch Allowed In CVOA	n/a	n/a	100%	
A-season: % of <125' CV Catch Allowed In CVOA	100%	100%	100%	
A-season: % of 125'-155' CV Catch Allowed In CVOA	100%	100%	100%	
A-season: % of >155' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of CP Catch Allowed In CVOA	n/a	n/a	0%	
B-season: % of <125' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of 125'-155' CV Catch Allowed In CVOA	100%	100%	100%	
B-season: % of >155' CV Catch Allowed In CVOA	100%	100%	100%	
Total % Catch Allowed in CVOA During the A-season	18.0%	4.5%	22.5%	45.0%
Total % Catch Allowed in CVOA During the B-season	22.0%	5.5%	2.5%	30.0%
Total % Catch Allowed in the CVOA	40.0%	10.0%	25.0%	75.0%

Table 6.3 shows that increasing the Inshore allocation by 5%, and decreasing the catcher processor allocation by 5% allows 75% of the BS/AI pollock TAC to come from the CVOA. Some management measures that could be used to reduce that percentage were mentioned above. Now specific examples will be discussed that would bring the total catch allowed in the CVOA down to an acceptable level. First, if only 85% the catcher processor harvest was allowed inside the CVOA during the A-season it would reduce the CVOA percentage to 71.9%. This would be considered an acceptable level. Another option would be to restrict catcher vessels greater than 155' LOA delivering inshore from fishing inside the CVOA during the B-season. Excluding those catcher vessels and the catcher processors during the B-season would result in 70.8%. Yet another option would be to restrict catcher vessels delivering to "true" motherships to harvesting a maximum of 50% of their B-season allocation from the CVOA. This would reduce the maximum amount that could be taken to 72.2%. Finally the last option that will be discussed is the option to change the A-season and B-season splits. If the split were changed to 40% during the A-season and 60% during the B-season the resulting maximum harvest from the CVOA would be 72.7% (again, assuming a 5% increase in the overall inshore allocation). This is slightly over the 72.5% maximum that NMFS would support.

There are many other allocation combinations that the Council may wish to consider, and several measures could be used to keep CVOA harvests within an acceptable range. The examples provided above are only a small subset of those possible, and are not intended to be the only options that may be considered.

The limits imposed by this guideline are not intended to provide an advantage or disadvantage for any of the fishing sectors involved in the allocation discussion. The sole intent of this guideline is to ensure that the final allocation scheme does not result in increased potential for competition between the fishery and the Steller sea lion. Because of the uncertainty involved in assessing that competition, this guideline may or may not be sufficient, and additional management measures may be necessary in the future to ensure the recovery and conservation of the Steller sea lion.

6.4.5 The Council's Preferred Alternative

The Council's preferred alternative will keep the maximum removals from the CVOA under the 72.5% calculated as the status quo. Allocating 4% more of the pollock TAC inshore was mitigated by forcing all offshore operations out of the CVOA during the B-season. The new estimate of maximum removals from the CVOA during the B-season is 66.5%.

It is important to note that the Council opted to restrict all of the offshore sector from operating inside the CVOA during the B-season for fairness reasons within the offshore sector, and not marine mammal issues. Several members of the Council felt that the Stellar sea lion issue was too complex to treat under I/O3. A separate comprehensive analysis of the actions required to protect Stellar sea lions was requested by the Council. NMFS, in conjunction with the Stellar sea lion recovery team, will work over the summer and fall to prepare a paper for the Council to review. Then with a better understanding of the problem and a wider range of alternative solutions, appropriate actions can be taken by the Council to help protect Stellar sea lions.

6.4.6 Effects of Allocation Alternatives in the GOA

The alternatives under consideration for inshore/offshore allocation of pollock and Pacific cod in the GOA involve (1) a continuation of the current allocation scheme, or (2) a discontinuation of that scheme and a return to a fishery open to participation by both the inshore and offshore sectors. The current allocation scheme does not allow offshore vessels to target pollock or Pacific cod in the Gulf, but does allow 10% of the pollock allocation for bycatch by offshore vessels.

With respect to the GOA pollock fishery, the distinctions between these two vessels types is related to (1) the rate at which the TAC is taken, and (2) the areas fished by the inshore versus offshore vessels. In the few years that offshore vessels fished in the Gulf, they fished a large portion of the TAC in a matter of weeks, ending the fishing season abruptly, and leaving the inshore vessels with no opportunity to continue the fishery. This rapid removal of the TAC lead to the current allocation scheme that preclude the offshore sector from the fishery.

With respect to Steller sea lions or other marine mammals in the Gulf, the effects of continuing the current allocation scheme versus an open fishery with offshore participation are somewhat uncertain. Presumably, participation by the offshore fleet would increase the probability of fishery-induced localized depletions due to the rapid and extensive removal of pollock. Such localized depletions have been considered as a threat to other marine consumers as they reduce foraging success and increase the energetic costs associated with finding sufficient prey.

On the other hand, inshore vessels may, on average, focus on pollock concentrations closer to shore and, therefore, of potentially greater benefit to pinnipeds such as the Steller sea lion and harbor seal. These pinnipeds may then be required to expend more energy and travel greater distances from shore to find sufficient prey. The additional energetic costs may be particularly important for young animals with a smaller foraging range and for mature adult females either pregnant or nursing or both. The offshore sector has not fished for pollock or Pacific cod in the GOA for a sufficient period of time to predict how their distribution might vary from the inshore sector, but the distribution of both would likely to be determined by the distribution of prey.

The distribution of the fishery has largely been delimited by the 200 m isobath from Portlock Bank (west of Kodiak Island) to south of Umnak Island. The smaller shelf in the GOA effectively keeps the fishery closer to shore and to rookeries and haulout sites of Steller sea lions and harbor seals. Large aggregations of spawning pollock were discovered in Shelikof Strait and those aggregations were fished heavily in winter months (Jan-Apr) from 1982 to 1986.

Estimated pollock biomass in the GOA near or less than one million tons until the late 1970s, increased sharply to over 2.5 million tons in the early 1980s, dropped to less than 1.5 million tons in the mid 1980s, and then declined to less than 1 million tons by the mid 1990s. The estimated harvest rate of Gulf pollock also increased significantly from less than 10% to nearly 18% in 1984 and 1985.

Counts of Steller sea lions in the central GOA (Kenai Peninsula to northeast of Shumagin Islands) declined have declined severely during the period of this fishery. In 1976, counts of sea lions in this region totaled 24,678. By 1985, the count total dropped to 19,002, and then plummeted to 8,552 in 1989. The most recent count (1997) was 3,352, indicating a total decline of 86% since 1976. About 42% of this decline occurred between 1985 and 1989, after the fishery had focused intense effort on the winter spawning aggregations of pollock in Shelikof Strait.

In the western GOA (Shumagin Islands to the eastern end of Umnak Island), the decline has also been severe. Counts in this region totaled 8,311 in 1976, dropped to 6,275 in 1985, dropped sharply to 3,800 in 1989, and were 3,633 in 1997. The total decline was 56% from 1976 to 1997, and 30% occurred between 1985 and 1989.

The concern about competition between the GOA pollock fishery and the endangered western population of Steller sea lions is largely founded on (1) the primary importance of pollock in virtually all studies of feeding habits of the Steller sea lion, (2) the apparent coincidence of the extensive Shelikof Strait fishery with the most severe period of decline of Steller sea lions in the region, and (3) the fact that, in general, extensive amounts of pollock are removed from areas (such as Shelikof Strait) that are designated as critical habitat for the Steller sea lion.

Pollock removals, both in mt and as a percentage of total GOA pollock landings, from Steller sea lion critical habitat in the GOA from 1977-96 are shown in Figure 6.4. The magnitude and percent of pollock removals from critical habitat increased from negligible levels in 1977 to over 200,000 mt in 1984-85, which represented between 75-80% of the GOA pollock landings. As the total catch for pollock in the GOA declined after 1985, so did the magnitude of removals from critical habitat, to between 40,000 and 85,000 mt from 1986-96. However, the percent of total GOA pollock landings from critical habitat did not decline along with the magnitude, and has remained between 55-90% from 1986-96.

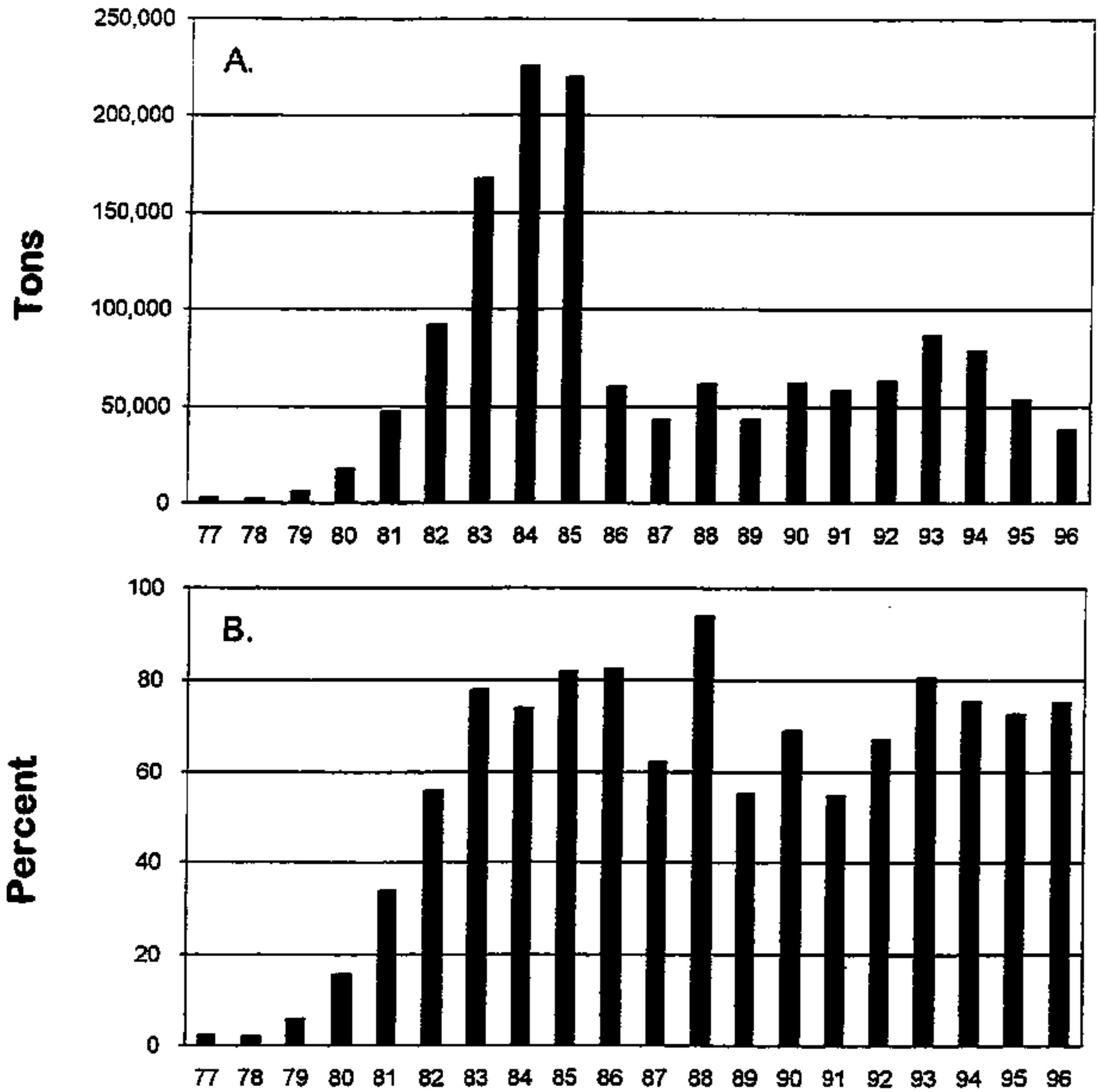

Figure 6.4 Catch of pollock in critical habitat of the Steller sea lion in the Gulf of Alaska. A. Tons of pollock caught in critical habitat. B. Percent of annual catch removed from critical habitat.

6.5 Discharge of Fish Processing Waste

During the Council discussions of reauthorizing the provisions of amendments 18 and 23, and during recent discussions of further extending the inshore/offshore allocations, members of the public expressed concern that continuation of those provisions might lead to continued or increased degradation of the marine environment from fish processing wastes disposed into the bay(s). Although past and current disposal of fish processing wastes into Unalaska Bay, and other areas, have 'degraded' some local benthic environments, those discharges are controlled under permits issued and monitored by the U.S. Environmental Protection Agency (Environmental Protection Agency, 1995 and 1998).

According to a letter to the Council from the Alaska Department of Environmental Conservation [Burden, 1995], there has been confusion about the listing of South Unalaska and Akutan Bays as "impaired" water bodies. The DEC states that these water bodies were listed as such for several years, but that agencies and processors have been working through the permitting process and a management regime known as "Total Maximum Daily Load" (TMDL), to control discharges and manage effluents into these water bodies.

The TMDL process, according to the Environmental Protection Agency [Harper, 1995 and 1998], sets limits on the amount of "pollutants" that may be discharged on any given day by individual processors. If these TMDLs are not exceeded, then the agencies believe the water bodies will maintain or improve their levels of quality. The EPA noted that the overall amount of fish or shellfish coming into a facility was not the issue so much as the amount discharged on a daily basis.

The amount of waste disposed into the marine environment (of Unalaska Bay and other marine areas receiving fish processing wastes) and the impacts of those discharges are not entirely dependent on the percentages of the walleye pollock and Pacific cod harvests allocated to the inshore processing component. Instead, they are related to the amount of fish (of all species) processed, the amount of processing waste that must be disposed of, how much of the total that will be disposed of in the marine environment, and the way it is disposed of in the marine environment. For example, while current alternatives allow for increased share of processing by the inshore plants, the overall pollock TACs have declined, such that an increased percentage share will result in similar amounts of pollock being processed in 1999 as were processed in the mid-1990's by these same plants. The same is true for the overboard disposal of harvest discards and fish processing wastes from vessels in the offshore component.

Given the above comments from State and Federal authorities, and noting the basic conclusion of previous analyses regarding the daily maximum throughput of inshore plants, i.e. the amount of fish processed daily is not expected to change significantly regardless of the Inshore/offshore allocation, it is unlikely that reauthorization of these amendments will have a negative impact on the water quality in these areas. Nevertheless the Council requested clarification of the EPA's current position on discharge waste. The following section contains further discussion of this issue from the EPA perspective and includes tables which summarize the 1997 discharges for the major inshore processing plants.

6.6 EPA and Seafood Processing Discharges

6.6.1 Seafood processing pollutants

The pollution from seafood processing comes from two sources: the solid seafood wastes and the wastewater from the butchering process, surimi process, canning process, and fish meal process. In addition wastewater also included disinfectants and detergents used in wash down water and non-process wastewaters include noncontact cooling water, refrigeration condensate, water used to transfer product, live tank water, and boiler water. These wastewaters contain pollutants such as total suspended solids, oil and grease, biochemical oxygen demand, and settleable solids.

6.6.2 Discharge control measures

EPA issues permits which regulate the amount of pollutants allowed to be discharged to waters of the U.S. There are two types of permits:

> **General permits** authorize discharges from facilities that grind the seafood wastes to 0.5 inch before discharging and covers shore-based facilities and vessels operating near-shore and at sea. Most of these facilities are seasonal and relatively small processors. The general permit does not cover seafood processors that produce surimi and fish meal or discharge to water quality limited water bodies or are in protected areas, such as wildlife refuges, national parks, or endangered/threatened species habitats. Any waste accumulation over 0.5 inch or thicker on the seafloor cannot exceed one acre
>
> **Individual permits** are issued to processors processing seafood into product as well as producing surimi and fish meal and/or are discharging to identified water quality limited water bodies. These processors are usually the very large facilities located in Dutch Harbor and Akutan Harbor as well as several other areas including Kodiak. Vessels operating within 1 mile of shore (near shore) and producing fish meal and/or surimi are also covered under individual permits.

6.6.3 Individual permit requirements

Individual permits may require sampling and monitoring of the discharge as well as the water body where the discharges occur. Southeast Unalaska Bay, Captains Bay, and Akutan Harbor are three water bodies that have been identified as impaired by seafood wastes accumulating on the seafloor and having a discharge high in biochemical oxygen demand (BOD) . Past monitoring of the water bodies found that in late summer when the water column is more likely to be stratified, the apparently naturally occurring low dissolved oxygen of the water was further impacted by the discharge of pollutants from the seafood processors in Captains Bay, Dutch Harbor, and Akutan Harbor.

6.6.4 Pollutant explanation

Dissolved oxygen (DO) levels in natural and wastewaters depend on the physical, chemical, and biochemical activities in the water body. The analysis for DO is a key test in water pollution and waste treatment process control. The control of (BOD) in a discharge is one way of assuring that the water body can absorb the pollutant without depressing the dissolved oxygen.

Dissolved oxygen concentration in ambient waters is a measure of the health of the water body and for the protection of aquatic life. Low DO concentrations are known to stress the water body and cause adverse effects to the range of aquatic species that form the food chain from insects to cold water fish.

6.6.5 Water quality limited water bodies

When a water body is identified as water quality limited, EPA and the State are required to implement a total maximum daily load plan which identifies the degree of pollution control needed to attain and maintain compliance with water quality standards and assigns allowable wasteload allocation to the contributing point sources. The TMDL and wasteload allocations are calculated by modeling the water body.

The Captains Bay, Dutch Harbor, and Akutan Harbor facilities all have stringent BOD limitations in their permits for the months of August through October. During this late summer period, each permittee is required to do extensive monitoring DO, temperature, salinity, and density which is the only means of assessing the efficacy of the permit limitations to control the impacts of the BOD discharge on ambient levels of dissolved oxygen in the receiving water.

While the statistics of how much BOD is discharged from these facilities appears to be extremely high, the stringent limitations are expected to improve the health and quality of the receiving water. These facilities have installed extensive and expensive treatment processes to assure that the discharge is in compliance with permit limitations. In addition the fish meal facilities are required to recycle as much as possible the stickwater (a high BOD pollutant load from the production of fish meal) back into the fish meal to reduce the discharge of this particular waste stream.

6.6.6 Vessels operating at sea

For the vessels that process seafood, produce surimi, and recycle seafood wastes into fish meal, there are no specific limitations. They are allowed to discharge solid wastes ground to 0.5 inch, are not required to recycle the stickwater, or to reduce pollutant loading on the receiving waters in any way. Also, the vessels are not required to do any monitoring, sampling, or analyses of the discharge nor monitoring of the ambient water quality of the receiving water.

6.7 Summary

A final version, and Finding of No Significant Impact (FONSI), will depend on the Council's selection of a 'Preferred Alternative'. This section will be completed following a Council decision, and prior to review by the Secretary of Commerce.

Assistant Administrator for Fisheries	Date

TABLE 6.4

Westward
BOD lbs discharged
Limit: July-Oct

	(Days)	Total lbs	58000 lbs monthly aver	90000 lbs daily maximum	Production finfish raw surimi/bottomfish	finfish finished surimi/bottomfish	crab raw	crabfinished
1997								
Dec	(6)	36,305	6,051	10,350	0 / 113,631	0 / 51,134	62,238	36,068
Nov	(16)	70,970	4,436	9,107	0 / 761,272	0 / 384,650	1,075,363	691,283
Oct	(30)	1,056,531	35,218	73,300	28,923,462/ 1,311,039	7,383,068/ 691,427	538,860	322,900
Sep	(30)	1,330,658	44,355	73,584	45,645,377/ 188,385	11,479,380 / 156,818	643,575	408,680
Aug	(27)	88,241	3,268	21,692	364,151/ 589,520	85,140 / 496,410	20,642	11,230
July	(27)	56,915	2,108	9,608	0 / 1,996,827	0 / 1,865,442	0	0
June	(30)	383,576	12,786	72,258	2,568,279/ 1,668,260	500,676/ 1,111,875	78,032	45,305
May	(31)	467,220	20,314	47,171	1,245,094/ 2,763,477	403,216/ 2,763,477	130,564	77,249
Apr	(29)	547,027	18,863	25,037	0 / 8,068,799	0 / 3,376,561	71,669	42,976
Mar	(29)	728,833	25,132	57,112	13,466,149/ 2,556,154	2,956,888/ 1,150,269	3,906,505	2,515,416
Feb	(28)	949,432	109,975	212,970	44,445,017/ 938,997	11,260,480/ 412,856	4,942,481	2,139,205
Jan	(14)	1,238,629	88,474	140,112	20,973,119/ 0	5,054,544/ 0	27,626	16,409
1996								
Dec		0	0	0	0	0	0	0
Nov	(13)	133,606	10,277	18,331	0 / 87,025	0 / 39,286	1,357,381	861,994
Oct	(19)	891,828	33,031	59,840	28,625,818/ 583,919	7,403,396/ 284,709	546,135	311,322
Sep	(27)	1,012,264	34,906	55,565	44,445,017/ 453,373	11,260,480/ 367,032	434,135	263,286
Aug	(14)	105,646	4,402	8,999	0 / 737,588	0 / 504,490	83,866	48,770
July	(21)	48,912	2,717	7,981	0 / 1,187,175	0 / 746,791	292,059	169,848
June	(18)	210,657	9,159	18,508	482,154 / 2,341,555	122,936/ 1,202,315	268,972	156,522
May	(27)	947,468	33,838	77,454	1,236,426 / 3,480,150	426,404/ 1,604,416	402,587	232.383
April	(27)	566,052	20,216	25,020	0 / 7,014,604	0 / 3,225,330	347,967	202,867
March	(30)	3,299,763	109,922	143,615	22,607,215/ 4,817,265	22,607,215/ 2,346,595	1,031,437	647,917
Feb	(29)	1,696,200	58,490	116,360	39,739,299/ 759,850	10,035,344/ 247,038	2,562,220	1,614,536
Jan	(8)	335,093	41,887	121,897	13,052,686/ 224,091	3,186,920/ 152,546	69,979	41,116

Table 6.5

Trident Akutan
BOD lbs discharged

Limit: May-Oct (eff. May)	(Days)	Total lbs	129,000 lbs monthly avr.	206,000 lbs daily max.	Production finfish raw pollock/bottomfish	finfish finished pollock/bottomfish	crab raw	crab finished
1997								
Dec		36**						
Nov		35**						
Oct	(18)	1,095,383	60,582	202,091	45,697,827/ 315,093	16,999,642/ 118,790	0	0
Sept	(28)	2,029,732	72,072	192,854	66,380,081/ 225,548	24,134,819/ 149,366	116,519	75,488
Aug	(9)	453,641	50,306	106,665	7,486,070/ 186,684	2,549,209/ 59,583	0	0
July	(8)	54**			0 0	0 0	0	
June	(17)	45**			0 / 954,095	0 / 318,986	0	0
May	(23)	103**			0 / 3,662,464	0 / 1,414,154	0	0
Apr	(30)	360**			0 / 19,975,174	0 / 6,796,734	0	0
Mar	(30)	5,817,397	191,383	375,133	1,907,535/ 13,959,515	724,021/ 5,266,352	1,814,353	1,198,229
Feb	(27)	4,372,043	161,422	224,729	53,232,514/ 13,267,701	18,921,874/ 5,001,923	430,603	281,619
Jan	(11)	2,299,837	208,667	211,169	24,659,106/ 2,323,783	8,525,886/ 867,066	0	0
1996								
Dec		14**						
Nov		62**						
Oct	(23)	1,280,081	104,345	267,519*	47,829,956 / 759,563	13,021,666/ 318,083	75,352	42,633
Sep	(29)	1,754,056	188,029*	243,608*	72,531,667/ 460,549	17,129,531/ 242,089	107,168	67,595
Aug	(6)	179,017	10,807	82,124	6,814,238/ 17,194	1,522,735/ 17,171	0	0
July		83**			0	0	0	0
June		166**			0	0	0	0
May	(10)	3,099	1,963	2,734	0 / 1,616,176	0 / 322,913	30,234	16,259
Apr	(28)	20,974	5,220	9,241	0 / 11,543,062	0 / 2,308,420	32,406	17,095
Mar	(31)	1,722,028	128,327	275,495	17,202,026 /11,227,986	3,048,382/ 3,583,999	19,557	11,698
Feb	(29)	2,891,576	173,674	304,018	55,891,631 / 6,325,790	13,724,010/ 2,238,638	893,305	509,274
Jan	(11)	462,336	151,974	210,602	21,083,093/ 2,558,826	4,960,851/ 740,044	0	0

* permit limits challenged
**sanitary only

Table 6.6

UniSea
BOD lbs discharged

Limit: July-Oct	(Days)	Total lbs	185,000 lbs monthly aver	297,000lbs daily max	Production finfish raw surimi/bottomfish	finfish finished surimi/bottomfish	crab raw	crab finished
1997								
Dec	(4)	Report not required						
Nov	(19)	Report not required						
Oct	(19)	n/a	120,826	194,240				
Sep	(29)	n/a	125,762	187,103				
Aug	(28)	n/a	8,498	11,198				
July	(21)	Report not required						
June	(21)	Report not required						
May		Report not required						
Ap		Report not required						
Mar	(27)	n/a	16,887	28,182				
Feb	(28)	n/a	166,095	296,170				
Jan	(28)	n/a	100,163	292,359				
1996								
Dec	(4)	Report not required						
Nov	(19)	Report not required						
Oct	(26)	2,607,809	120,826	194,240	42,647,451/ 1,021,850	9,751,392/ 492,752	1,335,168	807,408
Sept	(30)	2,996,694	125,886	187,224	71,573,953/ 389,798	16,249,527/ 305,645	139,615	81,540
Aug	(22)	39,366	7,506	11,233	0 / 1,078,562	0 / 582,297	54,915	32,250
July	(21)	Report not required						
June	(21)	Report not required						
May		Report not required						
Apr	(28)	5,003	n/a	n/a	50,473 / n/a	2,049/ n/a	12,850	7,967
Mar	(31)	40,325	n/a	n/a	19,676,404/ 8,718,691	4,288,182/ 5,895,750	533,953	402,740
Feb	(29)	88,728	n/a	n/a	70,020,968/ 1,327,353	16,793,571/ n/a	568,204	313,620
Jan	(9)	81,742	n/a	n/a	21,313,715/ 489,110	4,705,870/ n/a		

Table 6.7

Alyeska Seafoods
BOD lbs discharged

Limit: July-Oct	(Days)	Total lbs	90,000 lbs monthly aver	144,000 lbs daily max	Production finfish raw pollock/bottomfish	finfish finished pollock/bottomfish	crab raw	crab finished
1997								
Dec	Report not required							
Nov	Report not required							
Oct	(23)	634,523	20,468	99,687	18,098,548/ 1,268,802	n/a	n/a	n/a
Sep	(25)	547,180	29,747	63,132	30,142,875/22,670,046	n/a	n/a	n/a
Aug	no production							
July	Report not required							
June	Report not required							
May	Report not required							
Apr	Report not required							
Mar	(24)	483,250	15,600	70,600	3,796,870/ 527,499 [3,055,263 yellowfin]	n/a	1,307.374	n/a
Feb	(27)	1,401,391	50,050	84,957	34,650,783/ 204,376	n/a	2,267,834	n/a
Jan	(11)	429,916	14,331	54,480	15,770,682/ 228,523	n/a	n/a	n/a
1996								
Dec	(6)	Report not required						
Nov	(21)	Report not required						
Oct	(27)	718,484	23,953	73,658	14,357,662/ 1,915,257	11,538,364/ 1,037,453	330,146	205,667
Sept	(24)	722,451			22,786,378/ 189,408		395,699	130,103
Aug	(15)	3,851			0 / 612,817	0 /	148,766	
July	(15)	Report not required						
June	(23)	Report not required						
May	(31)	675,681	21,796	44,452	0 / 3,459,457	0 / 1,812,682	162,768	96,560
Apr	(26)	608,812	20,291	38,604	0 / 8,257,042	0 / 3,104,571	91,810	54,400
Mar	(29)	714,014	41,311	44,357	9,380,833/ 4,553,673	2,121,944 / 2,490.406	925,832	605,089
Feb	(25)	2,064,584	67,530	72,291	26,553,622/ 914,398	6,479,084/ 469,949	1,435,189	951,674
Jan	(15)	896,761	n/a	n/a	9,111,061/ 448,946	2,289,610/ 229,859	72,446	43,208

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FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL
North Pacific Fishery Management Council

Please check applicable box(es):

- ☐ Bycatch Reduction
- ☑ BSAI Groundfish FMP
- ☐ GOA Groundfish FMP
- ☐ BSAI Crab FMP
- ☐ Scallop FMP
- ☐ Habitat Areas of Particular Concern (HAPC)

Date: August 13, 1998

Name of Proposer: Alaska Marine Conservation Council
Address: Box 101145, Anchorage, Alaska 99510
Telephone: 907-277-5357

Brief Statement of Proposal:

To address ecosystem and fishery-specific concerns stemming from removals in the "A" season of the Eastern Bering Sea (EBS) pollock fishery, this proposal calls for the analysis of options to restructure the Eastern Bering Sea pollock fishery to reduce fishing pressure during "A", or roe-bearing pollock season:

- **Reduce the pollock harvest in the "A" season to no more than 10, 20, 22.5, or 30% of the total quota.**

  Sub-option: Reduce the annual harvest rate during "A" season. The annual harvest rate has averaged between 17 and 23% in the last 8 years. In 1998 it is roughly 20% (quota/exploitable biomass). This sub-option would lower this rate during the "A" season to 10%. For example, the harvest quota in 1998 is 1.19 mmt of an estimated 6.1 mmt exploitable biomass. The "A" season is allocated 45% of the annual quota or 535,5000 metric tons in 1998. In this sub-option, reducing the harvest rate to 10% during the "A" season translates to a reduction in "A" season harvest from 535,500 mt to 274,000 mt ((.10 x 6.1 mmt) x .45 = 274,500 mt). The "B" season harvest would remain unchanged from the annual harvest rate.

- **Break up the "A" season in time: redistribute the fishery through temporal closures to allow for greater prey availability for marine mammals. Options include: 1) open the fishery for one week, then close for one week; 2) 10 days on/10 days off; 3) 14 days on/14 days off.**

- **Reduce the levels of pollock catches in designated sea lion winter foraging grounds. Without closing out entire 60 nm radius determined to encompass winter forage grounds, we suggest that there be a maximum tonnage of pollock allowed to be extracted from these waters. The suggested maximum for the "A" season pollock harvest in critical sea lion habitat is the percentage of total of the pollock harvest removed in 1977: 10% or roughly 100,000 mt of pollock. The remainder of the quota could still be taken from outside of sea lion winter foraging range.**

Objectives of Proposal (What is the problem?):

The Eastern Bering Sea pollock population is roughly half of what it was in the mid-1980's. During this peak recorded in recent history, the mid-1980's' high of EBS pollock coincided with abundant levels of those stocks designated as the Aleutian Basin stock, the Bogoslof area stock, and the Western Bering Sea. The precise association between these "stocks" is not well understood today. However, it is not prudent to conduct an intensive fishery concentrated on a spawning aggregation of fish whose population is in a decline and whose adjacent stocks and/or populations are in decline or have disappeared (i.e. Bogoslof, Aleutian Basin, and Western Bering Sea Sea).

A precautionary measure for the EBS pollock fishery is to restrict or minimize the level of intense fishing on spawning aggregations. An extensive analysis of spawner-recruit relationships concludes that the size of spawning populations influences the number of recruits produced. Most often, high spawner abundance contributes to high recruitment, and low spawner abundance is most often associated with low recruitment. (Myers and Barrowman, 1996). "The failure to recognize the need to conserve spawning biomass is a principal reason for the disastrous collapse of the formerly great cod fisheries in Eastern Canada" (Hutchings and Myers, 1994; Myers et al. 1996,1997). The words may ring ominous for a fellow gadid, pollock, as we continue to apply intense fishing pressure on its spawning biomass as the population numbers continue their decline in the 1990's.

Pollock has been found to be a major prey item of the endangered Steller sea lion, and it is also preyed upon by at least 10 other species of marine mammals, 13 species of seabirds, and 10 species of fish (Frost and Lowry 1986). The western population of Steller sea lion may be an important barometer of ecosystem change. At the present time, pollock *are* an integral part of a complex food web of the North Pacific. Nutritional stress from lack of available prey is considered a major factor in sea lion decline. Undoubtedly there are significant environmental influences playing some role in the decline of sea lions and harbor seals, along with several marine birds and fishes. We must look to ourselves to insure that human activities do not impede the recovery of various marine populations. This proposal is one way to include ecosystem considerations into the design of a fishery.

Groundfish fisheries of the North Pacific have undergone unprecedented growth in capacity and technological efficiency in the last thirty years. The Bering Sea pollock fishery has developed into the world's biggest single species fishery. Prior to 1980, very little of this fishery occurred during winter months. In the last ten years, this fishery has intensified its harvest in area and time to coincide with critical foraging habitat of sea lions during winter months when metabolic demands are at an all-time high and the proximity and access to a roe-bearing (high nutrition) prey is crucial. In the Gulf of Alaska, NMFS' recognition that pollock is important forage for sea lions in the fall and early winter resulted first in a seasonal distribution of the fishery quota, and then recently resulted in an adjustment in the percentage of the seasonal allocation.

The Catcher Vessel Operating Area (CVOA) of the Bering Sea overlaps and is juxtaposed to a large area designated as critical habitat for Steller sea lions. While it is unknown what the harvest rate during pollock A season in the CVOA is, recent analysis indicates that localized harvest rates here during the B season may be as high as 46%, and the rate of decline in area pollock may be as high as 81% in the last three years (Fritz, NPFMC, 1998). This measured level of decline in pollock abundance during the "B" season is reason for concern. It also suggests that we should look more closely at the rate of pollock removals in the concentrated area and time of the "A" season, especially as it overlaps in area and time of foraging of Steller sea lions in winter months.

Rather than debate the reasons for the initial decline of sea lions, let us look to what is contributing to or exacerbating the sustained decline and impeding recovery of the population. If prey availability is acknowledged as important to the recovery of the western population of Steller sea lion, then we must be certain that we do what we can to minimize human influence on this availability. The absolute number of prey is important in a predator's foraging success, but it is not the only factor to be considered. "The availability of pollock to these consumers depends on the size structure of pollock populations, *their areal and temporal distributions, and the area and temporal distribution of the consumers.*" (NMFS, 1998).

Need and Justification for Council Action (Why can't the problem be resolved through other channels?):

The Council is responsible for the management of the pollock fishery. Voluntary reductions in the quota or in fishing time and area are unlikely. The Council and NMFS have a responsibility to take into account the protection of marine ecosystems when establishing yields from a fishery (definition of OY) and to ensure that no federal actions impede the recovery of an endangered species.

Foreseeable Impacts of Proposal (Who wins, who loses?):

The marine ecosystem and Alaskan coastal people who rely upon it for their cultural, economic, and spiritual sustenance will benefit. The heavily overcapitalized pollock fleet that relies on a roe product will have to adjust to a more sustainable approach in fishery exploitation.

Are there Alternative Solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

This proposal seeks to minimize impacts of an intensive fishery on roe-bearing pollock during critical foraging periods of the endangered Steller sea lion. There are many alternatives that are more constraining to the pollock fishery. However, this proposal offers a range of alternatives that would allow the fishery to continue with a foundation of an ecosystem approach in harvest strategies.

Supportive Data & Other Information (What data are available and where can they be found?):

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Hutching, J.A, and Myers, R.A. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhua,* of Newfoundland and Labrador. Canadian Journal of Aquatic Science. v. 51: 2126-2146.

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Signature:

FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL

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Fishery Management Plan: Gulf of Alaska

Brief Statement of Proposal:

This is a proposal to (1) extend year-round 20 nm trawl exclusion zones to protect the full extent of critical foraging habitat around sea lion rookeries and haulouts listed as critical habitat in the Gulf of Alaska management area, (2) apply the same trawl exclusion zones around major haulouts at which >100 animals[1] have been counted but which are not currently listed as critical habitat in the Gulf of Alaska – e.g. Kak Island (Semidi Islands), Mitrofania Island (midway between the Semidi and Shumagin Islands), Perl Island/Rock, Cape Elizabeth (Kenai Peninsula), and (3) reduce the total allowable catch (TAC) for Gulf of Alaska pollock.

The EA/RIR for Amendments 25 and 20 to the FMPs of the GOA and BS/AI (Prohibition to groundfish trawling in the vicinity of sea lion rookeries) recommended special management measures to prohibit trawling in certain areas because: (1) trawl fisheries account for the majority of the catch of species of concern in critical habitat; (2) trawlers have higher bycatch of non-target prey species including juvenile pollock, squid, octopus, salmon, herring, capelin, eulachon, and sand lance, as well as flatfish and shellfish, any number of which may serve as important seasonal or secondary items in the sea lion diet, depending on availability; (3) trawlers are the primary source of lethal incidental entanglements in nets; (4) trawlers are responsible for benthic habitat disturbances and changes in species composition (NPFMC/NMFS 1991).

[1] The >200 animal standard used by NMFS to define "major" haulouts (NMFS 1993) leaves out other important sites that support significantly large numbers of sea lions at a time when numbers at most sites have fallen well below 200 animals. Since haulout use is related to the location of critical foraging habitat (Boyd 1995), protecting these areas and populations during a period of severely reduced population is vital.

Objectives of Proposal:

The major objectives of this proposal seek to:

- **protect the full extent of GOA critical foraging habitat out to 20 nm** around rookeries and major haulouts listed as critical habitat;
- **extend trawl exclusion zones around other major haulouts** (>100 animals) which have not been granted protected status and where significant numbers of sea lions are known to forage at a time when numbers at most sites have fallen well below 200 animals;
- **provide full protective coverage to foraging habitat across all seasons** in order to reduce competitive fishery interactions and other adverse effects of concentrated trawl fishing in core foraging areas where the most vulnerable segments of the population are most likely to be found;
- **reduce the allowable pollock catch level below the ABC** in a precautionary manner to account for the current low level of spawner biomass, projections of below average recruitment in future years, large uncertainties about the stock-recruitment relationship, tendency for Gulf pollock abundance to fluctuate rapidly, heavy predation on pollock by Steller sea lions and other marine wildlife, and persistent overages of the TAC exceeding the maximum allowable catch for the stock.

Year-round extension of the no-trawl zones to from 10 to 20 nm around rookeries and from 0 to 20 nm around major haulouts is intended to provide protection in all seasons to vital nearshore foraging areas frequented by nursing females, young-of-the-year pups and weaned juveniles who may still depend on mother's milk for some portion of their nutrition even into their second year.

The data supporting the existing 20 nm boundaries as critical to Steller sea lions are consistent across all areas studied from Southeast Alaska, Gulf of Alaska, Eastern Aleutians, and the Russian Kurile Islands (Merrick 1992, 1993; NMML/NMFS 1993; Calkins 1996; Swain 1996; Loughlin and Merrick 1997; NPFMC/NMFS 1998). Sea lions forage much farther afield than 20 nm, especially in the fall/winter months; but 20 nm from land sites seems to be a good approximate average distance that encompasses much sea lion activity throughout the species' range, including home ranges of summer adult females and winter young-of-the-year pups (Merrick and Loughlin, 1997). Nursing mothers also appear to stay closer to shore even in winter in order to return to their pups regularly, while young weaned juveniles generally stay closer to shore and make shallower dives than adults (Merrick and Loughlin, 1997).

Need and Justification for Council Action:

■ DIRE STATUS OF THE ENDANGERED GULF SEA LION POPULATION

The Steller sea lion population in the Gulf of Alaska has plummeted since the late 1970s, coincident with the rise of a large trawl fishery for pollock which culminated in the overfishing of the Shelikof Strait spawning pollock stock during 1981-1985 in an area now designated as critical habitat. In 1976, >40,000 adult and juvenile sea lions were counted at rookery and haulout trend sites in the eastern (Prince William Sound), central (Outer Island to Chirikof Island) and western Gulf. By 1994, only 11,865 adults and juveniles were counted at these same sites and by 1996 only 9,782 were counted (Merrick 1994,1996). Calkins and Pitcher (1982) estimated 63,000-66,600 sea lion adults and pups at rookeries in the Gulf of Alaska in 1978-79, and a combined overall estimate of 135,666 for all age classes including pups:

- The hardest hit area has been the central Gulf region, where about 25,000 adults and juveniles were counted at rookery and haulout sites in 1976 but <4,000 in 1996 (Merrick 1994,1996). This region contains three of the four major rookeries in the Gulf of Alaska where pup production was centered historically: <u>Chowiet</u>, <u>Marmot</u> and <u>Sugarloaf</u> islands in the Kodiak region, as well as <u>Atkins Island</u> (Shumagin Islands) (Loughlin et al., 1992). Each has experienced major declines in pup and non-pup populations.
- From 1976-94, the breeding sea lion population on Marmot Island declined by 88.9% (Chumbley et al., 1997). In June, 1978, 8,506 adult and juvenile Stellers were counted at Marmot Island. In June, 1994, only 1,091 non-pups were counted (Chumbley et al., 1997, TABLE 3). Worse still, the decline appears to have accelerated from 1991-94.
- Similar large declines of 79% were reported at three other major Gulf rookery sites on Sugarloaf, Chowiet and Chirikof Islands, and an overall decline of 76.9% was reported for 14 trend sites (Chumbley et al, 1997).
- 40% of the total number of pups born annually in the central GOA in the 1970s came from the Marmot Island and nearby Sugarloaf Island rookeries. In 1979, 6,741 pups were counted on Marmot; in 1994, only 804 (Chumbley et al, 1997, TABLE 2).
- From 1991-1994, pup production declined by 50% at Marmot, 41.5% at Sugarloaf and 48.6% at Chirikof Island (Chumbley et al, 1997).

Major haulouts in the Gulf of Alaska have also shown an alarming decrease in numbers of animals sighted during the 1990s:

- In the central Gulf of Alaska, 21 of 22 major sea lion haulouts listed as critical habitat in 1993 have had >200 animals since 1970. During surveys in the 1990s, only 8 haulout sites had >200 animals at any time of year: Cape Chiniak, Cape Sitkinak, Cape Ugat, Latax Rocks, Puale Bay, Sea Otter Is., Two-headed Is., and Ushagat Is. (NMFS unpublished data).

■ FOOD LIMITATION IS THE LIKELY CAUSE OF THE DECLINE

Lack of available prey is considered the most likely cause of the Steller sea lion decline in western Alaska (NMFS/AFSC 1998). The 1996 Section 7 Biological Opinion concluded that trends in the Steller population are consistent with a food shortage. Other proposed causes such as emigration, disease, subsistence harvest, pollution, and predation are not supported by the data (Merrick and Calkins 1996).

Steller sea lions are particularly vulnerable because they are *the* major direct marine mammal competitor with the fishery, *"removing large quantities of fishes of the same size range as those being caught by the fishing fleets"* (Lowry et al., 1988). Available evidence suggests that fishery effects on size, weight, and abundance of pollock have had a potentially significant adverse impact on availability and quality of prey in the Bering Sea in the 1970s (Lowry et al. 1988) and again in the Gulf of Alaska in the 1980s (Calkins and Goodwin 1988).

Steller sea lions in the Kodiak region showed signs of food stress during and after the period of the peak harvests in the Shelikof Strait (1981-85), after which time pollock abundance collapsed. The Shelikof Strait roe pollock fishery of the early 1980s is one of the most blatant examples of overfishing in the modern history of the groundfish fisheries off Alaska:

> *"The most dramatic example of possible local overexploitation occurred in Shelikof Strait. A large spawning concentration was 'discovered' in this region in the late 1970s and increased from less than 100,000 t to more than 300,000 t and remained high even during the mid-1980s, when it was apparent that there had been poor recruitment and stock abundance was declining (Megrey and Wespestad 1990). During this period, annual combined removals from fishing and sea lion predation were estimated to be as much as 30-50 percent of the total exploitable biomass (Lowry et al. 1989)."* (NRC 1996)

Sea lions near Kodiak Island were smaller in size by age during 1985-86 than during 1975-76 (Calkins and Goodwin, 1988; Calkins et al. 1998). The 1996 Section 7 Biological Opinion for the GOA acknowledges that trends in the Steller population are consistent with a food shortage and that there is "*evidence of significant changes in abundance of sea lion prey species in the GOA...*" Pitcher et al. (in review) cite "*considerable evidence suggesting nutritional stress affected the reproductive performance of Steller sea lions, during both the 1970s and 1980s through high levels of prenatal mortality,* [i.e., abortions] *and the effect was greater during the 1980s.*"

During this same period, the largest Pacific harbor seal rookery in the world at Tugidak Island, south of Shelikof Strait suffered an 86% decline in population (Pitcher 1990). The harbor seal decline parallels that of the Steller sea lion population in the Kodiak region during the period of rapidly declining pollock abundance following record-high pollock harvests in the Shelikof Strait from 1981-85. Their eating habitats are similar and they share a reliance on pollock as a major dietary item in the food habits research of the 1970s and 1980s (Pitcher 1980, 1981, 1990). The timing, proximity and other similarities between harbor seal and sea lion declines in the Gulf of Alaska suggest a common cause and both appear food-related. As with Steller sea lions, harbor seals have experienced drastic declines in the west-central GOA, but not in southeast Alaska.

The Gulf pollock fishery has been the focus of so much attention due to the size of the fishery and the importance of pollock to endangered populations of Steller sea lions, as well as depleted populations of northern fur seals and Pacific harbor seals throughout western Alaska, fish-eating seabirds at large breeding colonies in the Semidi Islands (WGOA), Shumagin Islands (WGOA), Sandman Reefs (WGOA), and many commercially valuable fish species. Food habits data for Steller sea lions and Pacific harbor seals indicate that pollock has been the most important prey for both species in the Gulf of Alaska. In all, 11 species of marine mammals, 13 species of seabirds, and 10 fish species are known to feed on walleye pollock in the northeast Pacific Ocean (Frost and Lowry 1986).

Atka mackerel is also an important forage species in the Gulf of Alaska, where it is prey for other commercially valuable groundfish, some seabirds and many marine mammals, including Steller sea lions (Fritz and Lowe 1998). Atka mackerel populations in the Gulf have been identified previously in the Kodiak, Chirikof, and Shumagin areas, and supported a relatively large foreign fishery through the 1970s and early 1980s. By the mid-1980s the fishery appears to have depleted those populations and catches declined to zero by 1986 (Lowe and Fritz 1997). A short-lived domestic fishery began targeting Atka mackerel again in 1990-93, primarily in the Western Gulf regulatory area in areas proximal to sea lion rookeries and haulouts. Catches peaked at nearly 14,000 tons in 1992 before the stock declined once more and was placed on bycatch-only status in 1997(Lowe and Fritz 1997).

The food habits data indicate that pollock is the most important sea lion prey for all areas and seasons examined in the Gulf of Alaska in the 1970s and 1980s, except for summer in the Kodiak area in the 1970s (Calkins and Pitcher 1982; Merrick and Calkins 1996): *"In 13 studies summarized by NMFS (1995), walleye pollock ranked first in importance as a prey item for Steller sea lions in 11 studies, and second in the remaining two. Other prey consumed off Alaska were Pacific cod, Atka mackerel, salmon, octopus, squid, Pacific herring, capelin, sand lance, flatfishes, and sculpins. Most of the prey are schooling fish, many of which are commercially exploited."* (NPFMC/NMFS/AFSC 1998)

Imler and Sarber (1947) reported that sea lions in the GOA occasionally took hooked fish from the halibut and sablefish fisheries, and were known to interact with the salmon fishery, but most of the stomach samples collected in the summers of 1945-46 contained so-called "scrap" fish -- i.e., pollock, tom cod, flounders and octopus. Salmon, sablefish and halibut were the only commercial fish of value at that time that sea lions were reported to eat in their sample, representing 14% of the contents -- including an eight pound red (sockeye) salmon which had been swallowed whole. In the central Gulf at the Barren Islands, Imler and Sarber found the greatest variety of food items, including pollock, cod, flounders and octopus. In 7 out of 8 sea lions collected in southeast Alaska, all but one had fed principally on pollock.

Pitcher (1981) reported that the stomach contents of 250 Steller sea lions collected in the Gulf of Alaska between 1975-78 consisted of 95.7% fishes and 4.2% cephalopods by volume:

- Walleye pollock was the predominant prey, composing 67% by frequency of occurrence and 58% of the total volume of prey samples.
- Capelin and salmon appeared to present seasonal foraging opportunities mainly in the spring and summer when those species were abundant in nearshore waters.
- Other prey included Pacific herring, Pacific cod, sculpins, flatfishes and rockfishes.
- Utilization of pollock appeared to increase between 1958-60 and 1975-78.

Calkins and Pitcher (1982) reported that pollock was the top-ranked prey in all areas except for summer around Kodiak, where it was ranked second below capelin. However, consumption varied by area and season: capelin and salmon ranked much higher in the Kodiak area than in Prince William Sound or along the Kenai Peninsula, and predation on salmon and capelin was largely limited to spring and summer. Merrick and Calkins (1996) reached a similar conclusion regarding the seasonal availability of small forage fish (e.g., capelin and herring) and salmon.

Calkins and Goodwin (1988) reported that pollock was the most frequently consumed prey in Southeast Alaska and most frequently consumed and most important prey by volume at Kodiak in 88 sea lion stomach samples from 1985-86. Even though the Gulf biomass of pollock plummeted in the wake of the Shelikof Strait fishery, pollock consumption by sea lions as a percentage of occurrence in the diet actually increased from the 1970s to the 1980s while the size of pollock eaten by sea lions near Kodiak Island in 1985-86 was significantly smaller than during 1975-76 (Calkins and Goodwin 1988). Calkins and Goodwin estimated the average weight of pollock eaten in the 1970s to be 148g compared to 93g in the 1980s data, based on fork length of consumed fish and suggested that the occurrence of fewer big fish in the diet could mean more foraging effort to catch more small fish and could contribute to nutritional stress.

The existing food habits data indicate that Steller sea lions eat many medium and large-sized fish (>25 cm), and they compete directly with the fisheries. Lowry et al. (1988): *"Steller sea lions are a major direct competitor with the fishery, removing large quantities of fishes of the same size range as those being caught by the fishing fleets."* Although larger fish occur in smaller numbers in the sea lion diet, their caloric importance may be crucial to sea lion nutritional health. Availability of larger-sized of fish may be especially critical during the late winter/early spring when aggregations of energy-rich, roe-laden adult pollock provide both adult and juvenile sea lions an opportunity to fatten up and regain good condition (NPFMC/NMFS. 1998):

- Pitcher (1981) and Calkins and Goodwin (1988) found that sea lions were eating a wide size range of pollock in the Gulf of Alaska: 5-63 cm (average 29.3 cm) and 5-56 cm (average 25 cm) respectively.

- Loughlin and Nelson (1986) examined of the stomach contents of dead adult female and juvenile sea lions entangled in trawl nets aboard foreign processors in the Shelikof Strait roe pollock fishery, 1983-84. Fork lengths of undigested pollock ranged from 31-54 cm with a mean of 39.3 cm in 1983 and 43.5 cm in 1984, compared to mean fork length for pollock taken during the joint-venture fishery of 40.9 cm in 1983 and 41.7 cm in 1984.
- A summary of food habits data in the Gulf of Alaska by Merrick and Calkins (1996) concluded that slightly over half of the pollock mass consumed by juvenile sea lions came from juvenile pollock (<30 cm length) with the rest coming from larger fish, whereas 79% of the pollock mass consumed by adult sea lions came from larger fish.

The data strongly support the need to ensure availability of juvenile AND adult pollock to Steller sea lions, particularly since Steller sea lions often have extended nursing periods for pups -- two years or more in some cases (Calkins and Pitcher 1982) -- compared to other pinnipeds, and therefore the pup's welfare is dependent on the health of the mother.

Furthermore, increased reliance on pollock in the Gulf during a period of greatly reduced pollock abundance suggests a lack of alternative prey (Merrick and Calkins 1996) as well as the vital importance of protecting the availability of pollock in sea lion foraging areas generally.

■ EXISTING MANAGEMENT MEASURES HAVE FAILED TO PROTECT CRITICAL HABITAT

Critical habitat involves "determination of the essential physical or biological features that are essential to the conservation of the species, and second, the determination of whether these features require special management considerations or protections." (ESA) In designating Steller sea lion critical habitat, NMFS acknowledged the need for spatial and temporal regulation of fishery removals to ensure that pulse fishing and local depletions of prey stocks do not occur, noting that adverse modification of critical habitat and jeopardy to the species' survival are inseparable (NMFS 1993). More recently, NMFS has stated that the single most important feature of marine areas critical to Steller sea lions is their prey base (NMFS 1998).

NMFS has cited quarterly allocations (changed to trimesters in 1996) and spatial apportionment of the Gulf pollock TAC as important management measures for reducing the possibility of causing fishery-induced localized depletions of pollock in areas important to foraging sea lions. However, time-area apportionments of the Gulf pollock quota into quarters or trimesters and across three broad subareas (610, 620, 630) have not resulted in a reduction in the percentage of the catch taken from critical habitat, which has remained very high since the mid-1980s. Fritz and Ferrero (1997) note that "*the combination of spatial pollock allocations and trawl exclusion zones may have stabilized pollock removals and effort at 1985-91 levels, but did not reduce them.*"

The percentage of groundfish catch in GOA critical habitat increased dramatically from 5% in 1977 to more than 80% in 1985, peaking at 225,000 mt (mostly pollock) during the large but short-lived Shelikof Strait roe pollock roe fishery. The reasons for this collapse are attributable to overfishing accompanied by poor recruitment of subsequent year classes: *"Although much of this variation is thought to be due to recruitment, it seems reasonable to assume that removals by the fishery, which totaled in excess of 1.1 million t from 1981 to 1985, had some effect on the stock size. The stock was heavily harvested in 1985 when removals by the fishery (285,000 t) were equal to 41% of the estimated total exploitable biomass (687,000 t)."* (Lowry et al., 1988). The stock size declined to very low levels in the late-1980s and is only about one-third its former size today.

Although the pollock TAC, and hence the catch in critical habitat, fell off after 1985 as the Shelikof spawning stock collapsed, the percentage of the annual catch taken from GOA critical habitat has remained high -- 55-93% -- into the present (Fritz et al., 1995; Fritz and Ferrero 1997). The existing fishery catch data indicate that substantial portions of the groundfish trawl catch (dominated by pollock) are taken within critical habitat areas adjacent to rookeries and haulouts in the Gulf of Alaska, with higher concentrations of catch occurring between 10-20 nm. From 1990-97, an average of 63% of the *observed* GOA pollock catch has come from within 20 nm of sea lion rookeries and major haulouts listed as critical habitat (NMFS/AFSC unpubl. fishery data).

Despite the general agreement that food limitation is driving the sea lion decline, and despite the agreement that pulse fishing resulting in locally high extraction rates poses the greatest threat to sea lions' ability to find adequate amounts of food (SSLRT 1991; NMFS 1991, 1996, 1998), the Fisheries Service and the North Pacific Council have not acted adequately to prevent critical habitat from becoming the focal point of major groundfish fisheries in the 1990s, particularly for pollock, Atka mackerel and Pacific cod. NMFS has failed to recommend adequate measures to protect critical habitat even as trawl groundfish removals from foraging areas proximal to sea lion rookeries and haulouts in the GOA – dominated by pollock -- have remained very high as a percentage of the allowable catch:

- The April 1991 Biological Opinion concluded that sea lions and fisheries target large schools of fish to maximize foraging efficiency and minimize effort, therefore large fishery removals from schools of fish in close proximity to rookeries and haulouts are likely to decrease the amount of food available to sea lions.
- The June 1991 Biological Opinion concluded that the Gulf pollock fishery had become spatially and temporally compressed in nearshore waters over time, and that large pollock harvests over small areas and time periods may deplete local pollock stocks and limit prey availability for sea lions.
- The January 1996 Biological Opinions noted that fishery catches near Steller sea lion rookeries, haulouts and at-sea foraging habitats continue to be much higher than they were prior to the population decline and that the majority of the groundfish removals continue to be taken in rapid, intensive fisheries concentrated in time and area (NMFS 1996).

Concentration of fisheries on critical sea lion foraging grounds may cause localized depletion of the prey base and jeopardize sea lions even if overall fish stock abundance is high, as was the case with GOA pollock in the early 1980s. In the 1990s, with pollock stocks far below the levels of the early 1980s, the fishery has continued to concentrate the large majority of the catch in critical habitat, thereby increasing the likelihood that locally adverse effects on prey availability will occur.

The failure of existing management measures to reduce catch in critical habitat involves at least two essential features:

1. **Failure to institute adequate trawl closure areas in critical habitat.** In large measure the failure to reduce catches in critical habitat is owing to the failure of NMFS and Council to institute adequate trawl closure areas covering the full extent of critical habitat across all seasons. The inadequacies of the 10 nm trawl exclusion zones were apparent to NMFS even when they were proposed:

> *"Available data indicate that 10 nm zones would not be sufficient to cover feeding trips of animals during the winter, females without pups throughout the year, and some feeding trips of postpartum females during the breeding season.*
> (NPFMC/NMFS 1991)

NMFS initially recommended that trawl fishing be prohibited within 20 nm of the listed northern sea lion rookeries in the Gulf of Alaska (Aron memo, 16 May 1991). The 16 May 1991 recommendation was based on satellite telemetry data obtained from nursing females during the breeding season. The agency subsequently reduced the recommended trawl closure zones to only 10 nm around rookeries (Aron note, 30 May 1991). The 30 May 1991 memo demonstrated clearly that the 10 nm trawl closures would provide little protection to critical habitat foraging areas because very little groundfish fishing occurred in these areas: *"Data collected by fisheries observers suggests that 10 nm closures around northern sea lion rookeries would not seriously restrict the pollock fishery. From 1980-89, an annual average of 88.2% of all pollock caught within 20 nm of rookeries was caught between 10.1 and 20 nm."*

It is abundantly clear that the existing rookery trawl exclusion zones are inadequate for at least several crucial reasons:

- Since very little trawling occurred within the 10 nm rookery no-trawl zones, closing them was not likely to reduce the impacts of trawling. The 10 nm zones have done nothing to prevent the fisheries from becoming more concentrated in Steller sea lion critical foraging habitats during the 1990s.
- Telemetry tracking studies of seasonal foraging patterns (Merrick and Louglin 1993, 1997; Merrick 1992, 1993) and platform-of-opportunity sightings indicate clearly that 10 nm zones are "*too small to effectively separate the local effects of trawlers on sea lion prey from foraging sea lions.*" (NRC 1996)
- The 10 nm zones do not protect critical foraging habitat that is used in the non-breeding seasons, primarily from haulouts.

In addition to these shortcomings, the 10 nm no-trawl zones do not provide adequate protection to important but overlooked segments of the sea lion population whose health and nutritional status is crucial to the eventual recovery of the species. Calkins and Pitcher (1982) and Calkins (1996) found that mature females without pups comprise a large portion of the population in any given year -- 33-40% in Kodiak area during 1970s and 1980s. Research by Calkins (1996) in Southeast Alaska indicates that summer adult females without pups travel longer distances and move more extensively between haulout and rookery sites in a given region even in the summer. Thus rookery no-trawl zones of 10 or 20 nm do not encompass foraging areas of this portion of the population even in the summer months.

In summary, the existing rookery buffer zones (10 or 20 nm) do not cover critical habitat feeding areas of (a) adults and juveniles from winter haulout sites (as much as two-thirds of the observed animals in non-breeding months); (b) females without pups throughout the year (as much as 40% of the adult female population every year); (c) and some feeding trips of nursing females from the rookeries.

2. Failure of existing time-area management to address localized patterns of fishing in critical habitat. The second failure of management measures is attributable to the inadequacy of broad spatial allocations of the TAC to address the highly localized nature of the groundfish fisheries for pollock and other species in areas proximal to rookeries and haulouts:

- Available data show that sea lions and fisheries have concentrated their effort in the same areas where pollock abundance is concentrated – e.g. Shelikof Strait as well as the east side of Kodiak Island (Barnabus Gully, Chiniak Gully, Marmot Gully, and Marmot Bay) in Area 630. In a memorandum from William Aron to Steve Pennoyer, 16 May 1991, it is noted that these areas have accounted for a high proportion of the pollock catch since 1987.
- In most years, large percentages of the pollock catch have occurred within 20 nm of haulouts, which have not received trawl exclusion zone buffers (Fritz 1993). Foraging areas adjacent to haulouts in Shelikof Strait such as Cape Gull, Takli Island, Puale Bay, Cape Ugat and Cape Ikolik were intensively exploited during and after the Shelikof JV fishery of 1981-85. Haulouts at Cape Barnabus, Ugak Island, Gull Point and Chiniak Point on the eastern side of Kodiak Island have also been subject to heavy local pollock fishing (Fritz 1993).
- Heavy pollock fishing has also occurred around Chowiet and Chirikof Island rookeries (Area 620) and on Shumagin Bank and Sanak Bank in areas adjacent to the Atkins Island, Chernabura Island, Pinnacle Rocks and Clubbing Rocks rookeries and associated haulout sites (Area 610, western GOA).

Time-area management of the groundfish fisheries is an important but insufficient component of sea lion conservation in the Gulf of Alaska. Rookery trawl closure areas provide some protection to nearshore foraging areas frequented by females on the rookery in the summer months. But without year-round trawl closure areas for the critical foraging areas adjacent to rookeries AND haulouts in all seasons, groundfish trawl catches of primary sea lion prey will remain concentrated in critical areas proximal to land-based sites, increasing the likelihood of localized depletions to the sea lion forage base. NMFS cannot ensure that these fishery removals will not jeopardize sea lions.

■ WINTER FORAGING HABITAT PROTECTION AROUND HAULOUTS MUST BE A MAJOR MANAGEMENT PRIORITY IN THE GULF OF ALASKA

It can expected that haulout sites used over generations are not arbitrarily chosen but are located in the areas where prey fish are likely to be abundant in close proximity at various times of the year. Protecting sea lion winter foraging habitat goes hand-in-hand with protecting aquatic zones adjacent to haulout sites, since haulouts are related to critical foraging areas (Boyd 1995) and their use increases in the winter months when nutritional stress is more likely for sea lions.

Existing rookery trawl buffer zones do nothing to protect feeding areas of adults and juveniles proximal to haulouts in the non-breeding season. Winter versus summer distributions of sea lions reveal that the numbers of animals on rookery sites are considerably lower in many cases during the non-breeding season. Merrick (1993) found that only a third (32.9%) of the animals counted in the March 1993 survey were on 39 rookery sites; the remaining animals (67.1%) were scattered on 235 haulout sites from Forrester Island (Southeast Alaska) to Attu Island (western Aleutians).

NMFS has identified the fall/winter months as a crucial time of year. Both the 1991and 1996 Section 7 Biological Opinions observed that the effects of localized prey depletion would be worse in winter, when prey resources are more scarce and nursing and/or pregnant sea lions and juveniles are especially vulnerable to nutritional stress. Seasonal differences in foraging ranges and foraging effort have been identified using satellite-linked time-depth recorders. These data, along with other pinniped research, support the theory that winter is an especially difficult time for foraging sea lions: *"Results of these studies indicated that during summer, females with pups foraged close to rookeries, and made relatively short trips with shallow dives. In winter, females had much longer trips and dove deeper than summer animals."* (Merrick and Loughlin1993). Greatly increased foraging ranges and/or effort of adult females in winter suggest that prey is harder to find in winter (Merrick and Loughlin, 1997).

In addition to finding prey more scarce in fall and winter months, adult females may be nursing a young-of-the-year pup and probably carrying a fetus, which would place a much higher energy demand on the female. Research from Pitcher et al. (in review) on Gulf of Alaska sea lions supports the hypothesis that nutritional stress affected the reproductive performance of Gulf sea lions during the 1970s and 1980s, when "substantial embryonic and fetal mortality" occurred between late fall (when the embryo implants in the womb) and late gestation in the spring. These findings are consistent with research on Antarctic fur seals, whose pregnancy status and birth rates appeared strongly related to availability of food resources in the fall/winter (Boyd, 1996. Boyd et al., 1995).

The EA/RIR for Inshore/Offshore-3 (NPFMC/NMFS 1998) also notes that the period from October to March is likely the most critical period of the year for the most vulnerable segments of the population, pups and juveniles:

> "*Due to the chronology of pupping, nursing, and weaning, many pups may be weaned in the winter months; i.e., October through March or April. Therefore, many pups may face the critical transition to independence during a period when environmental conditions many be the most harsh; sea surface conditions worsen, prey availability decreases, and winter weather conditions increase energy requirements to thermoregulate (Merrick and Loughlin 1997). A precise or quantitative description of the increased energy costs associated with winter months is not possible at this time, but the period from October to March or April is likely the most critical period of the year for pups and juveniles.*" (NPFMC/NMFS/AFSC 1998)

The concentration of the first-trimester roe pollock fishery in Shelikof Strait aquatic foraging habitat may deplete local schools of fish at a critical time of year, causing food-stressed nursing and/or pregnant females (whose energy requirements are higher) to abort fetuses or wean nursing pups before they are able to feed themselves. Also, pups are just beginning to learn how to forage for themselves, "*and early weaning would severely compromise their ability to obtain adequate nutrition*" (Merrick and Loughlin, 1997). Therefore the pollock roe fishery in critical sea lion habitat may pose an especially serious threat to mothers and pups alike (Merrick and Loughlin, 1997).

The value of roe-bearing pollock to Steller sea lions may consist of several key factors:

- Pollock have greater nutritional value when female fish are bearing roe, and therefore are thought to provide some advantage to sea lions (NPFMC/NMFS 1998).
- Aggregations of roe-bearing pollock appear in predictable times and areas of winter/spring and it is likely that these large, dense schools reduce the energetic cost associated with foraging (NPFMC/NMFS1998).
- "*Roe-bearing pollock are available at the end of the winter season when sea lions are likely to be in their worst condition. The added nutritional value of roe-bearing pollock may be essential for sea lions, particularly reproductive females, to regain good condition. Roe-bearing pollock may also be a particular benefit to young sea lions, with less developed foraging skills and relatively greater nutritional demands for growth and thermoregulation.*" (NPFMC/NMFS 1998)

■ THE 1998 GOA POLLOCK TAC IS LIKELY TO JEOPARDIZE STELLER SEA LIONS

The history of the Gulf pollock fishery since its inception in the 1970s indicates that recruitment is highly variable and MSY is unknown, thus stock biomass can fluctuate rapidly in response to environmental factors, predation and fishing pressures. Annual harvests of pollock in the GOA increased from 10,000-60,000 metric tons during the early 1970s to approximately 300,000 t in 1984 and 1985, but the stock biomass plummeted afterward and remains at only about a third of its former size.

In discussing the merits of increasing the GOA pollock TAC 62% in 1998, the Gulf Plan Team cited most recent survey and model estimates of pollock biomass in the Gulf indicating that the stock abundance has remained far below the levels of the early 1980s. Furthermore, bottom trawl survey estimates indicate that the stock declined between 1993 and 1996 to the lowest levels since 1975 while female spawner biomass has dropped below the target level of B40%:

- The time series of pollock biomass used for the stock synthesis model is based only on the regions west of Cape St. Elias, where the 1996 bottom trawl estimate of biomass was 653,905 t in 1996 -- a drop of 14% from the 1993 estimate (760,788 t), and the lowest bottom trawl point estimate in the time series since 1975 (Hollowed et al., 1997, TABLE 1.7).
- Model estimates of age 2+ biomass for 1997-98 are about 1 million t, only about one-third the stock size of nearly 3 million t in 1981-83 (Hollowed et al., 1997, TABLE 1.11).
- Projected female spawner biomass (255,400 t) is below the B40% level of 267,200 t, which is the presumed level that would produce an MSY-like catch (MSY is unknown). By comparison, during the time of peak pollock biomass in the early 1980s, the female spawner biomass was estimated at between 724,000-940,000 t (Hollowed et al., 1997, TABLE 1.11).

The Gulf of Alaska Plan Team Minutes of November 17-21, 1997 expressed a high level of uncertainty and discomfort with the large increase in the 1998 TAC: *"The Team recommended that in setting TAC, the Council may wish to consider the relatively low level of pollock biomass, the dramatic increase in the Central Gulf ABC while the Steller sea lion population continues to decline in the area, and the effect of below average recruitment of pollock in future years which could result in a rapid decline in the pollock stock. The Team also noted that current information indicates that fishing rates may now be higher than at the peak of the fishery, the spawning potential ratio is the lowest since 1973, and while the high 1998 ABC is driven by the strong 1994 year class, there is no evidence to suggest that the 1995 and 1996 year classes are above average."*

Since the 1998 Gulf-wide pollock TAC is the highest in 13 years (131,000 metric tons, a 62% increase from 1997), the actual volume of pollock removed from critical habitat in the Gulf will almost certainly increase substantially this year. However, the percentage of the observed GOA pollock catch averaged only 39% of the total annual catch for 1990-97, thus estimates of the percentage of the catch taken from critical habitat are probably understated. In **Table 1** below note that five out of the eight years during 1990-97 have resulted in overages of the TAC. There have been substantial overages of the TAC in 1991, 1993, 1994, and 1995 as well as a large overage of the TAC for the western Gulf (Subarea 610) in 1997. Since the TAC is set at 100% of the ABC, these overages have consistently exceeded the maximum allowable catch for the stock:

Table 1. West-Central Gulf of Alaska pollock catch, TAC, and amount of the catch observed, 1990-97.

Year	W-C GOA Catch(1)	W-C GOA TAC(1)	Tons Observed(2)	Percent Observed
1990	90,500	100,000	30,580	34%
1991	107,500	84,000	39,180	36%
1992	93,900	111,000	34,430	37%
1993	107,400	102,000	40,740	38%
1994	104,000	62,000	36,260	35%
1995	69,900	29,700	35,170	50%
1996	49,800	52,500	19,690	40%
1997	83,199*	74,400	30,740	41%
1998	NA	120,800		

(1) Hollowed et al. 1997. Table 1.1.
(2) NMFS unpublished data. Gulf of Alaska west of 145W Longitude: Observer-sampled groundfish catch amounts by gear and species, 1990-97 (metric tons).
* GOA Groundfish ABCs and TACs, Final 1998 NPFMC Specifications, December 1997.

At the December 1997 TAC-setting meeting, the Fisheries Service acknowledged that catches of Gulf pollock in critical sea lion foraging habitat are likely to increase substantially in 1998 in response to the 62% increase in 1998 ABC/TAC. NMFS called for an emergency adjustment in the 1998 Gulf pollock trimester apportionment in order to limit the increase in catch that will occur in the fall-winter period, when prey is more scarce, foraging ranges are much more extensive, nursing and pregnant mothers have much higher energy requirements, and sea lion pups are just learning how to forage for themselves.

There are at least three major problems with this approach:

- Since the percentage of the pollock TAC taken from critical habitat has remained consistently very high year after year, the total tonnage of pollock removed from critical habitat in the Gulf will almost certainly increase substantially this year.
- Due to the sharp increase in the 1998 pollock quota, the new 25-35-40% apportionment of the TAC will *still* result in an estimated increase in third-trimester catch from critical habitat of about 10,000 metric tons over last year, during the time of year when nutritional stress is most likely to be a problem for the endangered population (Salveson in testimony, Dec 1997).
- NMFS has not addressed the need to move the fishery out of critical habitat areas, maintaining only the status quo rookery no-trawl zones of 10 nm. Thus the estimated 11,000 metric ton reduction in the third-trimester catch achieved by the new seasonal

25-35-40 apportionment simply shifts that catch into the summer season, but likely not out of critical habitat.

The emergency Gulf pollock TAC reapportionment is a stopgap measure, though NOAA General Counsel Sue Salveson advised the Council in December, 1997, of the need for more comprehensive measures: *"From staff's perspective, there needs to be a bigger, more comprehensive fix to the Steller sea lion issue and staff is working towards that."* (Salveson in testimony, Dec 1997)

To date, NMFS has not recommended measures to reduce the percentage and volume of GOA groundfish catch in critical habitat, and has not proposed a comprehensive set of time and area adjustments and trawl area closures which could provide a reasonable assurance that the pollock fishery is not jeopardizing sea lions.

We believe this proposal, which would prohibit groundfish trawling in critical habitat proximal to rookeries and major haulouts out to 20 nm year-round, provides the only adequate means of *reducing* catches in critical habitat and decreasing the strong likelihood that the fisheries jeopardize the survival of the species and act as a significant limiting factor on recovery of the endangered population.

Foreseeable Impact of Proposal:

This proposal would exclude the groundfish trawl fleet year-round from areas within 20 nm of sea lion rookeries and haulouts listed as critical habitat in the GOA, extend the same protection to major haulouts sites at which >100 animals have been counted but which are not now included as critical habitat, and expand no-trawl zones seasonally to protect the full extent of the Shelikof Strait aquatic foraging area during the pollock spawning season.

Altogether about 48 haulout sites would receive 20 nm no-trawl exclusion zones under this proposal, in addition to the 20 nm zones around 14 rookeries: 11 haulout sites listed as critical habitat in the western GOA, 22 in the central GOA and 11 in the eastern GOA, plus at least 4 other major haulouts where between100-200 animals have been counted but which have not been listed as critical habitat: Kak Island (Semidi Islands) and Mitrofania (between the Semidi and Shumagin Islands) in the western GOA, and Perl Island/Rock and Cape Elizabeth (Kenai Peninsula) in the central GOA.

Of the 1,508 vessels registered to fish GOA groundfish in 1996, 202 were trawl catcher boats (NPFMC/NMFS 1998). Observer fishery data gathered during 1990-97 indicate that average groundfish trawl catches within 10 nm of rookeries and haulouts listed as critical habitat have been relatively small (15.5% on average), but that much larger percentages ranging from 47-59% (53% average) have been taken within 20 nm:

Average percent of observed **groundfish** trawl catches within 10-20-40-60 nm of sites listed as critical habitat in the Gulf of Alaska, 1990-97:

Within 10 nm	Within 20 nm	Within 40 nm	Within 60 nm
15.5%	54%	87%	94%

Source: NMFS/AFSC unpubl. fishery data, 1990-97

Pollock catches have comprised the bulk (about 62% on average) of the observed average groundfish trawl catches within 20 nm of sites listed as critical habitat during 1990-97, and 55% of the total within 40 nm (NMFS/AFSC unpubl. fishery data). Almost the entire GOA pollock catch has come from within 40 nm of rookeries and haulouts listed as critical habitat, on average:

Average percent of observed **pollock** catches within 10-20-40 nm of sites listed as critical habitat in the west-central Gulf of Alaska, 1990-97:

Within 10 nm	Within 20 nm	Within 40 nm
21%	63%	97.5%

(Source: NMFS/AFSC unpubl. fishery data, 1990-97)

Although an extension to 20 nm of trawl exclusion zones around rookeries and haulouts in the GOA may cause the fleet to move to new areas in some cases, industry representatives have maintained that pollock abundance is high throughout the region. Therefore supplies of pollock should be adequate to allow the fleet to catch the TAC.

Additional benefits from these measures include reduced bycatch of non-target fish species which serve as important prey for marine mammals and birds, and protection for benthic habitat in nearshore areas where king crab and other shellfish were once abundant.

Are There Alternative Solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

Existing temporal (trimester) and broad spatial apportionments of the GOA pollock TAC (areas 610, 620, 630), coupled with rookery trawl buffer zones of 10 nm, have failed to reduce the amount of pollock or other groundfish removed from critical foraging areas proximal to rookeries and haulouts. Although the time-area management measures are an integral part of sea lion conservation and may help to reduce the risk of localized pulse fishing and depletions of the sea lion prey base by spreading the TAC out across the year and in large management districts, these measures have not constrained or reduced catches in critical habitats (Fritz and Ferrero 1997).

Given the importance of pollock and other groundfish species targeted by the Gulf of Alaska trawl fisheries as sea lion prey, the dire condition of the endangered sea lion population in the Gulf of Alaska, and the likelihood that food limitation is driving the decline and limiting future recovery, the only reasonable and prudent course of action is to prohibit trawl fishing which is now concentrated in critical sea lion foraging habitats.

Since Steller sea lions are broadly distributed in winter and can move extensively between haulout sites depending on weather and prey availability, a year-round prohibition of trawling within 20 nm of foraging areas around all rookeries and haulouts listed as critical habitat in the Gulf of Alaska, and around those sites with >100 animals which are not now listed as critical habitat, provides the simplest, most efficient way to provide reasonable protective coverage for the endangered population across all seasons. Expanded no-trawl buffer zones are also the only effective way to achieve large *reductions* in trawling effort and catch in critical foraging areas.

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FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL

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Fishery Management Plan: Bering Sea/Aleutian Islands

Brief Description of Proposal:

This proposal seeks to (1) establish comprehensive seasonal and area-specific management of the BS/AI pollock TAC to spread the fishery out more effectively in space and time, (2) create a year-round CVOA for the pollock fishery, (3) close the Aleutian Islands to directed pollock fishing, and (4) reduce the allowable catch as necessary such that fishing in any area does not exceed the target harvest rates for the managed stock as a whole.

Council authority to separate areas or geographic regions into management districts and subareas is expressly mandated in the Discretionary Provisions Section 303(b) of the Magnuson-Stevens Act. Specifically, any FMP may "*designate zones where, and periods when, fishing shall be limited, or shall not be permitted, or shall be permitted only by specified types of fishing vessels or with specified types and quantities of fishing gear.*" (303(b)).

Objectives of Proposal:

This proposal seeks large reductions in groundfish trawl fishery removals which are now concentrated in Steller sea lion critical habitat in the southeastern Bering Sea/CVOA and Aleutian Islands. The importance of pollock as a primary sea lion prey, coupled with the size of the BS/AI pollock fishery and the predominance of pollock in groundfish catches from these critical areas, make this fishery an obvious focal point of concern. Between 1990-97, on average pollock accounted for 63-80% of the total observed groundfish removals within

60 nm of terrestrial sites listed as sea lion critical habitat in the BS/AI (NMFS/AFSC unpubl. fishery data). The package of recommended measures in this proposal are also designed to reduce fishing pressure on the declining eastern Bering Sea pollock spawning stock and prevent temporal and geographic pulse fishing which jeopardizes the future of the fishery as well as Steller sea lions.

Reducing total catches in critical habitat substantially will require a combination of conservation measures which includes more effective spatial and temporal regulation of the pollock fishery, coupled with extension of no-trawl buffer zones to protect critical sea lion foraging habitat areas as described in a separate proposal.

Measures included in this proposal seek to:

1. **reduce the impact of large-scale pulse fisheries in any season** and reduce first quarter fishing on spawning aggregations of pollock by spreading the allowable catch out on at least a quarterly basis;
2. **limit overall pollock fishery removals from the CVOA** and other management districts by developing area-specific harvest guidelines to ensure that the TAC does not become geographically concentrated in one area or region, resulting in intense pulse fisheries, disproportionately high extraction rates, localized depletions of the stock and the available prey base;
3. **create a year-round CVOA** prohibiting the offshore pollock fleet from fishing there on a year-round basis to reduce fishery removals and effort on spawning pollock in the first quarter of the year, when the fish are most vulnerable to trawl gear, as well as reduce the impacts of high-volume trawling in critical sea lion habitat;
4. **close the Aleutian Island pollock fishery to directed pollock fishing** to promote rebuilding of a depleted stock and to safeguard the availability of this important prey for endangered Steller sea lions throughout the Aleutians;
5. **reduce the BS/AI pollock TAC and other groundfish TACs** by the amount of reduction in catch from Steller sea lion critical habitat to ensure that reductions in one area or season are not simply displaced into another area or another fishing season, and that catches in all management areas do not exceed the target harvest rate for the managed stock as a whole.

1/2. <u>SEASONAL AND AREA-SPECIFIC CATCH GUIDELINES</u>

Brief Statement of Proposal:

This proposal would establish at least quarterly and area-specific apportionments of the TAC to slow down and spread the fishery out temporally as well as geographically, reducing the concentrated pulse fishing that results in localized depletions of the prey base and reducing fishing on spawning grounds in the first quarter of the year and in critical sea lion habitats.

Objectives of Proposal:

The current "A" and "B" pollock seasons have actually created two large, short-lived pulse fisheries which are concentrated temporally in the first quarter of the year and beginning of the fall period, and concentrated geographically in southeastern Bering Sea CVOA/sea lion critical habitat area. 45% of the TAC now comes in the first quarter of the year on pollock spawning grounds, representing a nearly 10-fold increase in fishing on spawning grounds compared to the period prior to 1987. During this period of heavy roe fishing there has been a steady decline in the pollock spawning stock following the pattern of the large but short-lived roe pollock fisheries in the Shelikof Strait (1981-1985) and Bogoslof Island (1987-1991).

- Quarterly allocation (at a minimum) of the giant BS/AI pollock fishery as a whole is necessary owing to the sheer size of the TAC and the need to spread out its impacts more evenly over the year and minimize its impacts at any one time. The intent is to prevent concentrated pulse fishing and its associated effects (e.g. localized depletions), relieve pressure on the spawning stock and reduce impacts in critical sea lion habitat. It would be applied to the entire eastern Bering sea/Aleutian Islands TAC, not just the CVOA/critical habitat. The precedent for quarterly pollock allocations was set in the Gulf of Alaska in 1990.

- Area-specific catch guidelines and specified limits or caps on the amount of pollock and other groundfish that can be removed from any management area, based on the proportion of the pollock distribution in the area or on a fixed percentage of the TAC, are intended to spread the TAC out geographically and minimize its effects in any one area. Seasonally concentrated schools of spawning fish should not, however, become targets of concentrated high-volume fishing at the time when fish are most vulnerable to trawl gear. For instance, large schools of pollock are found in the CVOA/critical habitat area prior to and during spawning time. However, no one actually surveys pollock abundance in the CVOA in winter or knows how many fish are there prior to the start of the fishery. The only index of pollock abundance is fishery CPUE, which is much higher in the "A" season, as would be expected on spawning aggregations. CPUEs can remain deceptively high for aggregated schools of spawning fish even when the population is decreasing, as happened in the short-lived roe pollock fisheries at Shelikof Strait and Bogoslof Island.

Need and Justification for Council Action:

■ EXISTING TIME-AREA MANAGEMENT MEASURES ARE INADEQUATE

In an August 1997 statement by the NMFS Alaska region ("How Ecosystem Principles Currently Are Applied to Alaska Fishery Conservation and Management Activities and How Ecosystem Principles Might Be Applied to Future Activities"), the agency cites the spatial and temporal allocation of groundfish harvests as measures consistent with an ecosystem-based approach to management, as well as no-trawl buffer zones for sea lion rookeries.

The examples offered by NMFS include: spatial allocation of the GOA pollock and Aleutian mackerel TAC in regional 3 subareas; temporal allocation of the Bering Sea pollock TAC ("A" and "B" season) and GOA pollock TAC (trimester apportionment divided 25-25-50%). According to the Draft 1998 EA for the Groundfish FMP of the BS/AI and GOA (NMFS 1997), the regulatory intent of these measures was *"to disperse trawl fisheries in time and space, exclude them from some important sea lion habitats, and minimize the likelihood that groundfish fisheries would create localized depletions of sea lion prey."*

Despite the *intent* of broad seasonal and spatial apportionments of the Gulf pollock and Aleutian mackerel TACs, these measures have failed to reduce the concentration of groundfish catches in critical sea lion habitat. Existing 10 nautical mile (nm) no-trawl zones around rookeries, and broad time/area apportionments of fisheries have not constrained or reduced the total amount of the groundfish removed from critical sea lion habitats in the BS/AI or GOA, nor have they addressed the highly localized patterns of fishing and localized depletions in these areas. More comprehensive and refined measures are needed.

In the BS/AI, where there is currently only a broad spatial allocation of the pollock TAC between the EBS and AI management areas (Fritz and Ferrero 1997), pollock fishery removals in the southeastern Bering Sea-CVOA region have soared to record levels of 50-70% of the TAC during 1992-1997. At the same time, the pollock fishery season has been reduced from 286 days in 1990 to 77 days in 1997 as a result of pollock fleet over-capacity and a race for fish, creating short-lived and very intense pulse fisheries in the region. During this same period, overall eastern Bering Sea pollock abundance has dropped by about 38% but has been concentrated in the CVOA, where pollock survey estimates plummeted 81% from 1994-1997. It is difficult to understand how this temporally and spatially compressed pulse fishery could serve as an example of an ecosystem-based approach to fishing.

The absence of adequate time/area management measures in BS/AI was noted at the earliest stages of the Amendment 18 process (creating the CVOA). The 4 November 1991 Section 7 consultation (Aron memo) states the conditions under which an ESA no-jeopardy opinion could be issued for Amendment 18 to the BS/AI fishery management plan, which includes quarterly allocations consistent with the Gulf pollock regulations as well as caps or limits on total removals from the management area and no-trawl closure areas around sea lion critical habitats. A memorandum of 10 March 1993 from Aron to Steve Pennoyer reiterates the importance attached to quarterly allocation of the Gulf pollock TAC as fundamental to the NMFS conservation strategy of temporal and spatial allocation of the pollock TAC to minimize sea lion impacts in the Gulf of Alaska.

The Section 7 consultation of 21 July 1992 (Fritz and Ferrero memo) reiterates the need for better time-area management of the fisheries: *"...NMFS has stated (Section 7 consultation on Amendment 18, February 1992) that 'increased fishing effort in the CVOA may diminish the availability of food resources to Steller sea lions that forage in this geographic region and may adversely affect their survival and recovery.' ...Whether Amendment 18 is adopted or* *not, measures should be taken which reduce, rather than concentrate, fishing effort in the Bering Sea. Spatial or temporal allocation schemes (e.g. TAC allocation based on biomass distribution) may offer long-term benefits to the pollock resource, sea lions and competing fisheries.*"

More recently, concerns for now-endangered Steller sea lions and declining pollock stocks in the Bering Sea and Aleutian Islands have focused renewed attention on the massive concentration of fishing effort and catch in the CVOA/critical habitat. The January 1996 Biological Opinion for the BS/AI noted that fishery catches near Steller sea lion rookeries, haulouts and at-sea foraging habitat areas continue to be much higher than they were prior to the population decline and that the majority of the groundfish removals continue to be taken in rapid, intensive fisheries concentrated in time and area because the North Pacific Council has not adequately addressed the overcapitalization in the fisheries (NMFS 1996).

Recognizing the need for more effective time-area management of fisheries in the Bering Sea, the Bering Ecosystem report (NRC 1996) included the recommendation to broaden the distribution of fishing effort in space and time, especially for pollock: "*The concentrated fishing for pollock in some places at specific times probably reduces the availability of food for marine mammals and birds, especially juveniles. Thus one step that might help improve the food supply for and reverse declines in marine mammals and birds would be to distribute fishing over wider areas and over longer periods.*" Fritz and Ferrero (1997) have recommended that more effective use of these management tools to benefit sea lions and the fisheries: "*Of the measures discussed, we suggest particular attention be given to further refinement of the trawl exclusion zone strategy and both spatial and temporal reductions in fishery effort in areas identified as critical sea lion habitat. While this will cause changes in the distribution and structure of the Alaskan groundfish fishery, it may be necessary in order to insure its long-term viability.*"

At the Council's TAC-setting meeting in December 1997, the SSC further highlighted for the Council's attention the concerns for the dire condition of sea lions and the need for management measures to address fishery interactions that may affect prey availability in the times and areas where sea lions forage. The SSC minutes cited "*several multi-species concerns which lie at the interface of sea lion conservation and fishery management,*" noting that sea lions and fisheries compete for common prey and that prey availability is crucial to their recovery, given the consensus that food limitation is the most likely cause of high sea lion mortality. "*Thus the MAGNITUDE, TIMING, and LOCATION of major fisheries targeting sea lion prey species, particularly Atka mackerel and walleye pollock, become a focal concern.*"

The use of overall groundfish caps (e.g. 2 million metric ton limit on BS/AI groundfish removals) and single-species TACs are cited by NMFS as evidence of conservative management in the Bering Sea, but catch limits based on gross estimates of stock "biomass" for the managed stock as a whole tell us little about the actual dynamics of fisheries and their effects on the ecosystem. The use of allowable catch limits are important management tools for controlling *how much* fish are caught, but by themselves they do not address *where, when* and *how* fisheries operate.

Target fish stocks are not evenly distributed and neither is the fishing effort of a large, technologically advanced factory trawl fleet in the Bering Sea which, moreover, has at least 2-3 times as much fish-catching capacity as the annual allowable catch. The resulting race for fish by an overcapitalized fleet leads to rapid, locally intense pulse fisheries in the absence of effective time-area management. Management measures to regulate times of year and locations of the fisheries, as well as scale of operation and type of gear used, are crucial to any determination of sustainability in an ecosystem context.

3. YEAR-ROUND CVOA

Brief Statement of Proposal:

Create a year-round CVOA for pollock, excluding offshore factory trawl and mothership fleets during all fishing seasons.

Objective of Proposal:

In 1992, following the closure of the Bogoslof Island area (518), a large amount of pollock "A" season effort shifted to the CVOA. The Bogoslof area, which overlaps the western portion of the sea lion aquatic foraging area off the EAI out to 170W longitude, has remained closed to directed pollock fishing in response to very low (and declining) pollock biomass since 1992, as part of the Donut Hole treaty with Russia. When considering remedies to the overexploitation of the CVOA/critical habitat is important to remember that the Bogoslof portion of sea lion aquatic foraging habitat has *already* been depleted. If anything, there is a strong case to make for excluding ALL trawl fishing in the CVOA before it too goes the way of the Bogoslof area.

The objective of this proposal involves explicit Council treatment of the CVOA as a *conservation* measure to control trawl fishing effort and catch in an ecologically critical area encompassing sea lion critical habitat and essential fish spawning and nursery grounds. The goal is to achieve immediate large reductions in pollock catches which have become even more concentrated in Steller sea lion foraging habitat in the first quarter of the year, to achieve large reductions in fishing on the spawning aggregations, and to prevent increases in trawl fishery effort/removals throughout the year. Removal of offshore components of the pollock fleet is necessary to reduce exploitation on pollock spawning stock in the first quarter of the year and to prevent any increases in removals from the CVOA during subsequent seasons.

The reduction in CVOA roe fishing achieved by exclusion the offshore fleets in the first quarter should be reallocated to the ecosystem as a means of achieving the substantial reductions in fishery removals from CVOA/critical habitat and reductions in roe pollock fishing on a declining pollock stock without simply displacing the catch into another area or another time of year (**See Recommendation #5 below**).

Need and Justification for Council Action:

■ CONCENTRATION OF THE POLLOCK FISHERY IN CVOA/CRITICAL HABITAT JEOPARDIZES SEA LIONS AND THREATENS POLLOCK SPAWNING STOCK

Since there is currently only a broad spatial allocation of the pollock TAC between the EBS and AI management areas (Fritz and Ferrero 1997), there is no management framework to limit the allowable catch in CVOA/critical habitat. In the absence of controls on distribution of the catch, pollock fishery removals in the southeastern Bering Sea-CVOA region have increased steadily since 1980, reaching record levels in the 1990s: averaging 279,069 mt during 1980-1985, 611,178 mt during 1986-1991, and 724,676 mt during 1992-1997. From 1992-1997, 50-70% of the eastern Bering Sea pollock TAC has been extracted from the CVOA (NPFMC/NMFS 1998). *If the CVOA had not been created in the Pollock "B" season, removals from this area would likely have been even higher* (Fritz et al. 1995).

Critical habitat involves "determination of the essential physical or biological features that are essential to the conservation of the species, and second, the determination of whether these features require special management considerations or protections." (ESA) In designating Steller sea lion critical habitat, NMFS acknowledged the need for spatial and temporal regulation of fishery removals to ensure that pulse fishing and local depletions of prey stocks do not occur, noting that adverse modification of critical habitat and jeopardy to the species' survival are inseparable (NMFS 1993). More recently, NMFS has stated that the single most important feature of marine areas critical to Steller sea lions is their prey base (NMFS 1998).

Despite the general agreement that food limitation is driving the sea lion decline, and despite the agreement that pulse fishing resulting in locally high extraction rates poses the greatest threat to sea lions' ability to find adequate amounts of food (SSLRT 1991; NMFS 1991, 1996, 1998), the Fisheries Service and the Council have not acted adequately to prevent critical habitat from becoming the focal point of major groundfish fisheries in the 1990s, particularly for pollock, Atka mackerel and Pacific cod. In the eastern Aleutians/CVOA region most directly impacted by management decisions on Inshore/Offshore 3, a Steller sea lion population estimated to be >50,000 in 1960 has suffered a roughly 90% decline in population during the period in which a high-volume trawl fishery for pollock and other groundfish has operated.

The April 1991 Biological Opinion concluded that sea lions and fisheries target large schools of fish to maximize foraging efficiency and minimize effort, therefore large fishery removals from schools of fish in close proximity to rookeries and haulouts are likely to decrease the amount of food available to sea lions. The June 1991 Biological Opinion concluded that the Gulf pollock fishery had become spatially and temporally compressed in nearshore waters over time, and that large pollock harvests over small areas and time periods may deplete local pollock stocks and limit prey availability for sea lions. The January 1996 Biological Opinion for the BS/AI noted that fishery catches near Steller sea lion rookeries, haulouts and at-sea foraging habitat areas continue to be much higher than they were prior to the population decline and that the majority of the groundfish removals continue to be taken in rapid, intensive fisheries concentrated in time and area (NMFS 1996).

A. Explosive Growth of Winter Roe Pollock Fishery in the CVOA

In the BS/AI during the 1990s, the A-B seasonal allocation of the pollock TAC has resulted in an approximately ten-fold increase of the catch to come from the winter months and on spawning grounds in the large aquatic foraging habitat area from Unimak Island to Islands of the Four Mountains. The Bering Sea Ecosystem report (NRC 1996) noted the size, brevity and intensity of the contemporary pollock "A" season fishery: "*The development of sophisticated, highly capitalized fishing fleets has in many cases resulted in harvesting that is very intense. For example, during the winter of 1994 the Bering Sea trawl fleet caught approximately 600,000 t of pollock in a six-week period. At its peak, the fleet was harvesting at a rate of 30,000 t per day.*" The Bering Sea Ecosystem report suggests that fisheries operating on a broader temporal and spatial scale would be expected to have lesser impacts on fish local fish abundance (NRC 1996).

The Draft EA/RIR for Inshore/Offshore-3 (NPFMC/NMFS 1998) also highlighted the dramatic growth in the first quarter roe pollock fishery as well as its concentration in the CVOA: "*Pollock removals from critical habitat during the first part of the year increased from negligible levels in the late 1970s to over half a million mt in the mid-1990s. Pollock removals from critical habitat were less than 50,000 mt annually during the first quarters of 1977-1985*" but increased dramatically in the late 1980s with the development of the Bogoslof Islands roe pollock fishery and continued to rise in the 1990s:

- A-season pollock catch from both the CVOA and critical habitat increased from about 240,000 mt in 1992 to 320,000 mt in 1993 -- comprising about 50% of the A-season catch (NPFMC/NMFS 1998).
- A-season pollock catch from CVOA/critical habitat increased yet again to 530,000-580,000 mt/year during 1994-1995, or about 85-93% of the total A-season removals in those years (NPFMC/NMFS 1998).
- Greater use of areas outside CVOA/critical habitat in 1996-1997 resulted in the A-season pollock catch in CH declining to about 400,000 mt -- less than in 1994-95 but still comprising about 75% of the total A-season catch (NPFMC/NMFS 1998).

In addition to concerns about the localized effects of this large pulse fishery on the availability of energy-rich, roe-laden pollock in winter foraging habitat of Steller sea lions during the difficult winter months, there are possibly large indirect effects that roe fisheries may have on pollock year-class size and the annual production of juvenile pollock, which are a prime food source for many other groundfish as well as declining seabird colonies and marine mammals populations including Steller sea lions, northern fur seals and Pacific harbor seals in the Bering Sea: "*Roe fisheries could reduce the number of small pollock available to marine mammals and sea birds simply by reducing the number of spawners, by disrupting spawning behavior, and by removing a disproportionate number of female fish.*

These second-order fishery effects may have substantial impacts on North Pacific Ocean ecosystems and should be the subject of further research." (Merrick 1995)

In addition to concerns for sea lions, the scale of the roe pollock fishery should be cause for immediate measures to reduce the "A" season fishery in the interests of protecting a steadily declining spawning stock. Densely schooled spawning aggregations are more vulnerable to overfishing, and pollock is no exception. Episodes of intense fishing on spawning stocks in the Shelikof Strait (1981-1985) and Bogoslof Island (1987-1991) have been followed by steep declines in pollock abundance in each of those areas. The 4 November 1991 Aron memo notes that the southeastern Bering Sea shelf is an important pollock spawning grounds and suggests that the spawning stock may benefit from reduced catches in the area: "*Due to the predominant currents and drift of pollock eggs and larvae, this area probably contributes more to successful recruitment to the pollock population of the Eastern Bering Sea than spawning ground northwest of the Pribilofs. Consequently, from a pollock management perspective alone, it might be prudent to direct effort away from the Area.*"

B. <u>Evidence for Localized Depletion in the Pollock "B" Season</u>

The Section 7 consultation of 4 November 1991 (Aron memo) envisages a worst case scenario in which Amendment 18 to the BS/AI FMP (creating the CVOA) "*concentrates fishing effort even further in an area that has had a declining pollock biomass and has experienced relatively higher fishery exploitation rates during the last 5 years.*"

The trends of increasing catches and declining pollock biomass in the southeastern Bering Sea/CVOA identified by NMFS during 1986-1990 have continued during the 1990s and accelerated. Catches from the CVOA increased 45% from 1991-1995 to record levels, while survey estimates of eastern Bering Sea pollock abundance have declined 38% from 1994-1997. However, the decline has been concentrated in the CVOA/critical habitat region, where the abundance plummeted 81% from 1994-1997 – more than twice as high as the decline for the managed stock as a whole (NPFMC/NMFS 1998).

Similarly, NMFS has documented the trend in disproportionate exploitation rates in the pollock "B" season during this period: "*Pollock are harvested disproportionately to their areal biomass distribution. Harvest rates in the CVOA during the B-season are much higher than in Areas 51 and 52.*" (Fritz et al. 1995) As CVOA pollock abundance has declined sharply in the summer/fall months, accounting for only about 10% of the overall stock biomass in recent summer surveys, the "B" season extraction rate has risen correspondingly:

- In 1996, "B" season catches represented 31% of the stock size in the CVOA in the summer survey of 1996.
- In 1997, the observed "B" season catch in the CVOA equaled nearly 50% of the exploitable pollock stock biomass surveyed in the area prior to the start of the fishery (See Table below.).

Distribution of Age 3+ Pollock by Eastern Bering Sea Management Areas and Harvest Rates in Pollock "B" Seasons of 1991, 1994, 1996, 1997

Area	Year	Biomass (mt)	Catch (mt)	Harvest Rate
CVOA				
	1991	943,000	244,000	26%
	1994	1,984,000	291,000	15%
	1996	853,000	250,000	31%
	1997	385,000	189,000	49%
Areas East of 170W Outside CVOA				
	1991	1,688,000	107,000	6%
	1994	3,465,000	184,000	5%
	1996	3,115,000	217,000	7%
	1997	2,417,000	16,000	1%
Areas West of 170W				
	1991	3,059,000	529,000	17%
	1994	5,177,000	157,000	3%
	1996	4,174,000	101,000	2%
	1997	3,828,000	294,000	8%

Source: NMFS/AFSC unpublished fishery data and North Pacific Fishery Management Council, EA/RIR for Inshore/Offshore 3 (Amendments 51/51 to the FMPs of the BS/AI and GOA), May 1998.

At this level of exploitation, localized depletions of prey and other adverse effects on prey quality, composition or size of fish, density of fish, etc. are likely to occur. Similar and even higher extraction rates from critical habitat in the Aleutian Atka mackerel fishery have been shown to create localized depletions of fish for periods of unknown duration after the fishery is closed (Fritz, 1997; Lowe and Fritz 1997).

What has not been investigated is the degree to which intense "A" season fishing in the CVOA has caused or contributed to the observed decline in summer/fall pollock abundance within the CVOA boundary. Given the evidence of localized depletions in the Atka mackerel fishery, it is not unreasonable to suppose that a similar effect may deplete local pollock abundance for many months after the first quarter roe pollock fishery has closed. The only index of abundance in the "A" season is fishery CPUE, but CPUEs may remain high on spawning aggregations even as substantial declines in abundance are occurring.

Given the size and scope of the pollock fishery compared to any other groundfish fishery, the intense spatial-temporal compression of the fishery in habitats deemed essential to the survival and recovery of the Steller sea lion, the evidence for high exploitation rates and rapidly declining pollock biomass in the CVOA, and the importance of the CVOA as a spawning and nursery habitat for pollock and other fish and shellfish, NMFS and the Council must take action to reduce fishing pressure in the region under the terms of the protected species requirements of the ESA not to jeopardize the species or adversely modify its critical habitat, and in the interest of the future viability of the pollock fishery itself.

Foreseeable Impacts of the Proposal:

The Inshore/Offshore 3 EA/RIR provides evidence to support the efficacy of the proposal to establish the CVOA throughout the pollock fishing year as a means of reducing catch in CVOA/critical habitat:

- Section 6.4.3 indicates that exclusion of the offshore sector from the CVOA in the "A" season "would likely result in the greatest reduction in pollock removals." Section 5.3.1 indicates that exclusion of factory trawlers would provide the single greatest reduction from the CVOA: about 23%, from 554,628 mt down to 426,111 mt. By excluding catcher vessels delivering to true motherships, the reduction in A-season CVOA catch goes to 40% -- to 333,558 mt. These two measures combined would result in the biggest reductions in CVOA/CH catch during the "A" season.
- By excluding catcher vessels delivering to true motherships in the "B" season catch of pollock will "likely" be reduced (Section 6.4.3, p. 217). Since motherships are mobile and can move at will, that portion of the fleet which delivers to motherships is not tied to landbased processing plants and can move farther offshore more easily. That portion of the fleet represents about 100,000 metric tons or approximately 10% of the TAC in recent years.

The Inshore/Offshore 3 EA/RIR notes that during years with extensive ice coverage vessel may have to fish close to the ice edge "or perhaps even forgo harvesting the pollock while roe is prime to avoid the ice." However, that document assumes a status quo A-B seasonal split. When quarterly allocations and reductions in catch for critical habitat protection are considered, the likely impacts of excluding the offshore sectors of the fleet can be seen as the least disruptive to the pollock industry.

Assuming the percentages of the offshore factory trawlers' "A" season catch in the CVOA for 1991/1994 (96%) and 1996 (46%), the amount of pollock removed by the offshore fleet has ranged from about 150,000-310,000 metric tons per year. The loss to the offshore fleet would be substantial; however, continued intensive exploitation of the spawning stock appears increasingly ill-advised and unsustainable in the context of the fishery and is not justifiable under the terms of the ESA. The inshore fleet could continue to fish in this area within the framework of quarterly and area limits established by the Council and within the constraints of sea lion conservation measures designed to protect critical foraging habitat areas, including expanded no-trawl buffer zones.[1]

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[1] NMFS and the Council should assess the possibilities for redrawing the CVOA outside critical habitat.

Are there alternative solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

Time-area management of the BS/AI pollock fishery, combined with the expanded use of no-trawl buffer zones to protect sea lion critical foraging habitat, can achieve important conservation benefits for sea lions and for overexploited pollock in the region. However, the problem cannot be adequately addressed without substantial reductions in trawl effort and catch from the current high levels. Excluding the offshore fleet from the CVOA year-round would affect a small percentage of the total pollock fleet but achieve a large first quarter in fishery removals from critical sea lion foraging areas and important pollock spawning grounds.

4. <u>ALEUTIAN ISLANDS POLLOCK</u>

Brief Statement of Proposal:

Designate Aleutian Island pollock as a bycatch-only fishery to promote rebuilding of a depleted stock and ensure availability of an important sea lion prey.

Objectives of Proposal:

- Relieve pressure on pollock stocks which has been in steady decline since the 1980s, with only a modest upturn in the 1997 trawl survey abundance estimate.
- Avoid depleting the prey base of the endangered Steller sea lion and other pollock predators in the Aleutian Islands.
- Avoid short-lived pulse fisheries which are locally intense and increase the likelihood of localized depletions of prey in sea lion critical habitat.

Need and Justification for Council Action:

For management purposes, the Bering Sea pollock stock is divided into eastern Bering Sea, Aleutian Basin and Aleutian Island "stocks." However, there are large uncertainties regarding the appropriateness of defining Aleutian Island and Aleutian Basin pollock as separate stocks (Wespestad et al. 1997). Since strong year classes of pollock in the latter two regions have been similar to those in the eastern Bering Sea, it may be that a density-dependent "spillover" effect from large year classes spawned on the EBS shelf is necessary to replenish the outlying regions. If so, the declining population on the EBS shelf and the absence of extremely large year classes in the 1990s may be the limiting factor in the recovery of pollock in the Aleutians (Wespestad et al. 1997).

In the Preliminary Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands as Projected for 1997, Summary Section (p. 8), the BS/AI Plan Team recommended a moratorium on directed fishing for AI pollock:

> "*…the Plan Team believes that the Aleutian pollock fishery should be managed on a bycatch-only basis for the following reasons: 1) the trawl survey time series indicates that the Aleutian pollock biomass has declined sharply and consistently since 1983, and gives no reason to expect an upturn in the foreseeable future; 2) some fish captured in the Aleutian Islands region may be part of the Aleutian Basin stock; a stock on which fishery impacts should be minimized; and 3) pollock has been shown to be an important prey item for Steller sea lions breeding on rookeries just to the east of the Aleutian Islands management area, rookeries which recently have fared better than those for which the availability of prey consists largely of Atka mackerel.*" (NPFMC, 1996).

The Aleutian Islands pollock fishery has declined steadily from about 80,000 metric tons in 1990-1991 to <25,000 metric tons in 1998 as the estimates of pollock abundance have declined. Based on current trends in the EBS, the likelihood of rebuilding depleted pollock populations elsewhere may be slim. Large uncertainties about stock structure and dynamics argue for a more precautionary approach to exploitation of the diminished EBS stock, as well as an immediate moratorium on fishing for the depleted Aleutian pollock stock in order avoid the risk of a fishery-induced collapse.

Foreseeable Impacts of the Proposal:

Although the Aleutian Islands supported a large fishery in the early 1990s (about 80,000 metric tons per year), TACs have dropped steadily as the stock size has dwindled. In 1998, <25,000 metric tons were allocated to this broad area. At currently low biomass levels. The 1997 and 1998 fishery has average about 25,000 metric tons. Its closure to directed fishing will have relatively small impact on the pollock industry.

Are there alternative solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

Members of the BS/AI Plan Team have called for designation of the AI pollock as a bycatch-only in recent years, in part as a means of protecting the fish stock and in part to make more prey available to sea lions. Anything short of a moratorium on directed fishing appears insufficient to allow the stock the rebuild, given approximate decline of 80% since the early to mid-1980s.

5. REDUCE THE BS/AI POLLOCK TAC

Brief Statement of Proposal:

To reduce the BS/AI pollock TAC in proportion to the reductions in catch the Aleutian Islands fishery, from Steller lion critical sea habitats and other area-specific reductions based on biomass distribution, as mandated under a policy of area-specific harvest guidelines, such that removals from management areas do not exceed target harvest rates for the managed species as a whole.

Objective of Proposal:

This measure is intended to ensure that reductions in catch achieved by area-specific measures in CVOA/critical habitat and the Aleutian Islands are not simply displaced into another area or another time of year, and to prevent local catch rates from exceeding the stated target harvest rates for the fishery as a whole.

Need and Justification for Council Action:

The failure to reduce the TAC in proportion to the amount of the catch displaced by the closure of the Bogoslof area (518) to directed pollock fishing in 1992-93 resulted in intensified exploitation of the CVOA/critical habitat, especially in the first quarter of the year on spawning pollock, and contributed to the concentrated pulse fishery that must now be addressed.

The temporal and geographic compression of the fishery in the 1990s reflects the shrinking distribution and size of the pollock stocks. Today there is only one remaining productive area of the southeastern Bering Sea shelf where a million metric tons of commercial-sized pollock can still be found. Maintaining a policy of constant harvest under these circumstances is jeopardizing the long-term viability of the pollock stock as well as the endangered Steller sea lion and other species in the pollock food web of the southeastern Bering Sea. As a management strategy for pollock, it is staking the future of the fishery on forecasts of strong recruitment which have proven overly optimistic during the 1990s:

> "*The present assessment of Eastern Bering Sea pollock has noted that the stock has been historically abundant, relative to catch, but has fluctuated because of a series of good year classes. Currently it appears that biomass is declining from a period of historic high levels. Given the present strategy of maintaining a constant catch, the management concern is whether or not this constant catch and the present stock monitoring procedures will allow management to avoid the situation where surplus is less than the catch and biomass continues to decline.*" (Memorandum of Walleye Pollock Review Committee, 18 July 1995)

What appears to be a conservative catch rate relative to a survey and model-generated point estimate of overall pollock abundance across the eastern Bering Sea, actually is resulting in extremely high localized catch rates, particularly in the CVOA. When consideration is given for seasonally important times of the year in the life cycle of the fish (e.g., spawning) and areas of fishing (e.g., critical sea lion habitat), the million metric ton TAC is not supportable. For instance, the EBS pollock stock has declined by 38% in the summer surveys from 1994-1997 but the decline in the heavily exploited CVOA is about 81% -- more than twice as high as the decline for the managed stock as a whole. Since much of this CVOA effort is directed in the first quarter of the year on diminishing age classes of mature spawning fish, the reproductive potential of the stock is increasingly diminished.

Foreseeable Impacts of the Proposal:

Reducing the allowable catch in proportion to reductions from overexploited areas will avoid transferring the problem into another area or time of year. The effects on a highly overcapitalized, debt-driven industry are difficult to quantify. Many of the factory trawlers built in the late 1980s have experienced bankruptcy, but buyouts by wealthy competitors have kept most of the vessels on the water. Reductions in capacity are needed to make the fishery economically and ecological viable for the remaining participants.

Are there alternative solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

The only solution to geographically and temporally compressed pulse fisheries, locally high extractions rates, localized depletions, and declining pollock stocks is a comprehensive package of measures which (1) spread BS/AI pollock fishery out in space and time, (2) limit the amount of fish that can be removed from individual management areas, and (3) reduce the presently high allowable catch as required to prevent local catch rates from exceeding the stated target harvest rates for the fishery as a whole.

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Supportive Data & Other Information:

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FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL

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Fishery Management Plan: Bering Sea/Aleutian Islands

Brief Statement of Proposal:

This is a proposal to (1) extend year-round trawl exclusion zones out to 20 nm around Steller sea lion rookeries and haulouts listed as critical habitat in the Bering Sea/Aleutian Islands management areas, (2) apply the same trawl exclusion zones around major haulout sites at which >100 animals[1] have been counted but which are not currently listed as critical habitat -- e.g., Cape Sarichef and Oksenof Point (Unimak Island), Bishop Point and Cape Izigan (Unalaska Island) – and (3) expand no-trawl zones to 60 nm seasonally (e.g., Oct 1-Apr 30; Dec 1-May 15) or year-round to protect the full extent of the eastern Aleutian Islands aquatic foraging area from Unimak Pass to Islands of the Four Mountains, which serves as an accustomed winter foraging area for sea lions and also as a vital pollock spawning grounds.

The EA/RIR for Amendments 25 and 20 to the FMPs of the GOA and BS/AI (Prohibition to groundfish trawling in the vicinity of sea lion rookeries) recommended special management measures to prohibit trawling in certain areas because: (1) trawl fisheries account for the majority of the catch of species of concern in critical habitat; (2) trawlers have higher bycatch of non-target prey species including juvenile pollock, squid, octopus, salmon, herring, capelin, eulachon, and sand lance, as well as flatfish and shellfish, any number of which may serve as important seasonal or secondary items in the sea lion diet, depending on availability; (3) trawlers are the primary source of lethal incidental entanglements in nets; (4) trawlers are responsible for benthic habitat disturbances and changes in species composition (NPFMC/NMFS 1991).

[1] The >200 animal standard used by NMFS , to define "major" haulouts (NMFS 1993) leaves out other important sites that support significantly large numbers of sea lions at a time when numbers at most sites have fallen well below 200 animals. Since haulout use is related to the location of critical foraging habitat (Boyd 1995), protecting these areas and populations during a period of severely reduced population is vital.

Objectives of Proposal:

The major objectives of this proposal are three-fold:

- **Protect nearshore foraging habitat out to 20 nautical miles** year-round around rookeries and haulouts listed as critical habitat. These same trawl closure areas should apply to other major haulouts (>100 animals) not currently listed as critical habitat. The intent is to reduce fishery interactions in core foraging areas where the most vulnerable segments of the population are most likely to be found. Year-round extension of the no-trawl zones from 10 to 20 nm around rookeries and from 0 to 20 nm around major haulouts is intended to provide protection across all seasons to vital nearshore foraging areas frequented by nursing females, young-of-the-year pups and weaned juveniles who may still depend on mother's milk for some portion of their nutrition even into their second year. The data supporting the existing 20 nm boundaries around rookeries and haulouts is consistent across all areas studied from Southeast Alaska, Gulf of Alaska, Eastern Aleutians, and the Russian Kurile Islands (e.g., Merrick 1992, 1993; Merrick and Loughlin 1993; Calkins 1996; Swain 1996; Loughlin and Merrick 1997). Sea lions forage much farther afield than 20 nm, especially in the fall, winter and early spring months; but 20 nm from land sites seems to be a good approximate average distance that encompasses much sea lion activity throughout the species' range, including home ranges of summer adult females and winter young-of-the-year pups (Merrick and Loughlin, 1997). Nursing mothers also appear to stay closer to shore even in winter in order to return to their pups regularly, while young weaned juveniles generally forage closer to shore and make shallower dives than adults (Merrick and Loughlin, 1997).

- **Protect winter foraging habitat out to 60 nautical miles** in the at-sea foraging area from Unimak Island to Island of the Four Mountains, which has become the focal point of the largest groundfish fishery in North America during the 1990s. Although 20 nm trawl buffer zones will provide expanded protection for nearshore foraging areas around critical land sites, they will not address the larger problem of pulse fishing and depletion of primary sea lion prey resources in the larger aquatic foraging zones, particularly in the heavily exploited eastern Aleutians aquatic foraging area, the eastern two-thirds of which is extensively overlapped by the CVOA.[2] NMFS has previously determined that a seasonal trawl closure strategy comprised of 20 nm closures in summer and 60 nm closures in winter (Oct 1-Apr 30) would best approximate Steller sea lion seasonal foraging patterns (NMFS 1991), and that a large area of the eastern Aleutian Islands out to the continental shelf contains critical winter foraging habitat on pollock spawning grounds (NMFS 1993). A Section 7 Consultation on Amendment 18 to the BS/AI FMP, February 1992, found that "*increased fishing effort in the CVOA may diminish the availability of food resources to Steller sea lions that forage in this geographic region and may adversely affect their survival and recovery.*" Spatial and temporal concentration of the giant eastern Bering Sea pollock fishery in the CVOA/critical habitat and during

[2] The Catcher Vessel Operation Area (CVOA) became operational in the pollock "B" season of 1992 with the approval of Amendment 18 to the Bering Sea/Aleutian Islands Fishery Management Plan.

the winter months jeopardizes the ability of the sea lions to find adequate prey at a time when the animals are expected to be more nutritionally stressed due to adverse weather, fewer available prey, and higher nutritional demands on pregnant and/or nursing females and weaned pups (NMFS 1993).

- **Protect EBS pollock spawning and nursery grounds** in CVOA/critical habitat in the areas north and west of Unimak Island. Since the closure of the Bogoslof management district (518) in 1992, a technologically advanced trawl fleet with at least 2-3 times more fish-catching capacity than NMFS scientists say the stock will bear, has become steadily more concentrated in this area and in the first quarter of the year on a declining spawning stock. The pattern of fishing in the 1990s reflects the steady decline and shrinking geographic distribution of the stock, yet the TAC during 1990-96 has remained relatively constant and slightly above the 1.2 million metric ton recent historical average (Wespestad et al. 1997). The rapid growth of the roe pollock fishery and trends in pollock recruitment do not bode well for the long-term viability of the fishery itself. The protection afforded to spawning pollock by the 60 nm winter/spring trawl exclusion zone in the sea lion winter foraging area will reduce fishing pressure on the stock at the time of year when the fish are most vulnerable to trawl gear. This measure will also reduce bycatch of prohibited species such as halibut and crab, and reduce bycatch of non-target forage species such as juvenile pollock, squid, capelin, herring, sand lance and other important components of the food web.

Need and Justification for Council Action:

- DECLINE OF THE STELLER SEA LION IN THE BS/AI PARALLELS THE EXPANSION OF FACTORY TRAWL FISHING IN THE SAME TIMES AND AREAS

Present-day groundfish fisheries in the Bering Sea/Aleutian Islands (BS/AI) management areas have developed in areas that have historically supported the majority of the Steller sea lion population (NPFMC/NMFS 1991). In the last three decades, Steller sea lion numbers have declined 80-90% in these areas of western Alaska, but have increased in areas of Southeast Alaska where there are no large trawl fisheries targeting sea lion prey.

Based on trend survey counts, the sea lion decline began in the eastern Aleutian Islands during the period of rapid expansion in foreign factory fishing for pollock, which increased dramatically in the inshore areas of the eastern Aleutian from 1968-72 (Braham et al. 1980; Loughlin et al. 1984). By 1972-73, the pollock fishery had grown from 175,000 t in 1964 to over 1.8 million metric tons. Between 1970-75, nearly 10 million metric tons of pollock were removed from the eastern Bering Sea, much of it from the southeastern Bering Sea shelf, as factory trawl/mothership effort soared (NWAFC/NMFS 1976).

In addition to a soaring catch, there was a four-fold increase in effort, a 50% decrease in CPUE and increasing dependence on small, young fish (INPFC 1974; NWAFC 1976; Fredin 1987). The average size of pollock caught in the fishery declined from 44+ cm in 1965 to about 35 cm in 1974. Age composition of pollock taken in NMFS surveys 1971-75 confirmed that the older spawning stock was depleted and the stock age structure was dominated by 2-4 year-old (mostly immature) fish (NWAFC 1976). As the average age and length of pollock caught by the fishery dropped sharply, so did the projected mean weight of fishes – by perhaps as much as 45% (Lowry et al. 1988). Lowry et al. (1988) suggested that changes in numbers and sizes of pollock could have had a negative impact on sea lion nutrition, based on sea lion food habits research.

What we know for sure is that the period of record-setting pollock catches and declining pollock biomass coincided with the largest observed declines in sea lion populations in the Eastern Aleutians from about 1969-1977:

- Braham et al. (1980) documented a decline of about 50% in the eastern Aleutians population between 1957-77.
- Between 1969 and 1977, the largest Steller sea lion rookery in the world at Ugamak I. (Unimak Pass) suffered its greatest decline from about 13,500 non-pups to about 4,760 (Braham et al. 1980; Merrick et al. 1987).
- At the rookery on Walrus Island in the Pribilofs, abundance declined from 6,000-7,000 in 1960 (including 3,000 pups) to 1,529 in 1975 to 1,172 in 1981 (including 292 pups).
- In the Eastern Aleutian Islands as a whole, the population plummeted from >50,000 in 1960 to 20,000 in 1975-77 (Lowry et al. 1988).

In sessions of the International North Pacific Fishery Commission during 1974, the United States expressed alarm at the scale of factory fishing operations in the eastern Bering Sea:

> *"The total all-nation catch of Alaska pollock has increased more than tenfold since 1964 to a total of nearly 1.8 million metric tons in 1972. Japan accounted for about 90% of that total. We have noted declining CPUEs in all major fishing areas and a continued expansion of the fishing grounds as the Japanese fishermen have attempted to maintain their catch...It seems to us that Japanese fishermen continue to conduct a 'pulse' fishery in the northeast Pacific. We have experienced this phenomenon with both Japanese and Soviet fisheries over the past 10 years as their vessels moved into an area, fished it intensively for a few years, then moved on... The only forecast we can make of this situation is that Japanese fishermen will move from species to species and stock to stock, while our scientists are kept busy documenting their successive demise as they now are documenting the decline of the Pacific ocean perch."* (INPFC 1974)

Subsequently, the United States negotiated large seasonal trawl closure areas with the Japanese and USSR factory trawl/mothership fleets which closed off most of the southeastern Bering to trawling from Dec 1-May 15. A year-round trawl exclusion zone closed off most of Bristol Bay from Unimak Island eastward in the Crab Pot Sanctuary. The intent of these large seasonal and year-round trawl closure areas was to reduce halibut bycatch, protect spawning concentrations of several groundfish species in the northeast Pacific, and reduce pressure on stocks in the southern part of the Bering Sea that supported the trawl fisheries (Fredin 1987).

Whatever benefit or respite sea lions may have enjoyed from trawl closure regulations in the southeastern Bering Sea (circa 1975-1982) in terms of reduced fishery competition for the forage base, it was short-lived. The trawl exclusion zones were dismantled with Amendment 1 to the Bering Sea/Aleutian Islands FMP in 1982 in order to encourage the development of a domestic trawl fleet. The trawl closure areas in effect when the United States assumed territorial authority over the region in 1976 were cited as the reason for the reduction in halibut bycatch from 7,500 t in 1971 to 3,500 t in the early 1980s (NPFMC/NMFS 1981). The final EIS for the BS/AI Groundfish FMP (1981) considered trawl closure areas in the Bristol Bay Pot Sanctuary and the Winter Halibut Savings Area, citing significant conservation benefits:

> "*It would... increase the extent to which adverse impacts of commercial groundfish operations upon the natural environment, especially upon halibut, crab, and spawning pollock and flounders, would be mitigated. In addition, this alternative could reduce conflicts between United States users of trawl gear and United States users of fixed gear.*"

The choice of Amendment 1 as the preferred alternative in the original 1981 BS/AI EIS was clearly motivated by policy goals for the development of a domestic groundfish trawl fishery above all other considerations. It has had enormous consequences for fish and shellfish as well as sea lions:

> "With the adoption of a single amendment to the Bering Sea FMP, 15 years of tediously negotiated international fisheries agreements structured for the protection of king and tanner crab, halibut, salmon and herring were dismantled to encourage the development of domestic flatfish and other groundfish commercial fisheries." (Thomson 1996)

Groundfish catches in the southeastern Bering Sea and Aleutian Islands areas (now listed as critical habitat) steadily increased as "domestic" factory trawler capacity displaced the foreign pollock fleet. The sea lion population decline appears to have slowed by the early 1980s but accelerated suddenly in the mid- to late-1980s in the same times and areas where large trawl fisheries for pollock, Atka mackerel and Pacific cod developed.

- In the eastern Aleutian Islands, Steller counts plummeted from more than 50,000 animals (not including pups) in a 1960 survey of the area to less than 25,000 in the late-1970s to only about 5,000 today. The Ugamak Island rookery in Unimak Pass was the largest Steller sea lion rookery in the world 30 years ago, with about 20,000 animals in the 1960s. Today fewer than 1,000 return every summer to the rookery (Braham et al. 1980; Byrd et al . 1997) Of the nine haulout sites listed as critical habitat in the eastern Aleutian Islands which had >200 animals since 1970, none has had that many in trend counts between 1992-1996.
- In the Pribilof Islands (eastern Bering Sea) a population of 10,000-20,000 was estimated in the 1870s (Elliott 1880). 4,500 adults and juveniles were counted in 1960 but only 130 were seen in 1994. >200 animals were counted previously on all 10

haulout sites listed as critical habitat in the Pribilofs, but none have as many as 200 today.

- In the central Aleutian Islands, 36,600 adults and juveniles were counted as recently as 1979, but only 6,400 were seen 1992 and less than 5,500 were seen in 1996. Of the 28 listed haulout sites in the central Aleutians which had >200 animals since 1970, only 1 (Little Sitkin) had as many as 200 in sea lion trend counts between 1992-1996.

In the second half of the 1980s, as the domestic factory trawl fleet grew by leaps and bounds, the volume of the groundfish catch -- dominated by pollock and Atka mackerel and focused heavily in the southeastern Bering Sea/CVOA aquatic foraging area and Aleutian Islands critical habitat -- increased dramatically. In the 1990s, pollock and Atka mackerel catches in critical habitat have risen to record levels, and both fisheries have become heavily concentrated in the first quarter of the year.

The growth of pollock fishing in the southeastern Bering Sea/CVOA and in sea lion critical habitat is particularly alarming (See Table 1 below). Based on observer and fishery data from the foreign and domestic fishery (NMFS/AFSC unpublished fishery data), pollock removals from this area are probably considerably higher during the 1990s than at the peak of the foreign pollock fishery in the early 1970s:

- Eastern Bering sea pollock catches in the southeastern Bering Sea/CVOA averaged 279,000 mt during 1980-85, 611,178 mt during 1986-91, and 724,676 mt during 1992-1997 (NPFMC/NMFS 1998).
- 50-93% of the eastern Bering Sea pollock TAC was taken from the southeastern Bering Sea during 1990-97 (See Table below).
- 88% of the EBS pollock TAC was taken from the southeast area during 1993-1996 (See Table below).
- 50-70% of the EBS pollock TAC has come from the CVOA in the 1992-1997 period (NPFMC/NMFS 1998).

Table 1. Pollock Catches (1000's metric tons) from Southeast Bering Sea as % of Total Eastern Bering Sea Catches, 1979-96. (1)

	Eastern Bering Sea		Bogoslof I.		
Year	Southeast	Northwest		Total	% Southeast
1979	368,848	566,866		935,714	39.4
1980	437,253	521,027		958,280	45.6
1981	714,584	258,918		973,502	73.4
1982	713,912	242,052		955,964	74.6
1983	687,504	293,946		981,450	70.0
1984	442,733	649,322		1,092,055	40.5
1985	604,465	535,211		1,139,676	53.0
1986	594,997	546,996		1,141,993	52.0
1987	592,461	329,955	377,436	1,236,852(2)	73.0(2)
1988	931,812	296,909	87,813	1,316,534(2)	77.4(2)

1989	904,201	325,399	36,073	1,265,673(2)	74.3(2)
1990	640,511	814,682	151,672	1,606,865(2)	49.3(2)
1991	712,206	505,095	264,760	1,482,061(2)	70.0(2)
1992	663,457	500,983		1,164,440	57.0
1993	1,095,314	231,287		1,326,601	82.0
1994	1,183,360	180,098		1,363,458	86.8
1995	1,170,828	91,939		1,262,766	92.7
1996	1,086,840	105,938		1,192,778	91.0

(1) Does not include Aleutian Islands or Donut Hole pollock catches. All figures from Wespestad et al. 1997, BS/AI Walleye Pollock Assessment for 1998, Table 1.1.
(2) Total EBS pollock catch and percent of catch in Southeast, including Bogoslof Island catch.

What we see today in terms of the concentration of the pollock catch in the southeastern Bering Sea and in sea lion critical habitat is in some large measure the consequence of management decisions stemming from Amendment 1 to the BS/AI FMP, and the subsequent failure to provide any time/area management controls or limitations on the size of the trawl fleet in this ecologically important area, which serves as a spawning and nursery ground for commercially valuable fish species as well as an annual migratory route and foraging ground for hundreds of thousands of northern fur seals, tens of thousands of whales, and millions of seabirds. It has also been the historical center of Steller sea lion abundance.

■ FOOD LIMITATION IS LIKELY DRIVING THE DECLINE OF STELLER SEA LIONS AND OTHER APEX PREDATORS IN WESTERN ALASKA

The potential for conflict between large-scale commercial fisheries for pollock and large populations of pollock predators in the North Pacific was recognized in the final Environmental Impact Statement for the Bering Sea/Aleutian Islands Fishery Management Plan (1981). The three species of pinnipeds that have declined most significantly in western Alaska compete most directly for prey targeted by the commercial fisheries, particularly (but not only) pollock: northern fur seals were listed as depleted under the Marine Mammal Protection Act in 1988, Steller sea lions were listed as threatened under the Endangered Species Act in 1990 and endangered in 1997, and Pacific harbor seals have declined at least 50% but remain without legal protected status.

A workshop report of the marine mammal working group from Alaska Sea Grant's 1991 symposium "Is It Food?" (Alaska Sea Grant 1993) concluded on the basis of data that there might be a "food availability problem" for these pinnipeds and that food limitation appeared likely: "*Therefore, based on the changing population demographics of pinnipeds, the presence of diagnostic indicators of food limitation, and a possible shortage of the appropriate type of prey items, the working group concluded that food supplies are limited for pinnipeds in and around Alaska waters.*" However, there is no evidence to demonstrate that a natural decline in carrying capacity has occurred such that the area in the eastern Aleutians, which supported 50,000+ Steller sea lions in 1960, can only support 5,000 or so today; or that the central Aleutians, which supported nearly 37,000 sea lions in 1979 can support only 5,500 today.

The Bering Sea Ecosystem report (NRC 1996) concluded on the basis of the temporal and geographic pattern of fishing that fishery effects on sea lion prey availability are the only causal factor considered to have a high likelihood of explaining the declines in western Alaska, and further suggested that the development of large-scale groundfish fisheries in the Bering Sea is a significant limiting factor in the recovery of these declining populations:

> *"It seems extremely unlikely that the productivity of the Bering Sea ecosystem can sustain current rates of human exploitation as well as the large populations of all marine mammal and bird species that existed before human exploitation – especially modern exploitation – began."*

In areas of Southeast Alaska where there are no extensive trawl fisheries, the Steller sea lion population (as well as the harbor seal population) has *increased* significantly during the period of rapid decline in western Alaska.

NMFS has stated repeatedly that lack of available prey is considered the most likely cause of the Steller sea lion decline in western Alaska (NMFS/AFSC 1998). The 1996 Section 7 Biological Opinion concluded that trends in the Steller population are consistent with a food shortage. Other proposed causes such as emigration, disease, subsistence harvest, pollution, and predation are not supported by the data (Merrick and Calkins 1996).

■ POLLOCK AND ATKA MACKEREL ARE PRIMARY FORAGE FISHES IN THE BERING SEA/ALEUTIAN ISLANDS

The pollock fisheries are of special concern due to their enormous size and the importance of pollock to depleted or endangered populations of Steller sea lions, northern fur seals, and Pacific harbor seals throughout western Alaska, as well as to fish-eating seabirds at large breeding colonies in the eastern Bering Sea (Pribilofs Islands), in the eastern Aleutian Islands, and in the Semidi Islands (WGOA), Shumagin Islands (WGOA), Sandman Reefs (WGOA). In all, 11 species of marine mammals, 13 species of seabirds, and 10 fish species are known to feed on walleye pollock (Frost and Lowry 1986):

- Pollock are a primary prey for endangered Steller sea lions and depleted Pacific harbor seals (Phoca vitulina richardsi) throughout the year in the Bering Sea, Aleutian Islands and Gulf of Alaska (Pitcher 1980; Frost and Lowry 1986; Merrick and Calkins 1996). *"In 13 studies summarized by NMFS (1995), walleye pollock ranked first in importance as a prey item for Steller sea lions in 11 studies, and second in the remaining two. Other prey consumed off Alaska were Pacific cod, Atka mackerel, salmon, octopus, squid, Pacific herring, capelin, sand lance, flatfishes, and sculpins. Most of the prey are schooling fish, many of which are commercially exploited."* (NPFMC/NMFS/AFSC 1998)

- Pollock have been a primary prey item for northern fur seals during the critical pup-rearing summer/fall months in the eastern Bering Sea (Sinclair et al. 1994; 1996). After reviewing past and recent food habits data, Sinclair et al. (1994) concluded that the diet of female and juvenile male northern fur seals in the eastern Bering Sea has probably not changed much since the turn of the century: "*...fur seal consumption of walleye pollock, gonatid squid, and bathylagid smelt in the eastern Bering Sea is consistent throughout historical records, despite the wide variety of prey available to fur seals within their diving range.*"
- Spotted (Phoca largha), ribbon (Phoca fasciata) and ringed (Phoca hispida) seals are also believed to eat large quantities of mostly juvenile pollock (Lowry et al. 1996).
- Cetaceans known to feed on pollock include: fin, minke, humpback, orca, and beluga whales, and perhaps Dall's and harbor porpoises (Frost and Lowry 1986).
- Large seabird colonies rely on annual production of dense schools of pelagic juvenile pollock (age 0-1) in the critical breeding and chick-rearing season in the eastern Bering Sea. At the Pribilof Islands, for instance, age-0 and age-1 pollock have commonly been the most important prey for large breeding colonies of black-legged kittiwakes and common murres, as well as an important food source for red-legged kittiwakes and thick-billed murres (Hunt et al. 1996).
- In the eastern Aleutian Islands, prey items identified in the stomachs of adult birds collected in 1995 showed that pollock were the most common prey (72-86%) consumed by tufted puffins, horned puffins, common murres and pigeon guillemots. Of fish observed being delivered to tufted puffin chicks, juvenile pollock and cod dominated: 78% were identified as pollock, 22% as Pacific cod (Byrd et al. 1997).
- In past studies, tufted and horned puffins at the Semidi and Shumagin Islands (western Gulf of Alaska) consumed juvenile pollock in moderate amounts. Tufted and horned puffin pollock consumption was heavy at the Sandman Reefs (western Gulf of Alaska) and eastern Aleutian Islands (Hatch and Sanger 1992).
- Many fish species also eat large quantities of pollock at various stages of its development, including Pacific cod, Greenland turbot, yellowfin sole, flathead sole, arrowtooth flounder and adult pollock in the Bering Sea (Livingston et al. 1986; Livingston 1993). The reliance on pollock by these other fish species "*further emphasizes the importance of walleye pollock not only as the dominant groundfish species in the eastern Bering Sea but also as the dominant food source for other major components of the eastern Bering Sea system.*" (Livingston et al. 1986)

Atka mackerel is the most abundant marine fish species in the Aleutian Islands region, and plays a key role in that food web (AFSC 1996; Yang 1997). Atka mackerel was previously an important forage species the western Gulf of Alaska but was fished out in the 1980s and early 1990s:

- Atka mackerel are an important forage fish for northern fur seals, Steller sea lions, harbor seals, Dall's porpoises, thick-billed murres, horned puffins, and tufted puffins (Yang 1997).
- Food habits research in the west-central Aleutians indicates that Atka mackerel is the most important prey for sea lions, comprising the bulk of the diet in scat samples collected during and after the breeding season from 1990-93 (Merrick 1995; Merrick et al. 1997).

- Atka mackerel is an important forage fish for other groundfish, including Pacific halibut, Pacific cod, and arrowtooth flounder. Groundfish food habits research conducted during May-September 1991 estimated that these fish predators consumed >48,000 metric tons of Atka mackerel during those months, equivalent to 70% of that year's TAC for the fishery (68,000 mt) (AFSC 1996; Yang 1997).

TEMPORAL AND GEOGRAPHIC CONCENTRATION OF THE GROUNDFISH FISHERIES IN CRITICAL HABITAT JEOPARDIZES THE STELLER SEA LION

A. Explosive Growth of Winter Roe Pollock Fishery in the CVOA/Critical Habitat

In the BS/AI during the 1990s, the A-B seasonal allocation of the pollock TAC has resulted in an approximately ten-fold increase in the catch from the winter months and on spawning grounds in the large aquatic foraging habitat area from Unimak Island to Islands of the Four Mountains. The Bering Sea Ecosystem report (NRC 1996) noted the size, brevity and intensity of the contemporary pollock "A" season fishery: *"The development of sophisticated, highly capitalized fishing fleets has in many cases resulted in harvesting that is very intense. For example, during the winter of 1994 the Bering Sea trawl fleet caught approximately 600,000 t of pollock in a six-week period. At its peak, the fleet was harvesting at a rate of 30,000 t per day."* That report suggests that fisheries operating on a broader temporal and spatial scale would be expected to have lesser impacts on local fish abundance (NRC 1996).

The Draft EA/RIR for Inshore/Offshore-3 (NPFMC/NMFS 1998) also highlights the dramatic growth in the first quarter roe pollock fishery as well as its concentration in the CVOA: *"Pollock removals from critical habitat during the first part of the year increased from negligible levels in the late 1970s to over half a million mt in the mid-1990s. Pollock removals from critical habitat were less than 50,000 mt annually during the first quarters of 1977-1985"* but increased dramatically in the late 1980s with the development of the Bogoslof Islands roe pollock fishery and continued to rise in the 1990s (NPFMC/NMFS 1998):

- A-season pollock catch from both the CVOA and critical habitat increased from about 240,000 mt in 1992 to 320,000 mt in 1993 -- comprising about 50% of the A-season catch.
- A-season pollock catch from CVOA/critical habitat increased yet again to 530,000-580,000 mt/year during 1994-1995, or about 85-93% of the total A-season removals in those years.
- Greater use of areas outside CVOA/critical habitat in 1996-1997 resulted in the A-season pollock catch in CH declining to about 400,000 mt -- less than in 1994-95 but still comprising about 75% of the total A-season catch.

In addition to concerns about the localized effects of this large pulse fishery on the availability of energy-rich, roe-laden pollock in winter foraging habitat of Steller sea lions during the difficult winter months, there are possibly large *indirect effects* that roe fisheries may have on pollock year-class size and the annual production of juvenile pollock, which are a prime food source for many other groundfish as well as declining seabird colonies and marine mammals populations including Steller sea lions, northern fur seals and Pacific harbor seals in the Bering Sea:

> *"Roe fisheries could reduce the number of small pollock available to marine mammals and sea birds simply by reducing the number of spawners, by disrupting spawning behavior, and by removing a disproportionate number of female fish. These second-order fishery effects may have substantial impacts on North Pacific Ocean ecosystems and should be the subject of further research."* (Merrick 1995)

Furthermore, the scale of the roe pollock fishery should be cause for immediate measures to reduce the "A" season fishery in the interests of protecting a steadily declining spawning stock. Densely schooled spawning aggregations are more vulnerable to overfishing, and pollock is no exception. Episodes of intense fishing on spawning stocks in the Shelikof Strait (1981-1985) and Bogoslof Island (1987-1991) have been followed by steep declines in pollock abundance in each of those areas. The Section 7 consultation of 4 November 1991 (Aron memo) notes that the southeastern Bering Sea shelf is an important pollock spawning ground and suggests that the spawning stock may benefit from reduced catches in the area:

> *"Due to the predominant currents and drift of pollock eggs and larvae, this area probably contributes more to successful recruitment to the pollock population of the Eastern Bering Sea than spawning ground northwest of the Pribilofs. Consequently, from a pollock management perspective alone, it might be prudent to direct effort away from the Area."*

B. Evidence For Localized Depletion In The Pollock "B" Season

The Section 7 consultation of 4 November 1991 (Aron memo) envisaged a worst case scenario in which Amendment 18 to the BS/AI FMP (creating the CVOA) "*concentrates fishing effort even further in an area that has had a declining pollock biomass and has experienced relatively higher fishery exploitation rates during the last 5 years.*"

The trends of increasing catches and declining pollock biomass in the southeastern Bering Sea/CVOA identified by NMFS during 1986-1990 have continued during the 1990s and accelerated. Catches from the CVOA increased 45% from 1991-1995 to record levels, while survey estimates of eastern Bering Sea pollock abundance have declined 38% from 1994-1997. However, the decline has been concentrated in the CVOA/critical habitat region, where the abundance plummeted 81% from 1994-1997 – more than twice as high as the decline for the managed stock as a whole (NPFMC/NMFS 1998).

NMFS scientists have documented the trend in disproportionately high exploitation rates in the pollock "B" season since the early 1990s, noting that "*Pollock are harvested disproportionately to their areal biomass distribution. Harvest rates in the CVOA during the B-season are much higher than in Areas 51 and 52.*" (Fritz et al. 1995) As CVOA pollock abundance has declined sharply in the summer/fall months, accounting for only about 10% of the overall stock biomass in recent summer surveys, the "B" season extraction rate has risen correspondingly.

- In 1996, "B" season catches represented 31% of the stock size in the CVOA in the summer survey of 1996.
- In 1997, the observed "B" season catch in the CVOA equaled nearly 50% of the exploitable pollock stock biomass surveyed in the area prior to the start of the fishery (See Table below).

Table 2. Distribution of Age 3+ Pollock by Eastern Bering Sea Management Areas and Harvest Rates in Pollock "B" Seasons of 1991, 1994, 1996, 1997.

Area	Year	Biomass (mt)	Catch (mt)	Harvest Rate
CVOA				
	1991	943,000	244,000	26%
	1994	1,984,000	291,000	15%
	1996	853,000	250,000	31%
	1997	385,000	189,000	49%
Areas East of 170W Outside CVOA				
	1991	1,688,000	107,000	6%
	1994	3,465,000	184,000	5%
	1996	3,115,000	217,000	7%
	1997	2,417,000	16,000	1%
Areas West of 170W				
	1991	3,059,000	529,000	17%
	1994	5,177,000	157,000	3%
	1996	4,174,000	101,000	2%
	1997	3,828,000	294,000	8%

Source: NMFS/AFSC unpublished fishery data and North Pacific Fishery Management Council, EA/RIR for Inshore/Offshore 3 (Amendments 51/51 to the FMPs of the BS/AI and GOA), May 1998.

At this level of exploitation, localized depletions of prey and other adverse effects on prey quality, composition or size of fish, density of fish, etc. are likely to occur. Locally high extraction rates from critical habitat areas utilized by the Aleutian Atka mackerel fishery have been shown to create localized depletions of fish during the fishery and for periods of unknown duration after the fishery is closed (Fritz, 1997; Lowe and Fritz 1997).

What has not been investigated is the degree to which intense "A" season fishing in the CVOA has caused or contributed to the observed decline in summer/fall pollock abundance within the CVOA boundary. Given the evidence of localized depletions in the Atka mackerel fishery, it is not unreasonable to suppose that a similar effect may deplete local pollock abundance for many months after the first quarter roe pollock fishery has closed. The only index of abundance in the

"A" season is fishery CPUE, but CPUEs may remain high on spawning aggregations even as substantial declines in abundance are occurring.

C. Localized Depletions in the Atka Mackerel Fishery

In the Aleutian Islands, where Atka mackerel is a primary sea lion prey, the Atka mackerel fishery has always been concentrated in nearshore areas of critical habitat proximal to sea lion rookeries and haulouts, occurring in the same few locations every year (Lowe and Fritz 1997). Catches in this fishery were low throughout the late 1970s and never exceeded 40,000 metric tons in the 1980s, averaging about 25,000 metric tons prior to the 1990s. Since 1991, catches have soared, reaching a record 104,000 metric tons in 1996. Although the target harvest rate for the managed stock as a whole is believed to be 10-15%, based on overall stock biomass estimates, fishery data indicates that local rates in fished areas have ranged as high as 55-91% (Lowe and Fritz 1997; Fritz 1997, 1998).

Since the Atka mackerel fishery has always been concentrated in highly localized areas primarily within 20 nm of sea lion rookeries and haulouts in the Aleutians, the risk of adversely affecting sea lion prey availability and/or quality of prey is greatly increased by the record-high TACs for Atka mackerel in the 1990s. In addition, there has been a complete shift in effort by an overcapitalized factory trawl fleet to the first quarter of the year as vessels race for shares of the quota. A broad spatial division of the quota into three subareas has not reduced the concentration of removals from within critical habitat boundaries. In fact, as the TAC has reached record-high levels in the 1990s the volume of fishery removals from critical habitat has soared.

Locally high catch rates have been shown to cause localized depletions in the size and density of Atka mackerel populations "*which could affect foraging success during the time the fishery is operating and for a period of unknown duration after the fishery is closed. This raises concerns about how the fishery may affect food availability and the potential recovery of the population.*" (Lowe and Fritz 1997). In May 1998, NMFS cited evidence for fishery-induced localized depletions in critical habitat as reason for proposing management actions to reapportion the Aleutian Atka mackerel fishery in order to reduce the risk of depleting the local prey base and thereby adversely modifying critical habitat and jeopardizing survival and/or recovery of the species:

> "*If lack of available prey is an impediment to the recovery of the western population of Steller sea lions, then the evidence for fishery-induced localized depletions of Atka mackerel and the persistent distribution of the fishery within critical habitat support the hypothesis of sea lion fishery competition and fishery impacts on Steller sea lion population dynamics.*" (NMFS 1998)

Under the proposed restructuring of the fishery recommended by NMFS and adopted by the Council in June 1998, there would be an A/B season split of the fishery as well as a critical habitat split of the TAC (40% inside CH, 60% outside CH) in order to achieve an overall

50% reduction in the percentage of the TAC caught within critical habitat from the roughly 80% average today -- but only for Aleutian management areas 542 and 543:

- The proposed A/B seasonal 50-50 split of the TAC is not sufficient to prevent locally high extraction rates and localized depletions in the fishery, as assessed in the May 1998 EA by NMFS. Even in instances where the fleet's effort is presumed to be evenly distributed across all fishery sites, NMFS demonstrates that catch would exceed 20% of the largest Leslie initial biomass estimate at most sites analyzed in Districts 542 and 543. Since the TAC has risen to record levels of 64,000-100,000+ mt from 1993-1998, ranging from 2-4 times the historical average, both the "A" and "B" season TACs will exceed the entire catch of earlier years. NMFS has not proposed to reduce the TAC to levels nearer the historical average even though agency scientists have noted that localized depletions tend to occur in areas with the largest concentrations of the catch.
- NMFS decided arbitrarily that a 50% reduction (for Areas 542 and 543 but *not* for Area 541) in total fishery removals from critical habitat, phased in over 4 years, is adequate to avoid localized depletion or adverse modification of critical habitat. It *might* achieve the first goal if the fishery participants are spread out evenly, according to NMFS' own analysis; but in reality the factory trawl fleet is *not* spread out evenly and the choice of 50% does not ensure that localized depletions, adverse modification of critical habitat, and jeopardy to the species' survival are avoided. Nor does a 50% reduction ensure that an adequate level of prey will be available to halt the decline and promote the recovery of the population in the region.

In other words, a large Aleutian trawl fishery targeting primary sea lion prey will continue to operate in areas proximal to rookeries and haulouts listed as critical habitat and will likely continue to create localized depletions, by NMFS' own reckoning, despite the proposed measures (NMFS/AFSC 1998). NMFS cannot reasonably ensure that the Atka mackerel proposal is not jeopardizing the species or adversely modifying critical habitat under the current proposal.

■ SPECIAL MANAGEMENT PROTECTIONS FOR STELLER SEA LION CRITICAL HABITAT ARE NEEDED TO PROTECT THE AVAILABLE FORAGE BASE

Critical habitat involves "determination of the essential physical or biological features that are essential to the conservation of the species, and second, the determination of whether these features require special management considerations or protections." (ESA) In designating Steller sea lion critical habitat, NMFS acknowledged the need for spatial and temporal regulation of fishery removals to ensure that pulse fishing and local depletions of prey stocks do not occur, noting that adverse modification of critical habitat and jeopardy to the species' survival are inseparable (NMFS 1993).

More recently, NMFS has stated that the single most important feature of marine areas critical to Steller sea lions is their prey base (NMFS 1998). Steller sea lions are particularly vulnerable because they are *the* major direct marine mammal competitor with the fishery, "*removing large quantities of fishes of the same size range as those being caught by the* *fishing fleets*" (Lowry et al., 1988). Available evidence suggests that fishery effects on size, weight, and abundance of pollock have had a potentially significant adverse impact on availability and quality of prey in the Bering Sea in the 1970s (Lowry et al. 1988) and again in the Gulf of Alaska in the 1980s (Calkins and Goodwin 1988).

Despite the general agreement that food limitation is driving the sea lion decline, and despite the agreement that pulse fishing resulting in locally high extraction rates poses the greatest threat to sea lions' ability to find adequate amounts of food (SSLRT 1991; NMFS 1991, 1996, 1998), the Fisheries Service and the North Pacific Council have not acted adequately to prevent critical habitat from becoming the focal point of major groundfish fisheries in the 1990s, particularly for pollock, Atka mackerel and Pacific cod. NMFS has failed to recommend adequate measures to protect critical habitat even as trawl groundfish removals from foraging areas proximal to sea lion rookeries and haulouts in the BS/AI – dominated by pollock and Atka mackerel -- have remained very high as a percentage of the allowable catch:

- The April 1991 Biological Opinion concluded that sea lions and fisheries target large schools of fish to maximize foraging efficiency and minimize effort, therefore large fishery removals from schools of fish in close proximity to rookeries and haulouts are likely to decrease the amount of food available to sea lions.
- The June 1991 Biological Opinion concluded that the Gulf pollock fishery had become spatially and temporally compressed in nearshore waters over time, and that large pollock harvests over small areas and time periods may deplete local pollock stocks and limit prey availability for sea lions.
- The January 1996 Biological Opinion for the BS/AI noted that fishery catches near Steller sea lion rookeries, haulouts and at-sea foraging habitats continue to be much higher than they were prior to the population decline and that the majority of the groundfish removals continue to be taken in rapid, intensive fisheries concentrated in time and area (NMFS 1996).

Concentration of fisheries on sea lion foraging grounds may cause localized depletion of the prey base and jeopardize sea lions even if overall fish stock abundance is high, as was the case with Bering Sea pollock in the early 1970s and again in the 1980s. In the 1990s, with pollock stocks far below the levels of the 1980s, the this large pulse fishery has maintained high removals and targeted the catch increasingly in critical habitat, thereby greatly increasing the likelihood that adverse effects on prey availability for sea lions and other species will occur.

■ EXISTING 10 NM ROOKERY BUFFERS IN THE BS/AI ARE INADEQUATE

Although the stated regulatory intent of the rookery no-trawl zones established between 1991-1993 was to disperse trawl fisheries and minimize the likelihood that groundfish fisheries would create localized depletions of sea lion prey in critical sea lion habitats (Fritz and Ferrero 1997), the existing buffers have proven remarkably ineffectual. The reason is that areas within these rookery trawl exclusion zones were not heavily utilized by the groundfish trawl fisheries, with the exception of the Atka mackerel fishery. For instance, *"from 1984-1991, the annual percentage of pollock caught within these areas ranged only from 1-7%."* (Fritz and Ferrero 1997)

The inadequacies of the 10 nm rookery zones were apparent to NMFS even at the time they were proposed:

> *"Available data indicate that 10 nm zones would not be sufficient to cover feeding trips of animals during the winter, females without pups throughout the year, and some feeding trips of postparium females during the breeding season."* (NPFMC/NMFS 1991)

NMFS initially recommended that trawl fishing be prohibited within 20 nm of the listed northern sea lion rookeries in the Gulf of Alaska (Aron memo, 16 May 1991). The 16 May 1991 recommendation was based on satellite telemetry data obtained from nursing females during the breeding season. The agency subsequently reduced the recommended trawl closure zones to only 10 nm around rookeries (Aron note, 30 May 1991). The 30 May 1991 memo demonstrated clearly that the 10 nm trawl closures would provide little protection to critical habitat foraging areas because very little groundfish fishing occurred in these areas: *"Data collected by fisheries observers suggests that 10 nm closures around northern sea lion rookeries would not seriously restrict the pollock fishery. From 1980-89, an annual average of 88.2% of all pollock caught within 20 nm of rookeries was caught between 10.1 and 20 nm."*

It is abundantly clear that the existing rookery trawl exclusion zones are inadequate for at least several crucial reasons:

- Since very little trawling occurred within the 10 nm rookery no-trawl zones, closing them was not likely to reduce the impacts of trawling significantly. The 10 nm zones have done nothing to prevent the fisheries from becoming more concentrated in Steller sea lion critical foraging habitats during the 1990s.
- Telemetry tracking studies of seasonal foraging patterns (Merrick and Louglin 1993, 1997; Merrick 1992, 1993) and platform-of-opportunity sightings indicate clearly that 10 nm zones are *"too small to effectively separate the local effects of trawlers on sea lion prey from foraging sea lions."* (NRC 1996)
- The 10 nm zones do not protect critical foraging habitat that is used in the non-breeding seasons, primarily from haulouts.

In addition to these shortcomings, the 10 nm no-trawl zones do not provide adequate protection to important but overlooked segments of the sea lion population whose health and nutritional status is crucial to the eventual recovery of the species. For example, Calkins and Pitcher (1982) and Calkins (1996) found that mature females without pups comprise a large portion of the adult female population in any given year – 33-40% in the Kodiak area during 1970s and 1980s. Research by Calkins (1996) in Southeast Alaska indicates that summer adult females without pups travel longer distances and move more extensively between haulout and rookery sites in a given region even in the summer. Thus rookery no-trawl zones of 10 or 20 nm do not encompass foraging areas of this portion of the population even in the summer months.

In summary, the existing rookery buffer zones (10 or seasonal 20 nm) do not cover critical habitat feeding areas of (a) adults and juveniles from winter haulout sites (as much as two-thirds of the observed animals in non-breeding months); (b) females without pups throughout the year (as much as 40% of the adult female population every year); (c) and some feeding trips of nursing females from the rookeries.

■ WINTER FORAGING HABITAT PROTECTION MUST BE A MAJOR MANAGEMENT PRIORITY

Both the 1991and 1996 Section 7 Biological Opinions observed that the effects of localized prey depletion would be worse in winter, when prey resources are more scarce and nursing and/or pregnant sea lions and juveniles are especially vulnerable to nutritional stress. Yet both the Aleutian Atka mackerel and BS/AI pollock fisheries have become concentrated in the first quarter of the year in critical sea lion habitats during the 1990s.

Seasonal differences in foraging ranges and foraging effort have been identified using VHF radio transmitters and satellite-linked time-depth recorders. These data also suggest that winter is an especially difficult time for foraging sea lions: "*Results of these studies indicated that during summer, females with pups foraged close to rookeries, and made relatively short trips with shallow dives. In winter, females had much longer trips and dove deeper than summer animals.*" (Merrick and Loughlin, 1993) Greatly increased foraging ranges and/or foraging effort of adult females in winter suggest that prey is harder to find in winter (Merrick and Loughlin, 1997). In addition to finding prey more scarce in fall and winter months, adult females are probably still nursing a young-of-the-year pup and may also be carrying a fetus, which would place a much higher energy demand on the female.

Research from Pitcher et al. (in review) on Gulf of Alaska sea lions supports the hypothesis that nutritional stress affected the reproductive performance of Gulf sea lions during the 1970s and 1980s, when "substantial embryonic and fetal mortality" occurred between late fall (when the embryo implants in the womb) and late gestation in the spring. These findings are consistent with research on Antarctic fur seals, whose pregnancy status and birth rates in the spring appeared strongly related to availability of food resources in the fall/winter (Boyd, 1996; Boyd et al., 1995). Calkins and Pitcher (1982) and Calkins and Goodwin (1988) observed that 33-40% of the adult female populations in the study areas failed to deliver a pup to term in the Gulf of Alaska in the 1970s and 1980s. These studies indicate that the endangered population has a low late-term pregnancy/birth rate compared to other otariid species (NRC 1996), and that these low rates may be related to nutritional stress in the fall/winter months. Fishery-induced depletions of sea lion prey in accustomed winter foraging grounds within critical habitats, such as those identified in the Atka mackerel fishery (NMFS/AFSC 1998), may therefore be indirectly responsible for low birth rates contributing to the population decline and limiting recovery.

The EA/RIR for Inshore/Offshore-3 (NPFMC/NMFS 1998) also notes that the period from October to March is likely the most critical period of the year for pups and juveniles:

> *"Due to the chronology of pupping, nursing, and weaning, many pups may be weaned in the winter months; i.e., October through March or April. Therefore, many pups may face the critical transition to independence during a period when environmental conditions may be the most harsh; sea surface conditions worsen, prey availability decreases, and winter weather conditions increase energy requirements to thermoregulate. A precise or quantitative description of the increased energy costs associated with winter months is not possible at this time, but the period from October to March or April is likely the most critical period of the year for pups and juveniles."* (NPFMC/NMFS 1998)

Large schools of prespawning and spawning pollock in the CVOA/critical habitat area provide sea lions a rich, abundant, readily available food source in the critical winter/early spring months. The soaring growth and concentration of the "A" season roe pollock fishery in this area since the late 1980s has resulted in a the removal of nearly half a million metric tons of spawning stock in a brief six-week period, and likely poses a serious competitive challenge in sea lions' accustomed winter foraging grounds. Food-stressed nursing and/or pregnant females (whose energy requirements are higher) may abort fetuses or wean nursing pups before they are able to feed themselves. Also, pups are just beginning to learn how to forage for themselves, *"and early weaning would severely compromise their ability to obtain adequate nutrition"* (Merrick and Loughlin, 1997). Therefore the pollock roe fishery in critical sea lion habitat may pose an especially serious threat to mothers and pups alike (Merrick and Loughlin, 1997).

The value of roe-bearing pollock to Steller sea lions may consist of several key factors:

- Pollock have greater nutritional value when female fish are bearing roe, and therefore are thought to provide some advantage to sea lions (NPFMC/NMFS 1998).
- Aggregations of roe-bearing pollock appear in predictable times and areas of winter/spring and it is likely that these large, dense schools reduce the energetic cost associated with foraging (NPFMC/NMFS1998).
- *"Roe-bearing pollock are available at the end of the winter season when sea lions are likely to be in their worst condition. The added nutritional value of roe-bearing pollock may be essential for sea lions, particularly reproductive females, to regain good condition. Roe-bearing pollock may also be a particular benefit to young sea lions, with less developed foraging skills and relatively greater nutritional demands for growth and thermoregulation."* (NPFMC/NMFS 1998)

■ PROTECTING WINTER FORAGING AREAS REQUIRES 20 NM TRAWL BUFFER ZONES AROUND MAJOR HAULOUTS

In 1992 and 1993, NMFS placed seasonal 20 nm no-trawl zones around 6 rookery sites in the eastern Aleutians and at Seguam Island rookery. The 20 nm zones revert back to 10 nm at the end of the "A" season. This measure came in response to concerns over the heavy "A" season pollock catch in the region. It is the only significant action taken by the agency thus far in the BS/AI with the intent of providing no-trawl buffers to foraging habitat in the non-breeding season, although the final proposed Atka mackerel amendment to the BS/AI FMP for sea lion habitat mitigation includes a year-round 20 nm trawl exclusion zone around Seguam rookery (NMFS/AFSC 1998).

However, NMFS' own studies of winter versus summer distributions of sea lions reveal that the number of animals on rookery sites are considerably lower in many cases during the non-breeding season. Merrick (1993) found that only a third (32.9%) of the animals counted in the March 1993 survey were on 39 rookery sites; the remaining animals (67.1%) were scattered on 235 haulout sites from Forrester Island (Southeast Alaska) to Attu Island (western Aleutians).

Details from Richard Merrick's Memorandum for the Record, 31 August 1992, provide additional information on the importance of haulout areas to Steller sea lions:

> *"1. Numbers of animals on rookery sites are lower in winter than in summer.*
> *2. At least at some rookery sites (e.g., Akutan-Cape Morgan), there are few if any animals in midwinter.*
> *3. There are probably more animals on many haulouts in winter than in summer.*
> *4. With respect to the CVOA there appears to be a movement in winter of animals to the sites closest to the Bering Sea shelf (e.g., north side of Unalaska Island, Akun Island-Billings Head, Akutan-Reef and Lava Bight, north side of Unimak Island)."*

It can expected that haulout sites used over generations are not arbitrarily chosen but are located in the areas where prey fish are likely to be abundant in close proximity at various times of the year. Protecting sea lion winter foraging habitat goes hand-in-hand with protecting aquatic zones adjacent to haulout sites, since haulouts are related to critical foraging areas (Boyd 1995) and their use increases in the winter months when nutritional stress is more likely for sea lions. Protecting these foraging areas during the most difficult time of year is crucial to hopes for recovery of the species.

- **EXPANDED 60 NM NO-TRAWL ZONES ARE NEEDED TO PROTECT ACCUSTOMED WINTER FORAGING AREAS ON POLLOCK SPAWNING GROUNDS IN THE CVOA/CRITICAL HABITAT[3]**

Although the existing rookery no-trawl buffers in western Alaska offer some protection of nearshore foraging areas frequented by nursing females in summer, the extensive at-sea foraging habitat area overlapped by the CVOA remains completely unprotected and pollock catches in this winter foraging habitat have reached record levels in the 1990s: *"Recent pollock fishery distribution patterns suggest that interactions with sea lions in critical habitats are ongoing despite the partitioning that was achieved in the vicinity of rookeries...In the BSAI, where there is only broad regional allocation of the pollock quota between the eastern Bering Sea and*

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[3] The eastern Aleutians aquatic foraging area extends approximately 60 nm seaward from the islands from Unimak Island to Islands of the Four Mountains, 164-170W longitude.

Aleutian Islands management areas, the creation of 10 and 20 nm trawl exclusion zones did not constrain landings from important sea lion habitats." (Fritz and Ferrero 1997)

These larger at-sea foraging areas were first recommended by the Steller Sea Lion Recovery Team in 1991 and encompass major pollock spawning grounds in the Gulf of Alaska (Shelikof Strait) and eastern Aleutian Islands (from Unimak Island to Islands of the Four Mountains, 164-170W longitude) as well as Atka mackerel spawning grounds in Seguam Pass. Although the Steller Sea Lion Recovery Team expressed the need for more information, the Recovery Team also noted that nutritional factors appeared to be involved in the population decline and emphasized the need for designating at-sea areas adjacent to population centers where sea lions were commonly known to forage, and where the groundfish fisheries, particularly for pollock, were heavily concentrated (SSLRT 1991). The Recovery Team recommendation led to designation as critical habitat by NMFS in 1993:

> "*These sites were selected because of their geographic location relative to Steller sea lion abundance centers, their importance as Steller sea lion foraging areas, their present or historical importance as habitat for large concentrations of Steller sea lion prey items that are essential to the species' survival, and because of the need for special consideration of Steller sea lion prey and foraging requirements in the management of large commercial fisheries that occur in these areas.*" (NMFS 1993)

The existing sea lion research supports the importance of the larger at-sea foraging habitat in the CVOA, particularly in the winter months when large schools of spawning pollock gather in the area:

> "*Satellite telemetry data from tagged eastern Aleutian sea lions indicates that the shallow portion of the CVOA is an important foraging area for Steller sea lions. Most of the tagged eastern Aleutian Islands animals generally foraged on the shelf area within the Krenitzen Islands and to the east on the north and south sides of Unimak Island. Winter sea lion distribution data indicate that the number of animals on rookery sites generally decreases after the summer breeding season whereas use of haulouts increases. In the eastern Aleutians, animals appear to move from rookeries to haulout sites closest to the eastern Bering Sea shelf and perhaps the western GOA shelf.*" (Mello memo, 8 September 1992)

Loughlin and Merrick (1993) suggested that the Krenitzen Islands group is a distinct subpopulation of the western population. Movements of sea lions tagged at Akun Island and Ugamak Island in the Krenitzen area indicated intermixing between haulout sites in the winter season, and the entire Krenitzen area of the eastern Aleutian Islands out to the continental shelf break appears to contain important foraging areas. The area from Akun Island to Unimak Island appeared to be most important for pups, and their average trip distance (31 km) indicates that pups generally stay close to shore though one pup (presumably traveling with its mother) went as far as the Pribilof Islands area. Radio-tagged winter adult females ranged as far from the tagging site as 200 km (Akun to Sea Lion Rocks) and foraged to the north and south of Unimak Island. At low population levels, and with little in-migration from elsewhere, the Krenitzen Islands group is more vulnerable to extinction due to contingencies which a bigger population would be expected to withstand. It is crucial to protect the habitat areas which are essential to this endangered population of sea lions.

In the EA/RIR for Amendments 20 and 25 to the BS/AI and GOA Fishery Management Plans (Proposed Prohibition to Groundfish Trawling in the Vicinity of Steller Sea Lion Rookeries, 1991), NMFS determined that a seasonal trawl closure strategy comprised of 20 nm closures in summer and 60 nm closures in winter (Oct 1-Apr 30) would best approximate Steller sea lion seasonal foraging patterns:

> "*This alternative approximates the maximum observed foraging distance of females with pups during the breeding season, and provides a large closed area during winter to better encompass winter foraging habitats and compensate for increased nutritional need and stresses.*" (NPFMC/NMFS 1991)

Thus the agency has repeatedly found the existing rookery no-trawl zones inadequate, not only for failing to protect winter foraging habitat proximal to haulout sites but for failing to protect accustomed winter foraging grounds farther offshore, which are necessary for the survival and recovery of the species in the CVOA region (NMFS 1993).

These repeated agency findings underscore the need for trawl closure areas in both the nearshore habitats *and* in the larger aquatic foraging areas. Moreover, the agency has found that such measures are likely to provide benefits to the pollock fishery by relieving overexploitation on the spawning stock in the CVOA/critical habitat area (Aron memo).

- THERE IS HISTORICAL PRECEDENT FOR ESTABLISHING SEASONAL AND/OR YEAR-ROUND TRAWL EXCLUSION ZONES IN SOUTHEASTERN BERING SEA AQUATIC FORAGING HABITAT AREA

Groundfish catches in sea lion critical habitat of the southeastern Bering Sea have skyrocketed since the late-1970s. The reason why groundfish catches in sea lion critical habitat of the BS/AI were low in the late-1970s compared to the 1990s is that there were extensive trawl exclusion zones, seasonal or year-round, covering wide areas of the southeastern Bering Sea and Bristol Bay. The seasonal trawl closure areas negotiated with the Japanese and USSR factory trawl/mothership fleets in 1975 and 1976 closed off most of the southeastern Bering from Dec 1-May 15. A year-round trawl exclusion zone closed off most of Bristol Bay from Unimak Island eastward in the Crab Pot Sanctuary.

Concerns over trawl bycatch of halibut, crab, herring and salmon, as well as the desire to protect important fish and shellfish habitat (e.g., halibut juvenile rearing grounds) prompted the effort to restrict trawling in these areas (Fredin 1987). The trawl closures were also a response to serial overfishing of yellowfin sole, Pacific ocean perch, sablefish, herring and pollock by the distant water trawl fleets of Japan, USSR and others. The overexploitation of the EBS groundfish complex culminated when foreign trawl fleets recorded all-time high pollock catches in the early 1970s, followed by rapid depletion of the pollock stock in the mid-1970s.

The ongoing present-day decline of the EBS pollock stock, the geographic concentration of the pollock fishery in the CVOA/critical habitat region, and the temporal concentration of the fishery on the spawning grounds in winter suggest that the fishery as now construed is not sustainable. Model projections of EBS stock abundance to the turn of the century indicate that older spawning-age groups are rapidly dwindling and that the fishery hinges on the successful recruitment of large numbers of young (age 3-4) fish, the majority of which are still sexually immature. Thus the risk of recruitment overfishing appears increasingly high. Concerns expressed by Lowry et al. (1998) about overfishing's effects on availability of prey and reduced size, weight, and nutritional value of pollock to sea lions during the Japan/USSR Bering Sea pollock fishery of the 1970s are just as relevant today.

Conditions in the pollock fishery in the late 1990s are similar to the conditions which prompted the United States to negotiate the extensive seasonal (Dec 1-May 15) trawl closure areas in the southeastern Bering Sea in 1975-76. Seasonal extensions of the no-trawl buffer zones to protect sea lion winter foraging habitat in the CVOA will not provide protection for the sea lions alone; they will also provide much needed protection to the rapidly dwindling pollock spawning stock during the period when those fish are spawning and most vulnerable to trawl gear.

Such measures may increase the likelihood of sustaining heavily exploited fish populations, particularly during periods of high catch rates at spawning time (Hutchings 1996). Had such measures been in place in the Canadian northern cod fishery of the 1980s, the catastrophic stock collapse of the early 1990s may have been avoided:

> "*Hutchings (1995) explored the usefulness of seasonal fishing closures on the northern cod fishery. He suggested that an offshore fishing ban on northern cod from January through May; the months coinciding with the highest catch rates associated with the fishing of spawning and prespawning aggregations, would conform to historical fishing patterns in this fishery and would re-establish the temporal and spatial refuges experienced by this stock prior to the 1950s.*" (Hutchings 1996)

The use of such measures in the southeastern Bering Sea has a historical precedent, and their re-application to the eastern Bering Sea pollock spawning grounds in sea lion critical habitat may prevent a tragic and unnecessary repeat of the mistakes made in the northern cod fishery, in addition to protecting sea lion foraging habitat.

Foreseeable Impacts of Proposal:

1. Rookery and Haulout Protections:

NMFS previously estimated that only about 4% of the total groundfish catch was removed from within 10 nm of rookeries in the BS/AI, <55,000 metric tons of the observed catch in 1990. Much higher BS/AI groundfish fishery removals (mostly pollock) occurred between out to 20 nm (>280,000 metric tons in 1990) and 20-60 nm (>560,000 metric tons in 1990) (NPFMC/NMFS 1991). Similar data from 1990-97 indicate that only 2-6% of the observed groundfish removals have come from within 10 nm in critical habitat areas, whereas 12-28% (about 200,000 metric tons/year on average) have come from within 20 nm, dominated by pollock and Atka mackerel (NMFS/AFSC unpublished fishery data) -- a very significant amount but not so much that the fishery will shut down if the fleet is excluded from these areas and that portion of the catch is deducted from the TAC to avoid displacing the catch into other areas or seasons.

Average percent of observed **groundfish** trawl catches within 10-20-40-60 nm of sites listed as critical habitat in the Bering Sea/Aleutian Islands, 1990-97:

Within 10 nm	Within 20 nm	Within 40 nm	Within 60 nm
3.8%	17.8%	44%	63.8%

(Source: NMFS/AFSC unpubl. fishery data, 1990-97)

In all years, pollock has accounted for the great majority of the trawl groundfish removals in the BS/AI. Between 1990-97, pollock accounted for an average of 67% of the observed groundfish trawl catch within 10 nm of rookery and haulout sites listed as critical habitat, 72% of the catch within 20 nm, 79% of the catch within 40 nm and 80% of the catch within 60 nm (NMFS/AFSC unpublished fishery data).

Average percent of observed **pollock** catches within 10-20-40-60 nm of sites listed as critical habitat in the Bering Sea/Aleutian Islands, 1990-97:

Within 10 nm	Within 20 nm	Within 40 nm	Within 60 nm
3%	16%	44%	65%

(Source: NMFS/AFSC unpubl. fishery data, 1990-97)

Table 3 below shows that observed groundfish catches within 20 nm of the sites listed as critical habitat in the BS/AI in 1997 represented 13% of the total observed groundfish removals from within 60 nm of sea lion critical habitat sites in the BS/AI. Pollock and Atka mackerel accounted for the bulk of the observed groundfish catch within this zone, although the portion of the Pacific cod catch represented by observer data is less than half of the total trawl catch for 1997 and probably understates the impact of that fishery within 20 nm of listed rookeries and haulouts.

Table 3. Total observed groundfish trawl catch (1000s tons) within 60 nm, tons and percent within 20 nm of BS/AI sites listed as Steller sea lion critical habitat, and percent of catch by species within 20 nm, 1997. (1)

	Total Observed Within 60 nm.	Catch Within 20	% Catch Within 20	% Total Groundfish Observed Within 20
POLL	767,540	76,754.0	.10	.57
AMACK	45,620	37,408.4	.82	.28
PCOD	61,330	9,199.5	.15	.07
POP	9,850	4,334.0	.44	.03
YSOLE	107,190	3,215.7	.03	.02
RFISH	2,330	1,421.3	.61	.01
ATOOTH	3,320	564.4	.17	.004
OTHERFLAT	26,670	533.4	.02	.003
GTURB	740	392.2	.53	.002
RSOLE	33,940	339.4	.01	.002
SFISH	40	27.2	.68	.0002
TOTAL	1,058,560	134,189.5		

(1) NMFS/AFSC unpublished fishery data, observed BS/AI groundfish trawl fishery catches, 1990-97.

Thus this portion of the amendment to extend no-trawl buffers around sea lion rookeries and haulouts to 20 nm will primarily affect the conduct of the pollock fishery, followed by the Atka mackerel fishery.

- By placing year-round 20 nm no-trawl buffers around all critical habitat haulouts as well as rookery sites, 28 new sites would receive protection in the central Aleutians, 10 in the Bering Sea, 9 in the eastern Aleutians and 3 in the western Aleutians.
- In addition to current listed sites, major haulouts with >200 animals (the standard used by NMFS to define "major" haulouts) would qualify at Cape Sarichef (Unimak Island) and Cape Izigan (Unalaska Island). Carlisle Island (Islands of the Four Mountains) is not listed for protection even though Bailey and Trapp (1986) reported 250 sea lions at Dragon Point.
- The >200 animal standard now used by NMFS to define "major" haulouts (NMFS 1993) leaves out other important sites that support significantly large numbers of sea lions at a time when numbers at most sites have fallen well below 200 animals. Since haulout use is related to the location of critical foraging habitat (Boyd 1995), particularly in the winter months when sea lions are most likely to experience nutritional stress, protecting these areas during a period of severely reduced population is vital. Therefore sites >100 animals should also receive trawl buffer protections, including Oksenof Point (Unimak Island) and Bishop Point (Unalaska Island).

All told, about 55 haulout sites would receive year-round 20 nm trawl exclusion zones in the BS/AI in addition to 20 nm zones around rookeries, which also serve as haulouts in the non-breeding season. The extension of rookery no-trawl zones and the addition of trawl buffers around these major haulout sites, where the majority of the population is distributed in the non-breeding season, could displace as much as 200,000 metric tons of groundfish (mostly pollock and Atka mackerel) annually, based on observed catches within 20 nm of sites listed as critical habitat for 1990-97. Other groundfish fisheries would appear to experience little disruption from these measures and may actually benefit from the protection afforded to these nearshore areas, which serve as important nursery grounds for numerous fish species.

2. Aquatic Foraging Habitat Protection

Much larger groundfish removals occurring within 40 and 60 nm of critical habitat sites are concentrated in the aquatic foraging area off the eastern Aleutian Islands. Catches have been dominated by pollock removals, which have accounted for about 80% of the average (observed) groundfish trawl removals with 60 nm, based on observer data (NMFS/AFSC unpublished fishery data):

- 37-51% (44% average) of the observed BS/AI groundfish trawl catch, ranging from 391,667-531,511 mt (487,052 mt average) was removed from within 40 nm of sites listed as critical habitat during 1990-97.
- 59-74% (64% average) of the observed BS/AI groundfish trawl catch, ranging from 599,600-821,426 mt (701,809 mt average) was removed from within 60 nm of sites listed as critical habitat during 1990-97.
- Pollock has accounted for an average of about 80% of the observed BS/AI groundfish trawl catches within 40 and 60 nm of sites listed as critical habitat, averaging 383,464 mt and 563,766 mt respectively during 1990-97.

NMFS has documented the concentration of the pollock trawl fisheries in the large at-sea foraging habitat area off the eastern Aleutians from Unimak to Islands of the Four Mountains (164-170W longitude) and at numerous times has discussed internally the need for greater protection in this area, especially following the explosive growth of the first quarter Bogoslof roe pollock fishery after 1986 and the shifting of that fishery effort into the CVOA region following the collapse of the Bogoslof spawning stock in the early 1990s.

Although 60 nm seasonal (e.g., Oct 1-Apr 30; Dec 1-May15) trawl closures in the EAI aquatic foraging habitat will result in significant changes in the seasonal and geographic distribution of the pollock fishery, as well as proposed reductions in the TAC, the fact that the fishery has become steadily more concentrated in this area on a steadily declining spawning stock during the 1990s bodes ill for the long-term viability of the fishery itself. The protection provided to the spawning pollock stock by the 60 nm winter/spring trawl exclusion zone will reduce fishing pressure on a declining stock at the time of year when the fish are most vulnerable to trawl gear.

The Section 7 consultation of 4 November 1991 (Aron memo) notes that the southeastern Bering Sea shelf is an important pollock spawning grounds and suggests that the spawning stock may also benefit from greater sea lion habitat protection and reduced catches in the area:

"Due to the predominant currents and drift of pollock eggs and larvae, this area probably contributes more to successful recruitment to the pollock population of the Eastern Bering Sea than spawning grounds northwest of the Pribilofs. Consequently, from a pollock management perspective alone, it might be prudent to direct effort away from the Area."

Measures designed to protect sea lion foraging areas from trawling will provide protection to areas of important fish habitats, including spawning and nursery grounds for commercial species of fish.[4] Other benefits include: reduced bycatch of prohibited species such as halibut, crab, herring and salmon, reduced bycatch of non-commercial species important to the marine mammals and seabirds (e.g., juvenile pollock, sand lance, capelin, squid, octopus), and greater protection of benthic habitats in an area where once-abundant red king crab and tanner crab stocks have plummeted.[5]

Are there alternative solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

Broad spatial/temporal management measures applied in the 1990s have not *reduced* removals from major groundfish fisheries within critical sea lion habitat boundaries. In fact, removals of pollock, Pacific cod and Atka mackerel in critical habitat areas have reached all-time highs during the 1990s.

Although management measures are needed to spread the giant BS/AI pollock fishery out in space and time, they must be accompanied by comprehensive trawl exclusion zones to provide meaningful protection for critical sea lion foraging habitat. Expanded no-trawl buffer zones are the only effective way to achieve large *reductions* in trawling effort and catch in critical foraging areas. Combined with adequate time-area management of the fishery, these trawl closure recommendations can provide meaningful year-round protection which encompasses the seasonal movements of sea lions between accustomed haulout sites and rookeries as well as winter foraging areas in the larger aquatic habitat zone.

Temporal allocation of the Gulf pollock quota into quarters and now into trimesters, as well as spatial allocation of the Gulf pollock quota and Aleutian Atka mackerel quota into three broad subareas (subareas 610, 620 and 630 in the Gulf; subareas 541, 542 and 543 in the

[4] Technological advances have allowed fishermen to locate fish and exploit areas which, in the past, would have been de facto refugia (Wilson et al. 1996). The sea lion trawl exclusion zones will provide multiple ecological benefits in the manner of marine reserves elsewhere.

[5] The dismantling of the year-round no-trawl zone in the Crab Pot Sanctuary that had been negotiated with the foreign trawl fleets led to extensive bottom trawling of areas formerly protected from trawling. The subsequent consequences for benthic habitats and species have never been assessed, even though the impacts may be quite large. Since the early 1980s, for instance, crab species have experienced large declines throughout the eastern Bering Sea shelf and Bristol Bay, as well as the Gulf of Alaska. The area east of Cape Sarichef extending northward of Unimak Island used to be protected by the Crab Pot Sanctuary zone and supported high king crab abundance. Since 1981, the area has been intensively trawled for pollock, cod and flatfish. The 1995 NMFS king crab survey indicated that the area is devoid of king crab now.

Aleutian Islands) may have reduced the risk of pulse fishing and localized depletions. However, the distributions of the Atka mackerel and Gulf of Alaska pollock fisheries demonstrate that broad spatial/temporal allocations in those fisheries have not reduced overall catches from critical foraging areas and do not address the highly localized nature of the fisheries or their likely adverse effects on sea lion prey availability and foraging success in critical habitats proximal to sea lion rookeries and haulouts as well as larger winter foraging ranges.

In the BS/AI, the A-B seasonal allocation of the pollock TAC during the 1990s has actually institutionalized an approximately ten-fold increase of the catch coming from the winter months and on spawning grounds in the large aquatic foraging habitat area from Unimak Island to Islands of the Four Mountains, 164-170W longitude, extensively overlapped by the CVOA. In the absence of controls on the geographic distribution of the TAC, pollock fishery removals in the southeastern Bering Sea-CVOA region have been allowed to increase steadily since 1980 to record levels in the 1990s.

Given (1) the size and scope of the pollock fishery compared to any other groundfish fishery, (2) the intense spatial-temporal compression of major groundfish fisheries in habitats which are essential to the survival and recovery of the Steller sea lion, (3) the evidence for high exploitation rates and rapidly declining biomass in the critical habitat areas where pollock and Atka mackerel fisheries are concentrated, and (4) the importance of the CVOA as a spawning and nursery habitat for pollock and other fish and shellfish, we believe that NMFS and the North Pacific Council must take these proposed actions to reduce fishing pressure in these habitats under the terms of the protected species requirements of the ESA and in the interest of the future viability of the fisheries themselves.

Signature:

Barbara Jeanne Polo
Political Director
American Oceans Campaign

Susan Sabella
Oceans Campaign Director
Greenpeace

Supportive Data & Other Information:

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ALASKA FISHERIES SCIENCE CENTER

PRELIMINARY ATKA MACKEREL RESEARCH PLAN FOR 1999

PRELIMINARY RESEARCH PLAN FOR 1999

I. Introduction

The principal goals of AFSC's sea lion/fishery interaction research are: a) to quantitatively assess the impact of commercial fishing on localized abundance and distribution of Atka mackerel inside and outside of trawl exclusion zones around Steller sea lion rookeries; and b) to evaluate whether fishery impacts influence the condition of Steller sea lions that utilize exclusion zones. To achieve these goals we propose a fully integrated research agenda that draws on the expertise of staff from three Divisions of the Center: the National Marine Mammal Laboratory (NMML), Resource Ecology and Fisheries Management Division (REFM), and the Resource Assessment and Conservation Engineering Division (RACE).

The research questions necessitate a quantitative evaluation of the distribution, abundance and movement of sea lion prey in localized areas. The objective of the proposed research is to improve our ability to monitor three key factors: a) relative abundance and distribution before and after the fishery; b) total Atka mackerel biomass in the area; and c) rates of Atka mackerel movement between sub-areas open and closed to the fishery.

Atka mackerel exhibit dense schooling behavior and a patchy distribution. These two factors impose difficulties for monitoring small scale movements of fish. Therefore, three methods of fish stock assessment (one of which is fishery-independent) are proposed. We plan to utilize index bottom trawl surveys before and after the fishery to estimate relative abundance and distribution of Atka mackerel. A mark and recapture (tagging) experiment is proposed to estimate abundance and movements of Atka mackerel between areas open and closed to the fishery. Finally, a fishery-based Atka mackerel depletion experiment will be conducted to estimate abundance in the area open to the fishery. Prior to conducting the full-scale bottom trawl surveys and mark-recapture experiments, various preliminary studies must be carried out in 1999. These studies, outlined below, are necessary to ensure that the full-scale experiments and studies are properly designed.

Ideally, studies of sea lion condition would be conducted concurrently with studies of impacts of commercial harvest. The effect of prey removal by fisheries on the number of sea lions born each year and the number that survive to reproduce should be monitored. Sea lion population counts and abundance trends are reliable only as long-term indices because they are based on the number of sea lions on shore during the breeding season and the number of pups born in a given year, while female Steller sea lions enter the breeding population at about 4 years of age. Thus, a lag time will occur between the first year of a new fishery management regime and the appearance of any potential effect on population numbers of Steller sea lions. Indices based on biological parameters from a sample of Steller sea lions that reflect "real time" changes in the forage availability include changes in body mass, body length, total body water, metabolic rate, overall fat content, foraging effort, foraging area, and diet composition.

II. Fishery Impacts

1. Bottom Trawl Survey Design to Measure Atka Mackerel Population Changes near Sequam Island: A Pilot Study to Estimate the Variance and Determine Sample Size Requirements (partial base funding).

A preliminary experimental bottom trawl survey is proposed to assess sample size requirements to measure changes in Atka mackerel population densities within the closed fishing areas near Seguam Island after a commercial fishery. This study would be conducted during the Season 1 (January 20) or Season 2 (September) fishing periods. The potential impact will be judged by testing the hypothesis: H_0: mean survey cpue after the fishery is greater than or equal to mean cpue before; H_a: mean cpue after is less than mean cpue before, using a two sample t-test. The power of this test, or the probability of detecting a true difference, will depend upon the magnitude of the true difference in cpue and the variance of the mean cpue. At this time, the variance structure of the cpue from such a survey is unknown but must be determined before we know whether bottom trawl survey methodologies are appropriate and feasible for measuring density changes. The proposed preliminary survey will provide an estimate of the between-tow variability in cpue in the closed area at the time of year of the commercial fishery. Using this estimate of variance and standard statistical methods we will be able to estimate the number of required tows to design a paired survey (before and after a fishery) needed to detect the impact on fish densities given the acceptable levels of power. The number of vessel days at sea and budget for full a survey would follow. An appropriate set of preliminary cpue data could be collected with a chartered commercial bottom trawler using an appropriate survey net. It is anticipated that the preliminary survey could likely collect sufficient number of tows in fourteen fishing days although the duration of the experiment will depend on the degree of aggregation of Atka mackerel and the likelihood of an infrequent extremely large tow. The budget estimate for vessel charter, travel of scientific field party, overtime, shipping of gear to and from Alaska is $80K. This assumes that existing RACE trawl gear or commercial gear would be available.

If not then, an additional $20 to $30K per net system would be needed.

2. Development of Tagging Procedures and Assessment of Tagging-induced Mortality and Tag Shedding (partial base funding).

In this project, procedures will be developed for tagging of live Atka mackerel with various types of tags, including passive inducible transponder (PIT) tags, spaghetti-type tags, and coded-wire tags. Atka mackerel will be collected by jigging (aboard a commercial jig boat out of Dutch Harbor) and transferred to live tanks on-land. Experiments to estimate tagging-induced mortality and tag shedding rates will be conducted over a several week period. This project would entail charter of a jig boat in Dutch Harbor, purchase of tags, construction of a tag station (e.g., digitizing pad for length measurements, computer for storage of tag, fish, capture and release information), and a 3-4 week stay in Dutch Harbor for up to 3 scientists/technicians to arrange facility and conduct the experiments. The total cost of this project is approximately $50K, not including salaries of biologists prior, during and after the project is conducted, nor any costs for use or repair of live tanks/pumps owned by Alaska Department of Fish and Game. These experiments could be conducted in January-March 1999.

3. Development of Shipboard Procedures for Tag Placement and Detection (partial base funding).

Tagging procedures developed on-land in project 2 (above) will be transferred to a commercial vessel during normal fishing operations. Experimental tagging aboard a commercial vessel will be done for approximately 10 days during either the 1999 open-access or CDQ fisheries in the Aleutian Islands. This project will determine how many fish can be tagged per day and develop procedures to handle and store large numbers of live fish on a vessel. This project will entail the construction and deployment of a tag detector system (for PIT or coded wire tags) on board the vessel, approximately 2 weeks of travel for 4 scientific personnel, and a contract with the tag manufacturer for a technician to be aboard to assist in the installation of the detector system. The total cost of this project is approximately $60K, not including salaries of biologists prior, during and after the project is conducted, nor any costs for use of the vessel. These experiments could be conducted in April-June 1999.

4. Evaluation and Development of Tagging Model (base funding).

A mathematical model is necessary to estimate movement rates and population sizes of Atka mackerel in fished and unfished areas. Simulation studies and a power analysis will be conducted to determine what level of precision in movement rate and population size estimates are obtained with various numbers of tagged/

recaptured fish. This work, in conjunction with knowledge gained in projects 2 and 3, will enable us to design a feasible tagging experiment that will accomplish the objectives. It would cost approximately $10K for a one-month contract with a university-affiliated PhD.

5. Investigation of Alternative Depletion Models for Atka mackerel fishery CPUE data (need funding).

The Scientific and Statistical Committee of the Council recommended several improvements to the statistical analysis of Atka mackerel fishery CPUE data. One of the recommendations involved investigation of non-linear depletion models to fit the data, while others centered on examination of the statistical properties of using aggregated data, the variance structure of the underlying data, and whether the estimated regression coefficients were unbiased. In this project, the properties of the existing and alternative models would be explored. This project would cost approximately $10K for a one-month contract with a university-affiliated PhD.

II. Steller sea lion foraging and individual fitness patterns

Project 1 (genetics) and a portion of Project 2 (food habits) were initiated in 1998 with the intent of expansion in 1999, pending additional funding. Both projects will continue at a reduced level in 1999 under base funding if the proposed large-scale project is not funded. Projects 2 and 3 (food habits; distribution and abundance) are scheduled to fully begin in 1999, but will be conducted at a reduced level using base funds if the proposed large-scale project is not funded. A reduced version of Project 4 (foraging location) will be conducted in 1999 pending funding from NMFS' Recover Protected Species program. However, projects 5 and 6 (physical condition; physiology) are fully dependent on the funding requested in this large-scale proposal, and will otherwise not be conducted.

1. Genetics (partial base funding - approximate new funds required $20K).

Identification of stock origin is critical to measuring the potential impact of fisheries removal on individual sea lions. Stock determination will be accomplished through mitochondrial DNA analysis on cells sloughed during defecation. This work was initiated in FY98 and will continue into FY99. Fecal material (referred to as scat) will be collected during the winter cruise of the *R/V Tiglax*.

2. Food Habits (partial base funding - approximate new funds

required $40K).

Identification of Steller sea lion prey will be accomplished through analysis of scat. Scat collected during the winter of 1998/1999 will also be analyzed for the presence of PIT tags placed in Atka mackerel (if the Atka mackerel study is funded) as a direct measure of foraging location. Finally, an ongoing experiment in FY98 is being done in cooperation with the SeaLife Center in Seward, Alaska, where researchers are investigating the extent to which spaghetti tags, used to tag Atka mackerel, can be reliably recovered in the scats of sea lions.

3. Distribution and Abundance (partial base funding - approximate new funds required $80K).

Aerial surveys will be conducted in the winter following the protocol established by range-wide survey efforts ordinarily conducted every five years. This project will be coordinated with other studies, particularly those designed to determine foraging location.

4. Studies of the Temporal and Spatial Characteristics of Sea Lion Foraging (Approximate new funds required $135.2K).

Stomach sensors, satellite transmitters, and time-depth recorders will be deployed on juvenile Steller sea lions during the winter when juveniles are most vulnerable to lack of prey. The data collected will be used to determine feeding activity, dive depth, dive duration, and foraging location, and will be linked with physical condition data.

5. Monitoring Sea Lion Physical Condition (Approximate new funds required $114.5K).

Direct measures of mass, length, and girth will be obtained. The relative amount, thickness, and distribution of fat in individual animals will be determined using bio-impedance measures and ultra sound. Lipid class composition and fatty acid content will be examined.

6. Monitoring Sea Lion Physiology (Approximate new funds required $100K).

Blood parameters (i.e. glucose, blood-urea-nitrogen, and water content of plasma) that indicate pronounced changes that occur during development and are also indicative of overall health and condition will be collected. Metabolic studies to measure thermoregulation and metabolic rate will also be conducted. Metabolic studies and blood parameters will be measured in both free ranging and captive animals.

BUDGET SUMMARY

I. Fishery Impacts

Project 1	$ 80.0K
Project 2	50.0
Project 3	60.0
Project 4	10.0
Project 5	10.0
TOTAL	210.0K

II. Steller sea lion foraging and individual fitness patterns

Project 1	$ 20.0K
Project 2	40.0
Project 3	80.0
Project 4	135.2
Project 5	114.5
Project 6	100.0
TOTAL	489.7K

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October 27, 1998

RE: NMFS research plan for Atka mackerel fishery/Steller Sea lions

Dear Jim:

Nancy Kercheval of Cascade Fishing asked me to comment on the proposed research plan for Atka mackerel attached to your October 2, 1998 letter in response to her earlier inquiry into the status of Atka mackerel research. Please understand that Ms. Kerchival, and Groundfish Forum as a whole, is very appreciative of the thought and planning that went into NMFS' research plan and encouraged by the agency's efforts to jump start this important research.

As you might guess, Atka mackerel fishermen are frustrated by the anticipated pace of research on the question of how fishing may affect the density of Atka mackerel adjacent to sea lion areas. Even under the most optimistic schedule for the research, it appears that we can anticipate restrictions on fishing in "critical habitat" to proceed in the absence of new information. This means that we are looking at some substantial impacts to the fishery because large increases in fishing outside of critical habitat may not be feasible in some areas. What is most frustrating is that many Council members who were reluctant to approve such restrictions based on the available evidence were assured by NMFS that field research would be conducted to address the important questions and gaps in the fishery/sea lion interaction theory.

As you may know, we have been attempting to increase the awareness of this important research project in the minds of people in a position to provide funding. Yet our read on the situation is that despite our efforts and the mandate of an annual review clause approved by the Council, there is no practical way to mobilize and fund the full-blown density effects study for 1999. Having said this, it appears that the best we can hope for at this juncture appears to be to the year 2000 for the density study. It is in the spirit of moving ahead expeditiously that we offer the following comments on NMFS' research outline.

Proposed bottom trawl variance assessment study

One of the fundamental steps proposed in NMFS' outline is an evaluation of whether bottom trawling for Atka mackerel is a reasonable index of abundance. This was one of the concerns we raised in the CPUE decline study that was used to justify the need for restrictions on the fishery. This fundamental question has a great deal of bearing on the issue of whether the CPUE declines observed in some areas are an artifact of the difficulties of catching Atka mackerel given tides, diurnal/seasonal changes, or other factors that affect catch rates. Acknowledging that such a preliminary step is needed to assess variance from bottom trawling as a measure of abundance, we would like NMFS to consider a somewhat different approach to the one outlined in the NMFS plan. Our suggested alternative will not advance the date when results will be available from the important density study, but we feel it might avoid some of the potential for inaccurate assessment of the variance associated with bottom trawling for mackerel.

In the research outline, NMFS outlines a preliminary assessment of variance which is expected to cost about $80,000 and be conducted the year before the density effects study. Based on this outline, we glean that this preliminary piece would be accomplished by making a series of standardized pairs of tows in different areas (while the fishery is closed). These pairs would be used to estimate the inherent variability in catch rates within pairs. This estimate of variance is apparently needed for calculation of how many tows would be needed in the density study (the following year) to measure the effects of the fishery on density separately from the inherent variance surrounding bottom trawling as an index of abundance.

We feel that using a vessel that is not a dedicated Atka mackerel vessel for this charter could artificially increase the estimate of baseline variance. One of the main reasons that only dedicated Atka mackerel vessels participate in the fishery is that other trawlers do not possess the gear and expertise to catch Atka mackerel consistently. A vessel charter for $80,000 for 14 fishing days would not fund the operation of a dedicated Atka mackerel vessel (even without a processing crew on board) and the likely recipient of the charter would be a catcher vessel that is not well equipped or manned for Atka mackerel fishing.

We would like NMFS to consider modifying the project to use a dedicated Atka mackerel vessel for the baseline assessment of variance. We suggest that instead of breaking the study into two years (one for the variance assessment, one for the density study), the Atka mackerel vessel could do the baseline variance assessment at the start of the density effects study conducted in 2000. Under this alternative approach, the vessel chosen to do the density effects study would conduct the baseline variance tests at the start of the density research charter. Under this plan, the vessel would produce an estimate of variance that would be "plugged into" the experimental design to generate a number of tows needed for the density study to achieve statistically relevant results. There may be some consternation associated with mobilizing the full-blown density study without this baseline density estimate in hand, but there may be ways to accommodate that concern.

Under our proposal, only one mobilization of scientists and vessel is needed for the research, which could provide net savings. Our most overriding concern is that if the baseline variance is overestimated because an Atka mackerel vessel is not used, NMFS may feel the density study should be abandoned because there is no way to separate the fishing effects from the variability associated with bottom trawling. We feel it is reasonable to assume that the baseline variance that will be estimated is of manageable magnitude so that a reasonable number of tows will be needed to achieve a statistically valid assessment of the effects of fishing on Atka mackerel density. If Atka mackerel fishing were that variable, then even the dedicated vessels would not be able to afford to fish for it. Further, the vessel skippers report that variability is probably greater comparing the two ends of a three week period to two days at the beginning or end of the same time interval. This may be due to the nature of the factors that produce this variability. Therefore, several separate estimates of background variability just prior to the parts of the density study may be more useful than a one time assessment of variability. If the baseline variance turns out to be too unmanageable to permit the density effects study to achieve reliable results, then the rest of the research could still conceivably be abandoned at that point in time.

Tagging study: We understand the need for the tagging study and we feel the information gained from it could lead to an improved understanding of the migrations of Atka mackerel. This could benefit the management of the stock as well as the fishery. For instance, we feel the tagging experiment could help to shed light on the possible downstream effects of harvesting a large percentage of the total allowable catch in areas where Atka mackerel are less abundant. This is an important concern for the fishery under the proposed restrictions.

Preliminary work on evaluating mortality of tagged fish from the tag or from handling may require that scientists come aboard Atka mackerel trawlers next year. We suggest that this work would be best done during CDQ fishing, as that will allow the most flexibility for accommodating the needs of the preliminary research. Our understanding is that a split season will be in place in 1999 (January and September starts) and companies will likely be fishing for CDQ fish at the beginning or end points of those regular seasons. Groundfish Forum would be pleased to help coordinate access to vessels for scientists so please do not hesitate to contact us.

NPFMC's Science and Statistical Committee review of the research plan:
In case you had not already arranged for SSC to review NMFS' proposed research plan, we thought we'd suggest that they review the document. We feel the SSC would be a good venue for providing helpful suggestions to the plan. The SSC focussed a great deal of attention to the localized depletion analysis and the management measures created to address that problem earlier this year. We hope the SSC has the time and is willing to add this subject to their agenda.

Thanks for considering our comments on your proposed research plan. Please understand that we want to do whatever we can to make sure this research is undertaken and is successful at answering the important questions of how the fishery may affect the density of Atka mackerel adjacent to sea lion areas. As we stated in earlier correspondence, we will do everything we can to provide vessels and expertise to NMFS for the research at as low a cost as possible. Thanks again for your letter outlining NMFS' research plan.

Sincerely,

John R. Gauvin

CC: Nancy Kercheval, Cascade Fishing Co.

Alaska Fisheries Science Center
Resource Ecology and Fisheries Management Division
Flatfish Stock Assessment Review

May 18-21, 1998

Introduction

A review team met with staff of the Alaska Fisheries Science Center at Center headquarters in Seattle, Washington to review stock assessments and supporting research for Gulf of Alaska and Eastern Bering Sea flatfish stocks. Team members and their affiliations were as follows:

Jeff Fargo	Department of Fisheries and Oceans Canada Pacific Biological Station Nanaimo, B.C. Canada
William Clark	International Pacific Halibut Commission Seattle, WA
Stephen Clark	National Marine Fisheries Service Woods Hole, MA
Lew Haldorson	School of Fisheries and Ocean Sciences University of Alaska, Fairbanks, AK

The intent of the review was to provide an in-depth examination of the assessments and related research being performed by staff of the Resource Ecology and Fisheries Management (REFM) Division at the Alaska Fisheries Science Center (AFSC) in support of management of flatfish stocks in the Gulf of Alaska and Eastern Bering Sea. It was noted at the outset that optimally, the process should allow a detailed, rigorous dissection of the models and databases used; but other commitments of the review team members precluded this. Therefore, a broader based approach was chosen which included a review of data collection programs, modeling procedures and other research at the AFSC and development of a consensus report and recommendations.

Team members were provided with an initial overview of the resource situation and the pathway of scientific advice as it relates to the assessment process. For these stocks, AFSC assessments and supporting studies are reviewed by the Council's Plan Development Teams and Scientific and Statistical Committee, who formally approve, or modify as needed, determinations of Acceptable Biological Catch (ABC). The Total Allowable Catch (TAC) may be considerably lower, depending on likely bycatch scenarios and other factors. Bycatch limitations for Pacific halibut and other species have severely constrained flatfish catches, and together with limited demand have resulted in low exploitation rates in all of these fisheries. Generally speaking, flatfish stocks in both regions are stable at intermediate to high levels of abundance, with exploitation rates substantially below those corresponding to Acceptable Biological Catch levels in all cases.

The review team listened to presentations by REFM and the Resource Assessment and Conservation Engineering (RACE) Division on stock assessments and models used, data collection programs and supporting studies. Summaries of these presentations and ensuing discussions and review team findings and recommendations are given in the following sections.

Fishery-Independent Data Collection Programs

Gary Walters reviewed trawl survey programs for the Eastern Bering Sea (EBS) and the Gulf of Alaska. The EBS survey is conducted annually in spring and summer using a systematic grid design overlaid by strata determined primarily by depth. Initially, a "400 Eastern" trawl was used, which was replaced by the "83-

112" trawl in 1982. No standardization studies have been performed and it has been accepted that for critical quantitative work e.g. tuning of assessment models, that the time series begins in 1982. Bottom conditions throughout most of the survey area are relatively good and consequently a wire footrope is used. There was some discussion relative to the possibility for "herding" as it relates to effective trawl path width. Studies to evaluate this are underway. Tow durations are 30 minutes in length and a tendency for large catches and a concomitant need for subsampling on many tows was reported. The survey is performed by two chartered vessels which are very similar in size, horsepower and fishing characteristics and it is felt that bias from vessel effects is of lesser consequence than from other factors, e.g. behavior of vessel captains. Standard procedures are in place to insure the integrity of the time series; also, each tow is measured acoustically with SCANMAR trawl mensuration gear and tow duration is checked by bottom sensors. Industry cooperation has been excellent and no fishery related conflicts were reported. AFSC has been able to maintain a charter arrangement with the same company/vessels for the past several years and has renegotiated for another 4 years. Unfortunately, no conversion coefficients are available for earlier vessels used in this time series..

There seems to be general acceptance of the survey with respect to area/season coverage, sampling intensity and data provided; although the need for coverage of slope areas to enhance the assessment database for Greenland turbot was mentioned. There was also concern about potential sources of bias including effects of procedural differences or behavior by vessel captains. There was some discussion about the possibility of reducing tow duration to 15 minutes in length. Results of an MS Thesis were mentioned which indicate that resultant reduction in catch is linear, i.e. reduction to one-half. Shorter tows would be expected to provide increased precision while reducing workloads, thus providing the opportunity for other work. However, studies in other areas suggest that such changes may not be linear, particularly for larger individuals iof certain species. In view of the importance of this time series further research is warranted to confirm the validity of this result prior to making such a change. It was also noted that trawl mensuration data, particularly for tow duration as measured by contact sensors, would be more critical for maintaining the integrity of the time series if shorter tows were used.

Eric Brown described the Gulf of Alaska (GOA) survey. This survey is triennial, because of the need to conduct the Aleutian Island and West Coast surveys in alternate years. This is a stratified-random survey, with sampling in proportion to biomass of economically important species. As for the EBS survey , surveys are performed by chartered commercial vessels using standard gear (the "poly-noreastern") equipped with rollers to make it suitable for rough bottom. The concern was expressed that such gear may not be suitable for flatfish because of escapement under the trawl. Studies to evaluate the extent of this loss are underway and are described below. Maximum depth sampled is 500 meters (m) and concern was expressed that substantial components of the Dover sole population are being missed. The need was stated for increased coverage in these areas, and AFSC may wish to provide this as fisheries and resultant assessment data needs increase. The desirability for improved and/or more consistent coverage in inshore areas was also noted. This need is being addressed by cooperative studies to incorporate data collected by the Alaska Department of Fisheries and Game (ADF&G). The time series might also be improved by incorporating fixed stations in high priority areas utilizing some form of mixed sampling design. Further research to accomplish these objectives was encouraged.

Ken Weinberg reviewed research on catchability being performed at the AFSC, directed primarily towards resolution of "herding" and escapement. The need for such studies has been recognized for some time, but until recently resources allocated to the task have been very limited, and in the opinion of the review team, inadequate. Recent work has included underwater video observations of behavior and develpment of small sampling gear installed on the footrope to determine escapement. The approaches used seem adequate; but the team sensed the need for a more organized approach and more commitment by the Division and Center if this work is to be successful.

<u>Fishery-Dependent Data</u>

Sarah Gaichas reviewed operations of the fishery observer program, which provides vital information in support of NMFS missions in the Bering Sea and Gulf of Alaska, including catch and effort data; data on endangered and prohibited species takes; and biological samples and data including special projects sampling. Observer costs are paid by industry, while NMFS is responsible for training, debriefing and data entry and quality control. Coverage is mandatory for vessels over 125 feet; and 30 percent of the trips for vessels in the 60-125 foot range must be observed. For the latter category, industry designates which trips will be covered. Because of the complexity of factory ship operations and extensive catches considerable effort has been directed towards development of sampling procedures that will provide for data quality control and consistency; but substantial problems remain. In 1997, the program provided 80,000 observer days of coverage. This represents a vital contribution to assessments and related research and monitoring of bycatch and assessing the effect of regulatory measures.

The review team felt that sampling coverage was more than adequate, but were concerned about the quasi-voluntary nature of the program for vessels in the 60-125 foot range. Team members felt that observers should be allocated by the agency to avoid potential bias. The reviewers were very impressed with the program organization, the amount of data being collected and the provisions for assessing quality control. In addition, the availability of these data for stock assessment analysis does not appear to be a problem. The reviewers felt that more provisions should be made for sampling and data collection to address special project research needs e.g. maturity data that would fill critical data gaps for assessment work. The review team strongly supported initiatives to improve estimates of catch weights and species composition, e.g. facilitating or requiring use of surveyed bins and improved weighing procedures. The variability in estimates of catch weights and species composition among observers should also be addressed. This work should be undertaken in the near future to satisfy any concerns of assessment staff, managers and industry.

Biological/Ecological Research

Biological and ecological research that is being used or has the potential to be used in management of flatfishes in the Bering Sea and the Gulf of Alaska include food habits studies, development of maturity schedules, resolution of species identifications and habitat studies.

In many of the discussions, the possible importance of the regime shift that occurred in the late 1970's was recognized. In general, the review panel felt that the various research groups were aware of the implications of the regime shift. Future sampling should be planned on a temporal scale that will allow management to react in a timely way to future shifts.

Summaries of trophic studies for the Bering Sea and Gulf of Alaska were presented. Samples are collected in trawl surveys and occasionally from commercial catches. The review team believes that baseline data on trophic relationships and some level of routine monitoring of food habits is essential to understanding of ecosystem dynamics and the effect of climate regim shifts in the long term. Flatfish food habits were principally being used in the Gulf of Alaska to provide consumption estimates of walleye pollock. The review team was very favorably impressed by the extensive data set of food habits being produced in this program. Although there is a clear application of trophic studies to walleye pollock management, it was not apparent how the trophic studies will contribute to management of flatfish species. The review panel felt that food habit studies have potential in the development of multi-species management programs, and in incorporating ecosystem concerns into management; however, the information provided in the reviews, and the subsequent discussions, resulted in the perception that there was no clear research direction or management plan for use of trophic data. The review panel also felt that the trophic research program would benefit from some analysis of sample size requirements, and the development of procedures to prioritize sample processing. The current policy of processing all samples collected appears to be inefficient, and must contribute to the present two to three year back-log in unprocessed samples.

The need for maturity studies of flatfish species was stressed in the review, and the review panel shares the concern of the assessment scientists. With the exception of yellowfin sole and rock sole in the Bering Sea, there appeared to be a general lack of reliable maturity data. It does appear that in the Gulf of Alaska there will be a dramatic improvement in this situation as a result of cooperative sampling by Alaska Department of Fish and Game. The review panel was impressed with the plans to develop the necessary maturity data. There is a need to ensure that maturity data are sufficient to describe geographic variability (e.g. Bering Sea populations may have different maturity schedules than Gulf of Alaska) and to develop a sampling plan adequate to describe temporal variability in maturity schedules.

Species identification did not appear to be a general problem, with the exception of the recent confirmation that there are two species of rock sole in Alaskan waters. The review panel was very favorably impressed with the studies to resolve the identification of these very similar species.

Habitat studies have recently been elevated to new importance, and are being pursued through analyses of older data bases, and innovative new technology, especially in the Bering Sea. The review panel felt that these studies will be very useful in providing essential fish habitat information for flatfish species, and should be expanded to provide as much information about the Gulf of Alaska as is possible, although the panel recognized that the Gulf of Alaska will be a much more difficult research project.

<u>Stock Assessments and Assessment Models</u>

Most of the flatfish stock assessments done by AFSC scientists rely on the trawl surveys to provide unbiased estimates of absolute abundance (with catchability $Q = 1.0$). Depending on what data are available, an age-or length-based version of the stock synthesis model is fitted to the survey biomass estimates along with commercial and survey catch compositions to estimate historical recruitment and present stock size. Essentially the synthesis model is used to smooth the absolute biomass estimates from the surveys. The exceptions to this description are the Bering Sea Greenland turbot assessment, which considers a range of values of catchability Q, and a few of the Gulf stocks where there are no catch composition data and the latest trawl survey estimate is used directly as an abundance estimate.

We have a few suggestions for additional analyses that could be done in the stock assessment area, but in general we consider that the methods and management recommendations are sound. The assessments use all of the available data, and except for the Greenland turbot there are no important inconsistencies in the data to be resolved in fitting the models.

Survey Trawl Catchability

The AFSC flatfish assessments are somewhat unusual in that they use the trawl survey results as an absolute measure of abundance rather than as a relative index. The usual practice in fitting age- or length-structured models is to treat the survey results as an index and to estimate the survey catchability coefficient internally. Fixing the value externally (like the value of the natural mortality rate) is a question of judgment. Often the data do not determine the value of the catchability coefficient very well (as demonstrated to the panel for the case of Gulf arrowtooth), so if there are good reasons to believe a certain value to be correct, it makes sense to fix it. In the case of the Bering Sea survey it is reasonable to suppose that the catchability coefficient, if not exactly one, is probably close to it. In the case of the Gulf survey it appears likely from recent video work that the coefficient is smaller, but at worst that would result in very conservative stock size estimates.

Because of the critical importance of the assumption that $Q = 1.0$, the panel believes that the ongoing efforts to make direct estimates of herding by the survey trawls, and escapement beneath them, are of paramount importance to the flatfish assessments. In addition, Center scientists should attempt to estimate Q internally in the yellowfin sole assessment, where there is some chance that the long and detailed survey data series may contain enough information to supply a useful estimate.

Natural Mortality

Another important and uncertain ingredient of the quota recommendations is the natural mortality rate, which figures in the calculation of target fishing mortality rates. This parameter is normally impossible to estimate internally when a model is fitted to data from exploited stocks, but several of the North Pacific flatfish stocks are almost unexploited, so there is an opportunity to estimate natural mortality using classical catch curve methods.

Ageing

Age-structured models generally provide better estimates of historical recruitment than the length-structured versions. At present length-structured models are used for some stocks because otolith samples have been collected but not read. The panel suggests that a schedule be set up to provide age data on a regular schedule—not necessarily every year, and not necessarily large samples, but a regular supply.

Greenland Turbot in the Bering Sea

This assessment has been controversial for years and remains so. Juveniles were found historically on the shelf and adults in deep water on the slope. In recent years few juveniles have appeared in the shelf survey, indicating chronic poor recruitment. The slope trawl survey (1979-91) indicated declining abundance of adults, consistent with poor recruitment. Meanwhile the slope longline survey (1983-94) has shown increasing abundance of adults. The assessment biologists are inclined to dismiss the longline survey results as an artifact of decreasing competiton for hooks with the declining sablefish stock. The survey biologists do not agree with this interpretation, and the panel is also skeptical. We suggest an analysis of hook occupancy data from the longline survey to check whether competiton for hooks is likely to have occurred. We also recommend resumption of the slope trawl survey to update and continue that data series.

Variances

Except for the Gulf arrowtooth assessment, variances were not reported for any of the stock size estimates. With survey catchability assumed to be 1.0, much of the usual variance in model fits disappears. However, a large sampling variance of the survey mean catch rate could introduce a substantial variance into the abundance estimate, which should be reported.

Research Plan

The team reviewed the flatfish research plan and generally endorses the proposed work and priorities. Many of the elements of the research plan appear as specific recommendations of the team. We have certain reservations about two of the proposed projects which are discussed below.

Stock Identification

A tagging study was proposed to resolve the distribution and stock delineation of Greenland turbot. The reviewers felt that alternatives should be considered as well. Tagging studies are labor intensive, involve a considerable amount of time to conclude, and can be, to some extent, ambiguous in their results especially concerning stock identification and migration. Interpretation of the results of tagging experiments can also be clouded by perturbations in the fishery or environment and poor post tagging survival. Analyses involving the use of polyacrilamide gel electrophoresis and nuclear and mitochondrial DNA could be considered as alternatives. However, the latter is expensive and positive results are not guaranteed for either.

Pacific Halibut Bycatch Reduction

The reviewers felt that a detailed spatial analysis of halibut bycatch data from the Gulf of Alaska and Bering Sea groundfish fisheries may not be required. IPHC has done this already and has not found any opportunities to reduce halibut bycatch significantly by means of time and area closures of other groundfish fisheries.

Summary and List of Recommendations

The review team was impressed with the scope and direction of the work being performed. Data collection procedures and supporting research seemed appropriate and the methodology used was basically sound. Further, the team found no substantive issues to comment on in the stock assessment methods. The assessments and advice being generated appear appropriate for management needs for flatfish stocks in the Eastern Bering Sea and the Gulf of Alaska.

The problems and issues identified in the review have for the most part been discussed above. The team has developed some specific recommendations, which are as follows:

1) The review team was unaware of any comprehensive evaluations of either survey in terms of sampling design and intensity, and adequacy of data outputs, over the range of species of major economic or ecological concern. There has been such an evaluation performed for one species as part of a recent Ph.D. thesis; but a more comprehensive approach involving all species of major biological or ecological importance was warranted.

2) Conduct specific studies to improve the efficiency of field operations including a rigorous evaluation of the practicality and effects of reducing tow time from 30 to 15 minutes for the EBS survey. Another important area of research could involve evaluations of biological sampling requirements i.e. otoliths ("how much is enough?"). The team strongly encouraged plans for research on this question for the Bering Sea survey because of its relevance at AFSC and elsewhere.

3) Concerns were expressed relative to the effects of the station allocation scheme used in the GOA survey, i.e. allocation based on biomass of primary species as determined from previous surveys or other sources of information which has varied during the history of the survey. In a multispecies context, the team felt that some other form of allocation e.g. proportional to stratum area, would be more appropriate over a long time series. The team recommended further evaluations to determine the appropriateness of the approach being used in relation to other forms of allocation.

4) As the assessment models and management advice being formulated are strongly dependent on survey biomass estimates it is imperative to secure the best possible information on Q, and thus reliable information on herding and escapement.. The team strongly encourages a more focused and cohesive program which would benefit both AFSC and other Centers.

5) A recurring theme in the discussions of the bottom trawl surveys involved the need for increased coverage in slope areas (Bering Sea, for Greenland turbot; Gulf of Alaska, for Dover sole). The review team felt that of the two, the need for such coverage was most critical for Greenland turbot because of conflicting trends between longline and trawl survey data noted in the stock assessment. The team identified development and implementation of trawl coverage in slope areas as a priority need although it would be clearly lower than resolution of questions related to escapement or herding identified above.

6) AFSC should address the potential bias in observer data collected from smaller vessels; and regulations should be implemented giving management the perogative to select trips in the 60-125 foot range for observation.

7) AFSC should investigate and implement methods to improve estimates of total catch weight and species composition; and collect information which would allow assessment of the variability in catch weights and species compositions among observers.

8) Assessment scientists are encouraged to explore ways in which trophic information may be used to 1)

develop multispecies management approaches, and 2) analyze the ecosystem effects of flatfish fisheries.

9) Develop research plan and initiate work to describe habitat types in the Gulf of Alaska

10) Intensify research to develop maturity schedules for flatfish species.

11) Estimate survey catchability internally in the yellowfin sole assessment.

12) Explore options for estimating natural mortality of very lightly exploited stocks using catch curve analysis.

13) Establish a regular schedule for reading adequate numbers of otoliths.

14) Analyze longline survey data to check on hypothesized hook competition between sablefish and Greenland turbot.

15) Report variances of stock size estimates developed from stock synthesis modeling.

RESPONSE TO FLATFISH STOCK ASSESSMENT REVIEW

A review of the REFM Division's flatfish stock assessments was conducted from May 18-21, 1998. The review panel, consisting of fishery scientists from the National Marine Fisheries Service Woods Hole Laboratory, the International Pacific Halibut Commission, the Department of Fisheries and Oceans (Canada) and the University of Alaska School of Fisheries and Ocean Sciences was tasked with critically reviewing the current status of the flatfish stock assessments as well as providing recommendations on how these assesssments could be improved for the future. The review panel heard presentations by Center scientists covering the flatfish stock assessments which focused on the quality and quantity of the data used, the general nature of the assessments, outlined the modeling constructs used and how the results were communicated to the fishery managers and decision makers. In addition, RACE and REFM Division scientists made presentations covering: 1) the flatfish fisheries and current management, 2) trawl surveys in the Bering Sea, the Aleutian Islands and the Gulf of Alaska, 3) the fishery observer program and catch estimation proceedures and problems, 4) bottom typing studies, 5) flatfish trophic studies, 6) maturity research, 7) catchability studies and 8) the analysis of flatfish species growth rates during a time period of increasing population growth of the flatfish community in the Bering Sea.

The report submitted by the review panel addressed the topics presented as well as some generic issues which pertain to flatfish research. The review panel recommendations were communicated under the following general headings: Fishery-Independent Data Collection Programs, Fishery-Dependant Data, Biological/Ecological Research and Stock Assessments and Assessment Models. The following list is a summary of 15 recommendations made by the review panel with responses from REFM Division flatfish scientists. The scientists that contributed to this response included James Ianelli, Jack Turnock, Sarah Gaichas and Thomas Wilderbuer.

Trawl Surveys

1) *The review team was unaware of any comprehensive evaluations of either survey in terms of sampling design and intensity, and data outputs, over the range of species of major economic or ecological concern. The team felt that such a study or studies would be desireable particularly with regard to providing options for improved coverage in inshore and or slope areas.*

Response: The adequacy of the annual Bering Sea shelf trawl survey has been evaluated both in terms of survey stratification and sampling density and the precision and bias of the resulting biomass estimates.

Syrjala, Stephen E. 1993. Species-specific Stratification and the Estimate of Groundfish Biomass in the Eastern Bering Sea. 20 p. NOAA Tech. Mem. NMFS-AFSC-19. U.S. Dep. Commer. NOAA, NMFS.

McAllister, Murdoch. 1995. Using Decision Analysis to Choose a Design for Surveying Fisheries Resources. Phd. Dissertation, Univ. Washington., 293 p.

Results from these studies indicated that an increase in the precision in biomass estimates may or may not be realized from increasing the number of sampling stations or from alternate schemes of survey stratification. Also, the magnitude of these improvements is not large enough to yield biologically meaningful reductions in the sizes of the estimated confidence intervals of the species. These studies were not discussed at the flatfish review.

A comprehensive study of the Gulf of Alaska surveys has not been attempted.

2) *Continue studies to improve the efficiency of field operations including a rigorous evaluation of the practicality and effects of reducing tow time from 30 to 15 minutes for the EBS survey.*

Response: The effects of reducing tow time from 30 to 15 on trawl survey results were analyzed in the following master's thesis:

Goddard, Pamela. 1997. The Effects of Tow Duration and Subsampling on CPUE, Species Composition and Length Distributions of Bottom Trawl Survey Catches. 119 p. Masters Thesis, Univ. Washington.

This analysis concluded that there was little effect on the species and length composition estimates of the survey catch for fish species from the reduction in tow time during the survey. There is still concern on how this change in sampling would effect estimates of king crab abundance due to the highly contagious nature of these species. This problem is now being studied before tow time will be reduced to 15 minutes during the survey..

3) *Concerns were expressed relative to the effects of the station allocation scheme used in the GOA survey, i.e. allocation based on previous biomass data for previous surveys, which has varied during the history of the survey. In a multispecies context, the team felt that some other form of allocation e.g. proportional to stratum area, would be more appropriate particularly as experience with other surveys around the world has shown that data requirements tend to increase for a range of species over time. The team recommended further evaluations to determine the approriatenenss of the approach being used in relation to other forms of allocation.*

This type of study has not been completed for the Gulf of Alaska triennial surveys and the recommendation should be considered when planning for the 1999 survey. Recently received information from similar studies conducted at the NMFS Northeast Fisheries Center is presently being considered.

4). *As the assessment models and management advice being formulated are strongly dependent on survey biomass estimates it is imperative to secure the best possible information on Q, and thus reliable information on herding and escapement. While RACE and REFM staff have* *recognized this need and have obviously made a concerted attempt to address it there seems to be a lack of support resulting in a "catch-as -catch can" approach. The team strongly encourages a more focused and cohesive program which would benefit both AFSC and other Centers.*

We agree a more comprehensive program of herding and escapement studies would have been desireable to determine the survey "Q", however, the AFSC has conducted experiments of hering and escapement on the survey trawls. With the advent of many forms of towed camera arrays during the 1990s, a less haphazard direction in this type of research would be beneficial.

5). *A recurring theme in the discussions of the bottom trawl surveys involved the need for increased coverage in slope areas (Bering Sea, for Greenland turbot and the Gulf of Alaska for Dover sole). The review team felt that of the two, the need for such coverage was most critical for Greenland turbot because of conflicting trends between longline and trawl survey data noted in the stock assessment. The team identified development and implementation of trawl coverage in slope areas as a priority need although it would be clearly lower than resolution of questions related to escapement or herding identified above.*

We have acknowledged the need for the resumption of deep-water sampling for some time. We agree that the Bering Sea slope survey would provide very important results for Greenland turbot and would also desire sampling of the habitat of Dover sole in the Gulf of Alaska (500-700 m - which is also important for thornyheads).

Commercial Catch Sampling

6). *AFSC should address the potential bias in observer data collected from smaller vessels; and regulations should be implemented giving management the perogative to select trips in the 60-125 foot range for observation.*

We agree, and would have considerably more confidence in data extrapolations if observer cruises were randomly assigned in the small vessel fleet. However, this would require a complete reworking of the present groundfish observer procurement system, and the introduction of a monitoring system to identify vessels participating in each fishery in addition to a regulatory change

7). *AFSC should investigate and implement methods to improve estimates of total catch weight and species composition; and collect information which would allow assessment of the variabillity in catch weights and species compositions among observers.*

We agree. Estimates of fleetwide total catch by species might be improved by investigating statistical alternatives to the mixture of observer and industry data used now. However, any statistical estimation of total catch by species would assume random sampling of fisheries with less than 100% observer coverage (see above).

One known method for improving observer estimates of total weight and reducing variability in catch weights among observers is to conduct research to determine appropriate fixed density (volume to weight conversion) factors to be used in all observed fisheries. Variability in species composition sampling among observers is a more complex problem. We are beginning to address sources of variability by developing vessel profiles, so that observers will receive vessel-specific sampling instructions to reduce variability in methods. Information on observer sampling methods is presently collected as part of an electronic debriefing survey; this information is used to refine training and briefing materials to improve and standardize observer sampling techniques. Additional improvements in catch weight estimation and species composition sampling are possible if industry is willing to meet higher standards (such as the multi-species Community Development Quota (MS-CDQ) standards) for surveyed fish bins and well-equipped observer sampling stations.

Trophic Studies and Substrate Classification

8). *Assessment scientists are encouraged to explore ways in which trophic information may be used to 1) develop multispecies management approaches, and 2) analyze the ecosystem effects of flatfish fisheries.*

A graduate student contracted by REFM Division is currently working on a multispecies VPA with REFM staff which includes the important shelf flatfish species trophic information. An analysis of the ecosystem effects of the flatfish fisheries in the Bering Sea is important and will be a future research priority.

9). *Develop research plan and initiate work to describe habitat types in the Gulf of Alaska.*

We agree, this would be important for flatfish and rockfish species and to define essential fish habitat as mandated in the Sustainable Fisheries Act.

Stock Assessment Issues

10). *Intensify efforts to develop maturity schedules for flatfish species.*

Top priority in our flatfish research plan. A Gulf of Alaska rock sole sample is now undergoing histological examination and a collection of flathead sole will be made during the ADFG/NMFS seasonality study over the next two years. Efforts are also being made to begin a collection in the Bering Sea for flathead sole and Alaska plaice.

11). *Estimate survey catchability internally in the yellowfin sole assessment.*

In late 1995-early 1996 the M/Q surface was mapped for yellowfin and rock sole in conjunction with work that Dr. Micheal Sigler was doing. Internal model estimates of Q have also been explored for Bering Sea and Gulf of Alaska arrowtooth flounder.

12). *Explore options for estimating natural mortality of very lightly exploited stocks using catch curve analysis.*

This is a good idea which will be investigated this September for the 1999 stock assessment.

13). *Establish a regular schedule for reading adequate numbers of otoliths.*

The flatfish working group and assessment authors prioritize the reading of our otolith collections now but the pivotable point in the production of the age samples are the manpower constraints of the age and growth unit. Good progress has been made in recent years in establishing criteria for the inclusion of new species and in processing some of the backlog of collected survey otoliths.

14). *Analyze longline survey data to check on hypothesized hook competition between sablefish and Greenland turbot.*

This was done in past assessments and reported in the paper:

Ianelli, J. N. and T. K. Wilderbuer. 1995. Greenland turbot (Reinhardtius hippoglossoides) Stock Assessment and Management in the Eastern Bering Sea. P. 407-442. Proceedings of the Int. Symposium on N. Pacific Flatfish: Alaska Sea Grant College Program Report No. 95-04, University of Alaska Fairbanks.

15). *Report variances of stock size estimates developed from stock synthesis modeling.*

Utilization of the AD Model for future stock assessments will provide variances for output variables such as stock size estimates by using Baysian or bootstrap methods .

Copies of Comments Submitted to NMFS, Alaska Region on Proposed Sea Lion Protective Measures

ALEUTIANS EAST BOROUGH

SERVING THE COMMUNITIES OF
■KING COVE ■SAND POINT ■AKUTAN ■COLD BAY ■FALSE PASS ■NELSON LAGOON

October 30, 1998

James W. Balsiger
Acting Regional Administrator
Alaska Regional Office, NMFS
P.O. Box 21668
Juneau, AK 99802

Re: GOA/BSAI pollock management measures related to Steller sea lions

Dear Dr. Balsiger:

On behalf of the residents of the Aleutians East Borough, I have the following comments on the current state of the agency's approach to Steller sea lion recovery and proposed measures to reconstruct the pollock trawl fisheries in the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands (BSAI).

Vessels in the local Sand Point and King Cove fleets participate in the pollock fisheries in the Gulf of Alaska, primarily in Areas 610 and 620, and to some extent in the BSAI pollock fishery. These vessels are all under 125' and the vast majority of them are under 60'. These vessels are multipurpose vessels that rely on being able to participate in a wide variety of fisheries. Pollock has become increasingly important in the last decade.

Local residents throughout the borough have long been interested in the health of the fish, bird and marine mammal populations within the region. They participated fully in the reauthorization of the Marine Mammal Protection Act, and have consistently asked that the National Marine Fisheries Service take a comprehensive and systematic approach to designing fishery management measures that will enhance the viability of local Steller sea lion populations.

During 1990 the borough's salmon gillnetters participated in the NMFS marine mammal observer program. This event created a heightened awareness of the importance of protecting marine mammals, particularly Steller sea lions. Working in conjunction with Peninsula Marketing Association (PMA), the borough conducted a series of workshops within the region and created and distributed a "Don't Shoot," brochure. For the past 8 years local residents have hoped that NMFS would begin a systematic review of fishery regulations that would positively influence the Steller sea lion population.

We had hoped that NMFS would work with fishermen to develop a well thought out set of measures that could be implemented and tested. Working with Kodiak fishermen, we cosponsored the forage fish amendment which local fishermen believed would insure that important high fat fish were protected for marine mammals.

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It is, to say the least, disappointing that we are once again faced with a set of emergency rules that cannot be thoroughly reviewed.

However, we appreciate the fact that NMFS has provided a set of proposed reasonable and prudent alternatives (RPAs). It appears that the primary goals of these proposals are to spread the pollock fisheries out in time and space. We believe that these goals can be accomplished in a variety of ways.

The current proposals are going to have devastating effects on the local fleet. These vessels are much smaller than the average BSAI pollock vessels. They are unable to fish as far off shore, tow at much lower speeds, and tow much smaller nets.

Local fishermen are suggesting that the following regulations be implemented in lieu of the proposed pollock trawl closures around haulouts in areas 610 and 620:

1. Institute trip limits of 150,000 pounds/twenty four hour period. This would slow down effort dramatically allowing a much slower paced fishery that is still accessible to small vessels.

2. Limit gear size within the proposed haulout closed areas to trawls with no greater than a 400 foot rope.

3. Limit the second trimester 15% TAC allocation. The fish are much smaller at this time year, therefore more fish are being taken during this period than in the first and third trimesters.

4. Institute horsepower restrictions and vessel size limits inside and outside state waters as follows:

a) maximum of 600 hp and 68' for vessels inside state waters, and
b) maximum of 940 hp and 100' for vessels outside state waters.

Additionally, local fishermen want an industry/environmentalist work group set up to develop a systematic and deliberative process for developing and modifying RPA's. We would also like to see the Recovery Team more intimately involved in developing RPA's. It is disappointing to note that the Recovery Team will not have the time to evaluate the measures currently proposed. Since Steller sea lions will probably recover slowly, this problem will be with all of us for a long time. We don't want to face any more 'emergency' proposals. There is no emergency when everyone is aware of a problem and the problem has a long history.

It will benefit fishermen and Stellers more if the agency begins to address potential modifications to fisheries in a much more deliberative way.

Sincerely,

Beth Stewart
Director
Natural Resources Department

Lincoln County

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Telephone 541-574-6534 Fax 541-265-3887

Tom

26 October 1998

Dr. James W. Balsiger, Acting Regional Administrator
National Marine Fisheries Service - Alaska Region
P.O. Box 21668
Juneau, AK 99802

Comments on Draft Supplemental Environmental Impact Statement for Groundfish Total Allowable Catch Specifications and Prohibited Species Catch Limits for Groundfish Fisheries of the Bering Sea/Aleutian Islands and Gulf of Alaska

Dear Dr. Balsiger:

I appreciate the opportunity to comment on the draft supplemental environmental impact statement (DSEIS) addressing groundfish catch specifications and prohibited species catch limits for the groundfish fisheries of the Bering Sea/Aleutian Islands and the Gulf of Alaska. The DSEIS represents a substantial investment of effort and energy by your staff, and is a significant compilation of fishery-related, biological and environmental information for the areas addressed.

My principal concern and motivation in offering these comments is that the document - despite its impressive bulk - is conceptually very narrow and limited. The alternatives considered address only the volume of groundfish catch: management measures other than volume of groundfish catch were not analyzed as alternatives as this could happen only through formal regulatory mechanisms (Section 2.5, p. 12). However, the stated purpose of the document (Section 1.2, page 2) cites evolution in fisheries, changes in marine mammal, marine bird and marine fish abundance, while assuming an unchanged regulatory environment. This limitation to the scope of the analysis represents a significant conceptual problem to evaluating the environmental pros and cons of future management decisions of groundfish fisheries under federal jurisdiction off of Alaska. The exclusion of management measures other than volume of groundfish harvest on the basis of requiring other formal regulatory mechanisms is puzzling and inappropriate because the establishment of optimal yield (OY) levels themselves result from formal council action; in this case they are simply frameworked to allow year to year adjustments. Impacts to the physical and biological environment from fishing activities may be as much due to when and where those activities take place, in addition to or instead of simply how much is harvested.

Aside from the limited scope of the analyses, it would be valuable for the document to place greater emphasis on natural variation in the Bering Sea/Aleutian Islands and Gulf of Alaska ecosystems, and to evaluate whether or not fishing activities are similar or distinct to natural disturbance regimes on the basis of frequency (time), intensity, magnitude (spatial distribution) and duration. The document makes some reference to natural regime shifts (Section 3.2, pp. 42 - 44), and variation in sea ice extent (Sec. 3.1.5.4, Fig. 3.5, p. 43). However, the broader discussion of the physical environment in the areas under consideration would be strengthened by discussion of natural variability as a context in which to evaluate the impacts of fishing activities.

There is increasing understanding that fishing activities impose direct disturbance to ecological communities and processes. One would expect that the biota and physical components of these communities to be resilient to those disturbances (or elements of natural variability) which occur naturally -- with reference to the four parameters of consideration mentioned above. One would also expect, for purposes of generating testable hypotheses, that fishing activities which are quantitatively and qualitatively 'similar' to natural disturbances would be less likely to result in detrimental impacts to the ecological system than fishing activities which are qualitatively and qualitatively dissimilar to natural disturbances.

Consideration of natural variability is particularly important given the limited scope of the alternatives analyzed. One particular alternative may be deemed acceptable under one set of environmental conditions, yet may be deemed unacceptable under a naturally occurring alternative set of conditions.

In conclusion, the DSEIS represents a significant effort on the part of your staff, and the compilation of a great deal of information on the Bering Sea and Gulf of Alaska ecosystems. However, the scope of the discussion is unnecessarily narrow, and therefore the ability of the document to help the public truly understand the effects of fishery management practices is itself compromised.

Thank you for the opportunity to offer comments.

Sincerely,

Hal Weeks

Hal Weeks, Ph.D.
Marine Fisheries Specialist

Alaska Groundfish Data Bank
P.O. Box 2298 • Kodiak, Alaska 99615

TO: TIM REGAN
NMFS JUNEAU
CC: LOWELL FRITZ - AFSC

RE: COMMENTS ON PROPOSED
SEA LION PROTECTIVE MEASURES

DATE: OCTOBER 29, 1998

SENT BY FAX: 4 PP

COMMENTS ON PROPOSED SECTION 7 SEA LION PROTECTIVE MEASURES FOR 1999-2002

SUBMITTED BY ALASKA GROUNDFISH DATA BANK

On behalf of the members of Alaska Groundfish Data Bank the following comments on the proposed 1999-2002 Sea Lion Protective Measures.

The following comments address the following issues and our suggested solutions:

1. AGDB's dissatisfaction with the process, now and historically.
2. The use of the years 1960 thru 1998 for the selection of trawl exclusion zones
3. Lack of seasonal closures for rookeries and haul-outs only used by sea lions seasonally.
4. Request to open the Central Gulf B-Season in June instead of July to prevent excessive salmon bycatch and conflicts with other fisheries.
5. Application of trawl exclusion zones to all trawl fisheries.

ISSUE 1: PROCESS

We wish to convey our dismay and dissatisfaction with the process that has been used since Steller Sea Lions were listed.. We feel it is important at this point to list the reasons for our dissatisfaction in hopes that the future may be better, regarding process than it has been to date. We do want to make it clear that we have no criticism of any individual and wish to thank NMFS and the Marine Mammal Lab for the help and courtesy they have shown the industry.

A. NMFS refused to take action when it became obvious that Steller Sea Lions were in a serious decline despite pressure from industry to move forward before there was a lawsuit.

B. When the inevitable lawsuit was filed in 1992 or 1 (I forget which year) the listing was finally made and the mitigation measures hammered out on the East Coast by NMFS at the last minute with minimal industry consultation.

1. NMFS was told by the court to update the SEIS. NMFS failed to comply with the inevitable result that a new lawsuit has been filed to no one's surprise.
2. There was never a research plan or assessment of efficacy of the measures implemented following the first lawsuit despite the continued decline of sea lions and the change in status from threatened to endangered.

Chris Blackburn • Director • (907) 486-3033 • FAX (907) 486-3461 • e-mail 7353974@mcimail.com

3. The second and recent lawsuit has once again resulted in last minute mitigation measures and despite the money and time spent in research there is no data to justify the measures. And once again the industry is faced with trying to understand what appear to be draconian measures in an inadequately short time frame.
4. The working hypothesis to the best of our knowledge has been "it's the pollock fishery". During the nearly 30 years of sea lion declines the number and biomass of pollock has changed substantially as well as the catch in relation to the biomass and the temporal and spatial parameters of the fishery. It would seem logical, in the face of the intractable sea lion decline to have more than one hypothesis.

REQUESTED CHANGES IN PROCESS

A. The section 7 consultation process should be ongoing and involve industry. The local knowledge of people who live in the communities and spend their lives on the sea should be part of the process.

By making the section 7 consultation an ongoing process industry will have the opportunity to remain aware of the measures being considered in a timely matter, participate in the decisions, offer their knowledge and adjust their business plans accordingly. In plain English we don't want any more last minute cobbled together done deal measures forced because somebody filed a lawsuit. We want a process that reflects the seriousness of the sea lion decline and the seriousness of the impact on our industry, communities and families.

B. As part of the current section 7 consultation process we request that there be a written research plan which contains at least the following:
1. More than one hypothesis.
2. Expected results of the sea lion protection measures under each hypothesis.
3. Time needed to see expected results under each hypothesis.
4. Results that would indicate a hypothesis was wrong.
5. Things industry could do to provide additional information and data.

ISSUE 2: CRITERIA FOR SELECTION OF TRAWL EXCLUSION ZONES

It is our understanding that the trawl exclusion zones proposed for the current section 7 consultation are all rookeries and haul outs at which 200 sea lions were ever counted during the time period 1960-1998.

Including rookeries and haul outs which have had little or no sea lions for over a decade or more makes no sense. It does not seem likely that there will be some sudden increase in sea lions or sudden move by sea lions from the sites most used now to a whole different set of sites which have been long abandoned.

Certainly there would be time to make changes if there is some unexpected increase in sea lions or change in the preferred haul outs and/or rookeries.

REQUESTED CHANGE IN CRITERIA FOR SELECTION OF TRAWL EXCLUSION ZONES

AGDB requests that the trawl exclusion zones be based on rookeries and haul outs where 200 sea lions have been counted at any time between 1990 and 1998. This criteria should include the important rookeries and haul outs plus some which have been abandoned.

We assume the 200 sea lion criteria is reasonable. AGDB noted during its review of the historic counts that 200 seemed to be a breaking point between well used sites and sites with very few animals.

ISSUE 3: SEASONALITY (OR LACK OF) FOR TRAWL EXCLUSION ZONES

The proposed section 7 consultation designates all trawl exclusion zones as in effect year round.

For years marine mammal biologists have talked about designating seasonal trawl exclusion zones for those rookeries and haul outs which are only used seasonally. The trawl exclusion provisions would apply during the time period the sites are in use. This seems a logical measure and we are surprised, particularly in view of the devastating effect on the fisheries that seasonal trawl exclusion zones are not part of the proposed measure.

REQUESTED CHANGE IN SEASONALITY OF TRAWL EXCLUSION ZONES

AGDB requests that trawl exclusion zones for rookery and haul out sites used seasonally by Steller Sea Lions be open for fishery during the part of the year when the sites are not being used.

ISSUE 4: JULY POLLOCK FISHERY

The Section 7 consultation sets three pollock openings for the Gulf of Alaska and Bering Sea. The date of the 2nd or B-season opening is set for July 1 in both the Bering Sea and Gulf of Alaska. A July pollock opening in the Gulf of Alaska is a serious problem. In years past when the Gulf pollock openings were quarterly, tens of thousands of chum and chinook salmon were taken as bycatch. Protection of salmon moving through the Gulf of Alaska was a major consideration in allowing the Gulf to have trimester rather than quarterly pollock fisheries.

Further, the June opening is in the last month of second quarter and occurs after all non-pelagic trawling is closed, forcing the fishery to be a pelagic fishery to the benefit of the community. Rockfish also opens in the Gulf July 1 and the salmon fisheries are in full process. In short, a July opening doesn't work in Kodiak and Chirikof.

AGDB is pleased with the suggested apportionment of pollock quota among the three seasonal openings. Three seasonal openings work for Kodiak where there is a resident work force, but will be expensive and perhaps prohibitive for processors which must fly in their work forces.

REQUESTED CHANGE IN B-SEASON OPENING IN THE CENTRAL GULF OF ALASKA FROM JULY TO JUNE

As explained above a July pollock opening in the Central Gulf would result in excess chinook and chum salmon bycatch, compete with salmon for processing and exclude shorebased from the rocksole fishery which occurs in July to avoid halibut bycatch.

AGDB suggests that the Central Gulf pollock B-season open June 1 and a regulation added prohibiting vessels fishing the Central Gulf June opening from fishing any other B-Season pollock fishery and prohibit vessels fishing other B-Season pollock fisheries from fishing the Central Gulf B-Season pollock fishery.

ISSUE 5: APPLICATION OF TRAWL EXCLUSION ZONES TO ALL FISHERIES

The proposed trawl exclusion zones apply to all trawl fisheries. AGDB realizes that closing the zones to all trawling is the status quo. We whined, but we did not object, to this provision previously. If the amount of areas closed to trawling by the current proposed provision is not reduced by using the last 8 to 10 years of sea lion counts to designate trawl exclusion zones, the application of year round closures of the trawl exclusion zones precludes many other fisheries and/or forces the fleet to fish in areas of high PSC species bycatch.

REQUESTED CHANGE IN SELECTION OF TRAWL EXCLUSION ZONES OR APPLICATION OF TRAWL EXCLUSION ZONES TO ALL TRAWL FISHERIES.

AGDB request that either the trawl exclusion zones be based on the last 8 to 10 years of sea lion counts or that the trawl fleet be allowed to fish within the newly proposed trawl exclusion zones when pollock fisheries are closed.

COMMENTS ON THE EFFECT OF THE PROPOSED SECTION 7 CONSULTATION FOR THE KODIAK REPORTING AREA

The Marine Mammal Lab in the Alaska Fisheries Science Center has kindly provided AGDB with their analysis of the amount of catch taken in the proposed trawl exclusion zones.

The data for the Gulf of Alaska is Gulf wide rather than by reporting area. Since there are four pollock reporting areas, each with its own quota and each fished by different fleets the actual impact of the trawl exclusion zones cannot be adequately assessed.

However, the maps provided indicate that the Kodiak pollock fishing areas have been reduced to the point that intense effort will occur in the few small areas remaining.

The rocksole fishery also appears to be impacted. Rocksole is fished mostly in Kodiak and Chirikof. The data provided indicates that 44% of the rocksole fishery occurs in the proposed trawl exclusion zones. The shorebased fishery occurs mainly in the Kodiak area and the fishermen who participate in this fishery say all their grounds will be unavailable if the proposed trawl exclusion zones are implemented.

We thank you for the opportunity to submit our comments, concerns and suggestions.

Chris Blackburn, Director
Alaska Groundfish Data Bank

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October 30, 1998

Jim Balsiger
Acting Regional Director
NOAA/NMFS
Post Office Box 21109
Juneau, Alaska 99802

Dear Jim:

The National Marine Fisheries Service has published draft Reasonable and Prudent Alternatives for the groundfish fisheries off Alaska. Trident Seafoods operates shorebased pollock and cod processing facilities at Akutan and Sand Point. We rely upon the groundfish fishery in both the Bering Sea and Gulf of Alaska. The purpose of this letter is to explain the impacts of the draft RPAs on the seafood industry and to suggest alternative RPAs which would mitigate any impacts of cod and pollock fishing on Steller sea lion populations.

Spatial TAC Distribution.

1. NMFS Draft PRA. The Bering Sea RPAs propose that only 50% of the catch come from the CVOA during the roe season.

2. Impacts of NMFS Draft RPA. Catcher vessels within the Inshore Sector cannot effectively harvest pollock outside the CVOA and bring the product back to Alaskan based shoreplants for processing. The proposal would exclude the inshore industry from harvesting pollock during the roe season when 50% of the roe quota was taken.

3. Proposed Alternative. We strongly recommend that this restriction be eliminated from the package of RPAs. Any necessity to reduce the amount of Bering Sea pollock harvested in critical habitat areas of the CVOA should be taken into consideration in the setting of the pollock roe season quota.

Trawl Exclusion Zones.

1. NMFS Draft PRA. The draft RPA for the Bering Sea would include a 20 nautical mile no trawl zones around sites where 200 or more sea

lions have ever been counted and 10 or 20 nautical mile no trawl zones around those sites in the Gulf of Alaska.

2. Impacts of NMFS Draft RPA. This proposal will eliminate almost all of the trawl cod grounds in the Bering Sea and Gulf of Alaska. The pollock fishery will be similarly impacted, especially in the Western Gulf of Alaska where the small local fleet will be excluded from grounds such as Mitrofania, Sanak and the Shumanagin Islands—areas which are essential for the harvesting of pollock and cod.

The pollock and cod fisheries are critically important to local Alaska fishermen from the Western Alaska region. These fishermen have spent the money necessary to outfit their limit seine vessels to trawl for groundfish because of the severe downturn in the salmon fisheries in the region. Local fishermen and the communities they reside are dependent upon pollock and cod for their livelihoods.

3. Proposed Alternative. There is evidence that Steller sea lions to do feed extensively below 50 meters. Many of the proposed closure areas would extend several hundred fathoms in depth. We would propose that a no trawl zone be established in the near-shore critical habitat areas where the depth is 50 meters or less, while leaving the existing rookery closure areas in place.

It is our understanding that some agency personnel believe that sea lions feed at greater depths than the studies would indicate. For this reason, there may be an unfortunate reluctance within NMFS to support the closer of critical habitat only to 50 meters in depth. If it is essential to NMFS that no trawl zones be created around sites with 200 or more sea lions, we would propose that no more than 50% of any season's pollock TAC be harvested from within the new zones and that trawl cod harvesting be permitted in these zones. This proposal would limit the amount of pollock harvested within these newly created areas.

Temporal TAC Distribution.

1. NMFS Draft RPA. The draft RPAs divides the pollock quota into three separate seasons; starting on January 20, July 1 and September 1. It reduces the roe season quota from 45% to 35% of the pollock TAC. 15% of the quota is allocated to the July fishery and the remaining 50% to the September season.

2. Impacts of NMFS Draft RPA. I cannot overemphasize the fishery conservation and economic problems that would result from a July 1 opening. During July, the pollock are in a post spawn condition. Their body weight is low and the quality of the flesh is poor. Because the harvest quota is based on volume, instead of number of fish, harvesting pollock during this time of year would result in more pollock being

removed from the biomass. This would reduce the pollock available for Steller sea lions. Moreover, their are significant herring and salmon bycatch problems that would result from fishing in July. If "fattier" fish such as herring are important to the Steller sea lion diet, taking pollock during times of high herring and salmon bycatch would be harmful to sea lions.

Because the flesh of the pollock during the summer is in poor condition, they produce lower valued products with poorer recovery to finished product. In August and September, Trident's Akutan shoreplant can consistently achieve 25% recovery to primary product on pollock. We anticipate that during July recovery rates would be as low as 18%. In addition, we anticipate that July fishery would be harvested in 15 days. For Trident to operate our Akutan plant for that period of time would require us to fly over 400 employees into Akutan. Our fishing fleet would have to fly another 100 crew members. To start our plant for this short fishery would cost nearly a million dollars in airfare alone!

In the Gulf of Alaska, a July pollock opening would conflict with the ongoing salmon fishery, precluding the local salmon fleet from gearing up for the pollock fishery.

3. Proposed Alternative. The intent of the starting the fishery in July is to spread-out harvesting of pollock; however, a summer pollock fishery will not benefit Steller sea lions. It will only increase the number of pollock and herring which will be removed.

The pollock fishery will be more spread-out during 1999 than at any time since the late 1980s. The recently passed American Fisheries Act removed nine factory trawlers from the industry and allocated more pollock to the slower paced CDQ and Inshore pollock fisheries. This new law alone will substantially slow the pace of the harvest. Therefore, we proposed that in the Bering Sea, the pollock fishery continue to be harvested in two seasons. To assure that the fishery is temporally spaced through longer periods of the year, we suggest the opening date for the second season be August 1, and that the opportunity exist to fish beyond October 31. For the Gulf of Alaska, we propose to maintain the existing trimester system and the current June 1 opening.

Sincerely,

Joseph T. Plesha
General Counsel

cc: Tim Ragen

Bering Sea Coalition

22541 Deer Park Drive
Chugiak, Alaska 99567

COMMENTS REGARDING FISHERIES AND STELLER SEALIONS SUBMITTED TO THE NATIONAL MARINE FISHERIES SERVICE BY LARRY MERCULIEFF, COORDINATOR October 28, 1998

Bering Sea Ecosystem Trends

The Indigenous peoples along the coast of the Bering Sea have depended on the health of the Bering Sea ecosystem and all the seabirds, fish, and marine mammals which live or migrate through the Bering Sea for nearly ten thousand years. The Bering Sea provides the foundation for all coastal cultures, language, nutrition, spirituality, healing arts, and physical sustenance.

The Bering Sea ecosystem is in the process of being fundamentally restructured. In the past twenty to thirty years numerous higher trophic species have undergone sustained and precipitous decline. Steller sea lions in the Bering Sea, now declared Endangered under the Endangered Species Act, have declined between eighty and ninety percent since their peak population in the late 1960's. Northern fur seals have declined to below fifty percent of their optimum sustainable population since the late seventies and have been declared depleted under the Marine Mammal Protection Act. Red-legged and black legged kittiwakes on St. George and St. Paul in the Pribilofs have declined 60 percent and 80 percent respectively over the past twenty years. The IUCN has placed the red-legged kittiwake on their "Red list" as endangered. (It should be noted that 80 percent of the red-legged kittwake kittiwakes in the world breed in the Pribilofs). Harbor seals around the Pribilofs and other locations in the Bering Sea are known to have declined at least 70 percent. Red faced commorants, steller/spectacled/king/common eiders are plummeting in populations. Steller and spectacled eiders have already been listed under the Endangered Species Act. It is likely that horned and tufted puffins are also declining, although little data exists on these seabirds.

Ecosystem wide, Alaska Natives from Gambell and Savoonga are reporting that walruses are appearing with lesions and appear emaciated. In 1997, hunters from Pt. Barrow, Nome, and St. Paul have observed king and common eider ducks literally dropping from the sky-dying. In 1997, the U.S. Fish and Wildlife Service reported that murres and other seabirds were washing ashore dead at a rate of a thousand birds per mile of beach in the

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Bering Sea. Aleuts from False Pass noted over 300 sea lions gathered in the bay across from their village in 1995 and it is unusual. Likewise, average size sea lion pods at sea have increased according to sea lion hunter observations. In the Pribilofs it was not unusual to see sea lions traveling in pods averaging 10 to 15 animals on a regular basis. Today hunters are observing pods as large as 60 animals and on a less frequent basis than what was observed in the 1970's and early 1980's. It is possible that sea lions are congregating in these numbers because their normal food sources (normally spread throughout the Bering Sea) are now unavailable except in a limited number of locations; or, they have shifted their diets to prey that concentrate in limited locations.
Elders from the Pribilofs are noting a distinct change in the taste and color of fur seals-they are more orange and taste "fishy", possibly indicating a shift in their diet to salmon. Elders also report that the taste of murre eggs is also changing. Orcas are now known to be eating sea otters because their prey-harbor seals, fur seals, and sea lions, have declined so drastically. On the Russian side of the Bering Sea, observers have noted similar instances of marine mammals and seabirds washing ashore dead in the Commander Islands. Jelly fish are dramatically increasing in numbers, perhaps filling the niches created by the higher trophic specie declines in the Bering Sea.

One can only say, given available scientific evidence, that it is coincidental that many of the higher trophic species in a state of severe and sustained decline are in the pollock food web. At least 60 percent of the sea lion diet has been known to be pollock; 58 percent of the fur seal diet, and equal percentages (if not more) for murres and kittiwakes in the Bering Sea. We do know that the likely cause for the declines is food stress. We do not know what links this fishery has to the declines. It is possible that the trawl fisheries caused the collapse of herring, sandlance, and other similar prey of these declining species directly or indirectly through bycatch, discard, and/or destruction of benthic habitat, combined with natural phenomena.

Scientists are unable to determine if there is a correlation between all the declines and anomalies in the Bering Sea. Likewise, after 20 years of research on these declines, researchers do not know the direct causes for the declines but speculate that food stress is a probable cause. Whether or not any determinations are made, these ecosystem wide declines signal a fundamental change in the health of the Bering Sea ecosystem which threatens the viabilility of all cultures and economies of coastal communities.

These Bering Sea ecosystem wide trends indicate that decline of higher trophic species will likely continue to the point that many more species will become candidates for the Endangered Species list in the foreseeable future.

Steller Sea lions

Steller sea lions have decreased in population by 80 to 90 percent since the late 1960's. The sea lion recovery team, formed after the sea lions's listing as Threatened under the ESA in 1990, developed and implemented "no trawl zones" around the sea lion haul out and breeding rookeries. The Bering Sea Coalition believed that this effort, although well intended, would do little to arrest the alarming decline of sea lions in the Bering Sea.

Given the trends since this strategy to protect sea lions was adopted, it appears that the prognosis of the Coalition was correct-the declines continue unabated to this day.

The reason the Coalition believed that the sea lion recovery team strategies would not work is that it protected sea lion rookeries under an implicit assumption that sea lions had site and area fidelity throughout the year, and the protective strategies only affect the U.S. side of the Bering Sea. It has been known that sea lions are probably declining in the non-breeding late fall, winter, early spring seasons. These are seasons where site and area fidelity have not been demonstrated. In fact, Alaska Natives believe that sea lions, being very strong swimmers, go to where the food is located, regardless of distance. The location and availability of sea lion prey changes in any given year, by season, and according to climatic and biologic conditions. In other words, there is little site fidelity unless the biologic and climatic conditions warrant. It is reasonable to assume that there is general site fidelity in that sea lions will haul out near where the food is located, (although sea lions are known to Alaska Native hunters to prefer staying at sea during cold weather times and will limit their time on land unless they are exhausted or sick). Also, it is reasonable to speculate that sea lions, like fur seals, migrate into Russian waters in any given year. At least 20 percent of the Pribilof fur seal population are known to migrate into Russian waters in any given year. Sea lions are much stronger swimmers than fur seals and are just as likely to migrate into Russian waters. Given that pollock and other fish are being exploited in huge quantities by trawlers from several countries along the Russian side of the Bering Sea, it is likely that food sources for migrating sea lions are adversely affected.

RECOMMENDATIONS and COMMENTS ON LATEST PROPOSED ACTIONS BY NMFS TO PROTECT SEA LIONS

NMFS has conducted workshops on possible courses of action with regard to protection of sea lions in the context of fishery interactions. These recommendations include possible designation of wider no trawl zones around sea lion breeding rookeries and haulouts, and improved temporal/spatial management of trawl fisheries in the Bering Sea. The NMFS recommended spatial allocation of pollock trawl fisheries concentrate the bulk of the TAC in the late fall, winter, early spring seasons, and only three different time periods. We believe that the strategies recommended by NMFS are modest, at best, in light of the serious state of sea lion populations.

We recommend the following actions and policy findings with regard to protection of steller sea lions from Kenai to Kiska:

- The serious plight of sea lions demands the maximum precautionary measures to manage anthropogenic activities which potentially may be adverse to sea lion populations.
- Proactive management protective strategies must be made even given the uncertainty of probable causes. Scientific recommendations must not be held to the impossible standard that causes for sea lion declines must be proven definitively before any

management action is taken. History is replete with examples of various wildlife population crashes where such definitive proof was required. Uncertainty with regard to the causes for sea lion declines may take decades to resolve. Given the dramatic changes and regime shifts in the Bering Sea, and the huge number of possible variables that may affect sea lion reproduction and survival, it is unlikely that major causes for declines will be determined in the next decade.

- A finding of "jeopardy" for sea lions is warranted at this time. Given NMFS' own computer model projections (five years ago) of the probable fate of steller sea lions at the present rate of decline within twenty years indicate that sea lions are headed to extinction, all things being equal. Many factors must be considered in light of the present population numbers and trends, including:

1. The facts that prey are low in numbers and probably dispersed to ever changing locations due to sea temperature changes. Young sea lions may likely depend on the older sea lions to locate prey. If this is the case, then the substantially diminished number of older sea lions at a time when prey abundance may be low, and prey dispersed in new locations in response to sea temperature changes, may result in significantly lower foraging success. Such a situation, if correct, will translate into lower reproduction and increased at-sea mortality.
2. Decreased sea lion populations in the magnitude of 80 to 90 percent (and continuing) translates into A substantially diminished gene pool. It is widely acknowledged that the breadth of a gene pool is a significant factor in adapting to new environmental parameters, viruses, and diseases. It is reasonable to assume that the lowered sea lion gene pool will exacerbate sea lion population declines over time.
3. Decreased numbers of sea lions may result in a lessened ability to protect against predators such as Orcas. Sea lions, like all other species, warn others of their specie of the presence of danger. It is logical to assume that the less number of sea lions in any given locale will result in a diminished area covered by sea lions for purposes of their "warning system", thus likely to result in greater mortality from predators.
4. All indications are that the Bering Sea ecosystem is undergoing a fundamental restructuring which is adverse to all currently declining higher trophic species. It is likely that climatic conditions and sea temperature changes, combined with heavy fishing and resultant changes to the benthic system (on both sides of the Bering Sea) are the underlying causes for this restructuring. Despite widely acknowledged opinions that the Bering Sea ecosystem is undergoing dramatic changes, fishing activities and quotas have not been substantially modified in the past twenty years- in fact they have been increasing on the Russian side while the U.S. maintained relative status quo.

All of the above factors indicate a poor prognosis for arresting the decline of the steller sea lion and thus the declines are likely to continue. Given this, a "jeopardy" finding is justified.

- Temporal and spatial fishery allocations is necessary immediately, because of uncertainty. The NMFS recommendation that there be three trawl fishing areas is good; however, it is inadequate to fully protect sea lions throughout its range in terms of foraging success. TAC should be spread equally in four seasons instead of concentrated in two, and the time required to fish extended with a reciprocal requirement that fishing effort be spread evenly throughout the season. It is logical to assume, given the high cost of operating factory trawlers on a daily basis, that trawlers will to take their catch in the shortest available time, thus still concentrating their efforts in the shortest legally available time. In addition, no fishing must be allowed in locations where animals are feeding during their breeding seasons.

- TAC for pollock must be reduced significantly. Whether or not there is any demonstrated direct or indirect link between declines of pollock feeders, pollock availability, and pollock fishing, the uncertainty requires precautionary approaches in favor of the sea lion since they are in the pollock food web and a major portion of their diet is acknowledged to be pollock.

- Even though sea lion declines may have "apparently stabilized" in trawl fishing zones, NMFS must still maintain no trawl zones around such areas. If the cause for sea lion declines is food, and if the food sources were either over-fished in these locations, or the sea bottom damaged to the point that it harmed benthic organisms with links to the sea lion food web, the trawl exclusion zones may play a significant role in restoring the habitat and/or food supplies over time. If there was time to scientifically prove or disprove any of these likely scenarios it would be reasonable for NMFS to recommend this; however, as previously stated, such research would take time which is not available given NMFS' own projections of sea lion decline trends.

In addition, scientists must exercise caution in assessing apparent stabilization in population trends or declines. It is reasonable to assume that any food stressed specie population will stabilize when the specie achieves parity with available food supplies; however, such a stabilization would be temporary if food supplies continue to decline and/or new environmental conditions adverse to the already weakened population appear.

- Sea lion managers must not stop conservation and restoration measures for sea lions, assuming a positive reproductive trend, until the positive reproductive trend peaks out and will clearly not increase with any further measures to manage human activities. Sea lions are a major subsistence specie, involving communities throughout the Bering Sea. Many of the cultural practices, ways of knowing, and stewardship ethics and values are defined by the taking of sea lions. To the extent that sea lions are no longer hunted, or the extent that such hunting is materially diminished, is the extent that these cultural ways will be adversely affected. The federal government has a fiduciary duty to protect the subsistence uses of sea lions and a statutory responsibility to maintain the health of the sea lion stocks.

- Efforts must be made immediately to develop reciprocal fishery conservation measures on the Russian side of the Bering Sea through bilateral agreements. The IUCN, early this year, passed a resolution asking that the presidents of Russia and the U.S. initiate such efforts.

- Sea lion managers are obligated to follow the mandates of the Marine Mammal Protection Act as amended in 1994. The MMPA requires use of an ecosystem approach to management and for research to be conducted in the Bering Sea to the maximum extent practicable.

- NMFS managers and policy-makers must support the development of the capacity of coastal communities to develop a formalized information and observation exchange network. Coastal residents can provide complementary and supplementary information which can flag anomalies on a year around basis that may help sea lion researchers.

Thank you for this opportunity to comment.

AMERICAN SEAFOODS · PRIDE OF THE SEA ·

American Seafoods Company
2025 First Ave., Suite 900
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October 29th, 1998

James W. Balsiger
Acting Regional Administrator, Alaska Regional Office
National Marine Fisheries Service
P.O. Box 21668
Juneau, Ak. 99802

Re: Endangered Species Act Section 7 Consultation Regarding Steller Sea Lions and 1999 Pollock Management Measures

Dear Dr. Balsiger:

We are writing to express our concerns about thé process, preliminary findings, and the potential impacts to the Bering Sea/Aleutian Islands pollock fishery due to the recent Section 7 consultation regarding Steller sea lions. We request that this letter be included as part of the administrative record for this issue.

Based on the recent public scoping meetings held in Seattle and Anchorage, it appears that NMFS is considering a jeopardy opinion regarding the effect of the pollock fishery on the Stellar sea lion population. We are concerned that this opinion does not take into consideration the best scientific and commercial data available. Conspicuous by their absence in the October 22 draft biological opinion are references to data regarding the following relevant issues:

1. The pollock fishery targets pollock larger than the size preferred by sea lions. Harvest of small pollock by the fishery is insignificant.

2. The pollock fishery trawls at depths greater than the shallow depths at which sea lions dive and forage.

3. Removing larger pollock reduces the possibility of cannibalism of younger, smaller pollock preferred by sea lions.

4. Lack of evidence to suggest that localized fishing efforts have resulted in negative impacts on the sea lion population.

5. Inadequate consideration of recent research that indicates diversity of diet is the most important factor in the sea lion's diet, not availability of pollock.

6. The importance in the sea lion diet of fatty fishes such as herring, capelin, and other forage fishes. Ongoing herring fisheries that take place within sea lion critical habitat are not being considered.

7. The problem of pollock in the sea lion diet. Low energy content and indigestibility result in a net loss in sea lion weight when pollock is the predominant food source.

8. The effect on the size of herring biomass due to competition with pollock in the ecosystem.

9. Lack of information on the scope and impact of Steller sea lion removals through subsistence hunting.

10. Effect of killer whale predation on sea lions.

11. No consideration of the temporal impacts S. 1221 will have on Bering Sea pollock fishery. Allocating more pollock quota to the onshore sector and to CDQs will result in significantly spreading out effort over time and area.

Given that the draft RPAs are not likely to improve Steller sea lion conditions NMFS should be considering alternative measures that could be more effective. Should a jeopardy finding be reached we agree with the alternative RPAs that have been proposed by the pollock industry, such as:

1. **Time**-Stagger start dates of pollock A and B seasons. A third season in July should not be considered because it could result in increased bycatch, lower resource utilization, and poorer product quality. The American Fisheries Act will result in even longer seasons, and a pollock cooperative will spread out effort still further over time.

2. **Area**-No trawl zones should be restricted to areas that sea lions and small pollock are found, within 50 meter depths near critical habitat. Rookery closure areas should be closed to all gear types, not just trawl. Designated haulout areas should be based on recent data, not prior to 1980. Closed areas should be paired with control areas to test the effectiveness of this management measure.

3. **Other Fisheries**-Restrict other commercial fisheries, particularly forage fishes known to be important to the diet of sea lions, such as herring, capelin, and other fatty fishes.

4. **Research**-Develop additional, industry-funded research efforts on the distribution of pollock biomass during the A season.

Thank you for your attention to this issue.

Best Regards,

Jan Jacobs
Director of Government Affairs
American Seafoods Company

GROUNDFISH FORUM, INC.

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Dr. James Balsiger
Acting Regional Administrator
NMFS – F/AKR
P.O. Box 21668
Juneau, AK 99802

October 27, 1998

RE: Proposed additional rookery closures applying to non-pollock fisheries

At last Friday's pollock fishery/Steller sea lion workshop, I raised the question of whether the proposed additional rookery and haul out closure areas were slated to apply to trawling for pollock or all trawling. I was disappointed to learn that all trawl fisheries were targeted. For the flatfish and cod fisheries in the Gulf of Alaska and Bering Sea, we see no potential benefit to such a regulation in terms of protection to sea lions because there is absolutely no evidence that the flatfish or cod fishing in those areas is in any way responsible for potential localized depletion of forage for Steller sea lions. At the same time, crab and halibut bycatch reduction improvements that the industry has undertaken will be jeopardized by this measure. We have pushed hard to get the fleet to work together to rapidly identify bycatch hotspot areas and move out of them. For our bycatch reduction efforts to continue to be successful, however, we must be able to fish in clean fishing areas. Some of the areas slated for closure are the cleanest fishing areas currently available to us, others offer seasonal windows of clean fishing. The bottom line is that being closed out of them makes no sense to us.

If the purpose for including non-pollock fisheries in these Bering Sea and Gulf of Alaska closures is ease of enforcement, we would hasten to point out that our current system of fisheries management results in numerous areas being closed to targeting of some species with trawl gear while being open to targeting of other species with the same type of gear. Generic closures of trawl fisheries for the singular purpose of "easy" enforcement is costly to the industry and often results in increased bycatch of groundfish and prohibited species.

Turning to the subject of the additional proposed rookery closures in the Aleutians being applied to the Atka mackerel fishery, we feel this will counter the intended purpose of the management actions approved by the Council at its June, 1998 meeting. Additional limitations in areas where the fleet can fish will intensify fishing efforts in areas still open for fishing, increasing potential for localized depletion. In its presentations to the Council during the development of the Atka mackerel measures approved in June, NMFS specifically encouraged an expansion of the area fished for Atka mackerel both inside and outside of critical habitat. Groundfish Forum has since worked to develop an industry initiative to spread fishing out in both areas. We hope to implement these voluntary measures to help divide vessels among fishing areas in 1999 as further insurance against localized depletion. We think the proposal for additional rookery/haul out closures could substantially limit our ability to reduce potential for localized depletion.

One final reason for not including Atka mackerel in the additional rookery closures is that Groundfish Forum members came to the table in good faith to engage in a process to develop measures to reduce localized depletion for their fishery. They were told by NMFS to put everything they could on the table to address the localized depletion issue or they might not have a fishery the next year. They thought that once that process was concluded at the June Council meeting, they would be able to attempt to salvage a fishery out of what remained of an opportunity to fish for mackerel. Now it appears that NMFS was holding back additional restrictions for the mackerel fishery for later consideration. Taking account of all the impact on the mackerel fishery, the Council might not have restricted the fishery so severely had it known that additional restrictions on fishing areas were to be added later on. In addition to the localized depletion reason for not including Atka mackerel in this proposal, we would like NMFS to consider the "credibility of the process" reasons for not bringing this proposal forward at this time.

Sincerely,

John R. Gauvin

CC: Rick Lauber, Chairman, NPFMC; Chris Gates, Adak Reuse Corporation; Senator Stevens; Senator Gorton; Senator Murray; Congressman Young; Alaska Representative Austerman;

Western Alaska Fisheries Development Association

Coastal Villages Region Fund • Yukon Delta Fisheries Development Association • Central Bering Sea Fishermen's Association • Norton Sound Economic Development Corporation • Bristol Bay Economic Development Corp.

October 30, 1998

Mr. Jim Balsiger
Acting Regional Director
Alaska Regional Office
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802

Dear Mr. Balsiger,

On behalf of the Western Alaska Fisheries Development Association (WAFDA), I wish to express our concern regarding the health of the Steller sea lion population in the Bering Sea. Our members have a close and dependent relationship with the Steller sea lion both as subsistence users and as residents of the Bering Sea ecosystem. In addition, we are also participants in the Bering Sea pollock fishery.

While scientific evidence strongly points to nutritional deficiency as the cause of reduced populations, there is at best a weak relationship between pollock fishing and nutritional deficiency in Steller sea lions. We recognize that there are a number of factors that may be contributing to the decline in sea lion populations, but we are concerned that NMFS is responding to the problem with a "just do something" approach rather than determining the cause of the reduced populations through directed research.

This issue has been apparent for several years and WAFDA is concerned that NMFS has not done enough work to evaluate the effects of conservation measures—such as no-trawl zones—already in place. One of the key findings of the 1996 National Research Council review of the Bering Sea ecosystem was the need to apply adaptive management strategies to determine the best size for no-trawl zones (p. 255).

Finally, NMFS has not included an analysis of the effects of S. 1221 on the spatial and temporal distribution of pollock fishing effort in the development of its RPA. In our opinion, the effects of S. 1221 are numerous and substantial and include:

1) a significant reduction in the overall effort through the removal of nine factory trawlers;
2) a shift in the fishing effort as a result of a reduced factory trawl fleet from the offshore sector to the onshore sector with attendant spatial, temporal and vessel size affects;
3) an extension in the length of fishing seasons that will result from the formation of fishing co-ops in the offshore and onshore sectors;
4) and the effect of a shift of 2.5 percent of the TAC from the "co-op" fisheries to the CDQ program.

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WAFDA does not have a specific alternative to the draft RPA, but we question whether the changes to the pollock fishery need to be as significant as proposed given the facts listed and the uncertainty of outcomes. We also urge NMFS to commit to a major increase in research to determine the effectiveness in measures it does take to address the sea lion population decline and to work with Native Alaskans and the industry.

We appreciate the opportunity to comment. Please contact me if you have further questions.

Sincerely,

Mary L. McBurney
Executive Director

cc: Tim Ragen, Protected Resources Division

To National Marine Fishery Service
Juneau, Ak.

Fax 907-586-7249

attn Tim Regan

From Ruel Holmberg Sr.

As a boat owner and participant in the Gulf of Alaska bottom fishery area 610 and 620. I am deeply concerned about the ~~Greenpeace~~ proposal concerning the stellar sealion issue, and the impact it will have on our small boat fleet. If the Greenpeace proposal is put in effect It will have a devestating effect on a fleet that has the least impact and will suffer the greatest consequence not to mention the impact it will have on the Coastal Communities.

Therefore I would urge that any decision on this matter be considered with utmost regards to the economics of this situation and what impact it will have on the fleet that does the least harm to the enviroment.

We do appreciate your Consideration.

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October 28, 1998

James Balsiger
Acting Regional Administrator
National Marine Fisheries Service
P.O. Box 21688
Juneau, AK 99802

RE: ESA Section 7 Consultation
Draft Alaska Fisheries Science Center Reasonable and Prudent Alternative

Dear Mr. Balsiger:

The Alaska Marine Conservation Council submits the following ideas in response to NMFS request for comments on the Draft Reasonable and Prudent Alternative (RPA) presented at the October 26 scoping meeting in Anchorage.

First, and most importantly, the decision on whether or not the BSAI and GOA pollock fisheries jeopardize the continued existence of Steller sea lions or adversely modify SSL critical habitat is solely the responsibility of NMFS and must be based on biology alone. The process being pursued here is questionable in that the agency is soliciting public input on possible RPAs before arriving at such a decision. The result of this process is to dramatically politicize both the jeopardy decision that is solely the responsibility of NMFS and the development of possible RPAs which are also, ultimately, the responsibility of NMFS. It is unfortunate that this process increases the possibility of agency decisions being unduly influenced by economic considerations.

General Comments on the necessary elements of any RPA

The temporal, spatial, and exclusionary measures of the draft RPA are inextricably linked and, *at a minimum*, any RPA must include at least these three elements. Simply adopting two of the three elements presented in the draft would be insufficient. That said, the measures in the draft RPA do not fully represent the range of elements NMFS should consider. We suggest consideration of at least the following two elements at this time:

- pollock ABC/TAC reductions
- a prohibition on any directed fishery for Aleutian Island pollock

In addition to being incomplete, AMCC believes the specifics of the three elements detailed in the draft RPA are insufficient.

Temporal TAC distribution

Temporal allocations are needed to lessen the impacts of a major fishery on a spawning aggregation of major prey for sea lions during fall and winter months. From that perspective, the temporal TAC distributions presented in the draft RPA are inadequate. In fact, the TAC distribution for the GOA would actually increase the amount of pollock harvested in the fall and winter months over the status quo. An RPA should more appropriately include the following:

- quarterly rather than trimester allocations
- under either quarters or trimesters, more substantial reductions in the percentage of quota apportioned to fall and winter months
- long-term RPA elements should include the option of drastic reductions in A season allocation along the lines of our BSAI groundfish FMP amendment proposal submitted August 1998 (see attached)

Spatial TAC Distribution

The spatial TAC distribution aspect of the draft RPA is also unacceptable. Rather than capping pollock removals from critical habitat areas at 50% during the "A" season, the RPA should lower removals 50% from the amount currently being removed from these areas during the "A" season. For example, if 75% of pollock removals during the existing "A" season come from critical habitat areas, the RPA should reduce that amount by 50% for a total of 37.5% pollock removals from such areas.

NMFS should also give greater consideration to adopting localized harvest rates. Two variations on this theme seem appropriate for inclusion in an RPA:

- setting localized harvest rates such that they do not exceed the harvest rate established for the overall management area. For example, if the BSAI pollock harvest rate is 15% for a particular season, every individual area's harvest rate should be capped at 15%
- setting localized harvest rates based on biomass distribution. If 20% of the biomass is located in a particular area, then 20% of the total TAC could be taken from this area as long as doing so did not cause a localized harvest rate to exceed a reasonable rate

Trawl Exclusion Zones

AMCC believes the agency needs to reconsider seasonal changes in the TEZ strategy. There may be sound biological reasons for larger TEZs in specific locations during specific times of the year. We also believe whatever TEZs the agency adopts should apply to all trawl fisheries. Finally, we support the GOA pollock industry's request for more refined maps detailing exactly where the proposed 20 nm TEZs occur. These maps will provide much needed biological information on pollock removals within the 20 nm critical habitat areas.

Research Ideas

The RPA should include some mechanism for winter biomass surveys to better understand harvest rates localized in critical times and areas.

An RPA research plan should include an option for 100% observer coverage in the GOA pollock fishery and perhaps 200% observer coverage elsewhere for monitoring purposes and more complete baseline data on fishery activity in defined critical habitat areas, including that beyond 20 nm.

Again, AMCC remains concerned about the process NMFS has chosen during this Section 7 consultation. We strongly encourage the agency to produce a decision on this important conservation matter in a timely fashion.

Sincerely,

Francine Bennis
Project Coordinator

Steve Ganey
Project Coordinator

RECEIVED
AUG 1 4 1998
NPFMC

FISHERY MANAGEMENT PLAN AMENDMENT PROPOSAL
North Pacific Fishery Management Council

Please check applicable box(es):

- ☐ Bycatch Reduction
- ☑ BSAI Groundfish FMP
- ☐ GOA Groundfish FMP
- ☐ BSAI Crab FMP
- ☐ Scallop FMP
- ☐ Habitat Areas of Particular Concern (HAPC)

Date: August 13, 1998

Name of Proposer: Alaska Marine Conservation Council
Address: Box 101145, Anchorage, Alaska 99510
Telephone: 907-277-5357

Brief Statement of Proposal:

To address ecosystem and fishery-specific concerns stemming from removals in the "A" season of the Eastern Bering Sea (EBS) pollock fishery, this proposal calls for the analysis of options to restructure the Eastern Bering Sea pollock fishery to reduce fishing pressure during "A", or roe-bearing pollock season:

- **Reduce the pollock harvest in the "A" season to no more than 10, 20, 22.5, or 30% of the total quota.**

  Sub-option: Reduce the annual harvest rate during "A" season. The annual harvest rate has averaged between 17 and 23% in the last 8 years. In 1998 it is roughly 20% (quota/exploitable biomass). This sub-option would lower this rate during the "A" season to 10%. For example, the harvest quota in 1998 is 1.19 mmt of an estimated 6.1 mmt exploitable biomass. The "A" season is allocated 45% of the annual quota or 535,5000 metric tons in 1998. In this sub-option, reducing the harvest rate to 10% during the "A" season translates to a reduction in "A" season harvest from 535,500 mt to 274,000 mt ((.10 x 6.1 mmt) x .45 = 274,500 mt). The "B" season harvest would remain unchanged from the annual harvest rate.

- **Break up the "A" season in time: redistribute the fishery through temporal closures to allow for greater prey availability for marine mammals. Options include: 1) open the fishery for one week, then close for one week; 2) 10 days on/10 days off; 3) 14 days on/14 days off.**

- **Reduce the levels of pollock catches in designated sea lion winter foraging grounds. Without closing out entire 60 nm radius determined to encompass winter forage grounds, we suggest that there be a maximum tonnage of pollock allowed to be extracted from these waters. The suggested maximum for the "A" season pollock harvest in critical sea lion habitat is the percentage of total of the pollock harvest removed in 1977: 10% or roughly 100,000 mt of pollock. The remainder of the quota could still be taken from outside of sea lion winter foraging range.**

Objectives of Proposal (What is the problem?):

The Eastern Bering Sea pollock population is roughly half of what it was in the mid-1980's. During this peak recorded in recent history, the mid-1980's' high of EBS pollock coincided with abundant levels of those stocks designated as the Aleutian Basin stock, the Bogoslof area stock, and the Western Bering Sea. The precise association between these "stocks" is not well understood today. However, it is not prudent to conduct an intensive fishery concentrated on a spawning aggregation of fish whose population is in a decline and whose adjacent stocks and/or populations are in decline or have disappeared (i.e. Bogoslof, Aleutian Basin, and Western Bering Sea Sea).

10/29/98 THU 08:27 [TX/RX NO 5698]

A precautionary measure for the EBS pollock fishery is to restrict or minimize the level of intense fishing on spawning aggregations. An extensive analysis of spawner-recruit relationships concludes that the size of spawning populations influences the number of recruits produced. Most often, high spawner abundance contributes to high recruitment, and low spawner abundance is most often associated with low recruitment. (Myers and Barrowman, 1996). "The failure to recognize the need to conserve spawning biomass is a principal reason for the disastrous collapse of the formerly great cod fisheries in Eastern Canada" (Hutchings and Myers, 1994; Myers et al. 1996,1997). The words may ring ominous for a fellow gadid, pollock, as we continue to apply intense fishing pressure on its spawning biomass as the population numbers continue their decline in the 1990's.

Pollock has been found to be a major prey item of the endangered Steller sea lion, and it is also preyed upon by at least 10 other species of marine mammals, 13 species of seabirds, and 10 species of fish (Frost and Lowry 1986). The western population of Steller sea lion may be an important barometer of ecosystem change. At the present time, pollock *are* an integral part of a complex food web of the North Pacific. Nutritional stress from lack of available prey is considered a major factor in sea lion decline. Undoubtedly there are significant environmental influences playing some role in the decline of sea lions and harbor seals, along with several marine birds and fishes. We must look to ourselves to insure that human activities do not impede the recovery of various marine populations. This proposal is one way to include ecosystem considerations into the design of a fishery.

Groundfish fisheries of the North Pacific have undergone unprecedented growth in capacity and technological efficiency in the last thirty years. The Bering Sea pollock fishery has developed into the world's biggest single species fishery. Prior to 1980, very little of this fishery occurred during winter months. In the last ten years, this fishery has intensified its harvest in area and time to coincide with critical foraging habitat of sea lions during winter months when metabolic demands are at an all-time high and the proximity and access to a roe-bearing (high nutrition) prey is crucial. In the Gulf of Alaska, NMFS' recognition that pollock is important forage for sea lions in the fall and early winter resulted first in a seasonal distribution of the fishery quota, and then recently resulted in an adjustment in the percentage of the seasonal allocation.

The Catcher Vessel Operating Area (CVOA) of the Bering Sea overlaps and is juxtaposed to a large area designated as critical habitat for Steller sea lions. While it is unknown what the harvest rate during pollock A season in the CVOA is, recent analysis indicates that localized harvest rates here during the B season may be as high as 46%, and the rate of decline in area pollock may be as high as 81% in the last three years (Fritz, NPFMC, 1998). This measured level of decline in pollock abundance during the "B" season is reason for concern. It also suggests that we should look more closely at the rate of pollock removals in the concentrated area and time of the "A" season, especially as it overlaps in area and time of foraging of Steller sea lions in winter months.

Rather than debate the reasons for the initial decline of sea lions, let us look to what is contributing to or exacerbating the sustained decline and impeding recovery of the population. If prey availability is acknowledged as important to the recovery of the western population of Steller sea lion, then we must be certain that we do what we can to minimize human influence on this availability. The absolute number of prey is important in a predator's foraging success, but it is not the only factor to be considered. "The availability of pollock to these consumers depends on the size structure of pollock populations, *their areal and temporal distributions, and the area and temporal distribution of the consumers.*" (NMFS, 1998).

Need and Justification for Council Action (Why can't the problem be resolved through other channels?):

The Council is responsible for the management of the pollock fishery. Voluntary reductions in the quota or in fishing time and area are unlikely. The Council and NMFS have a responsibility to take into account the protection of marine ecosystems when establishing yields from a fishery (definition of OY) and to ensure that no federal actions impede the recovery of an endangered species.

Foreseeable Impacts of Proposal (Who wins, who loses?):

The marine ecosystem and Alaskan coastal people who rely upon it for their cultural, economic, and spiritual sustenance will benefit. The heavily overcapitalized pollock fleet that relies on a roe product will have to adjust to a more sustainable approach in fishery exploitation.

Are there Alternative Solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?

This proposal seeks to minimize impacts of an intensive fishery on roe-bearing pollock during critical foraging periods of the endangered Steller sea lion. There are many alternatives that are more constraining to the pollock fishery. However, this proposal offers a range of alternatives that would allow the fishery to continue with a foundation of an ecosystem approach in harvest strategies.

Supportive Data & Other Information (What data are available and where can they be found?):

Frost, K.J. and Lowry, L.F., (1986). Trophic importance of some marine gadids in northern Alaska and their body-otolith size relationships. Fishery Bulletin, 79:187-192.

Fritz, L. 1998. NMFS, Projections of Pollock Catches and Estimations of B-Season Harvest Rates Inside and Outside of the Catcher Vessel Operating Area (CVOA) along with Trends in Pollock Catches in Steller Sea Lion Critical Habitat in the Bering Sea/Aleutian Islands Region (Inshore/Offshore3 document)

Hutching, J.A, and Myers, R.A. 1994. What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhua*, of Newfoundland and Labrador. Canadian Journal of Aquatic Science. v. 51: 2126-2146.

Magnuson-Stevens Fishery Conservation and Management Act, 1996

Myers, R.A., and Barrowman, N.J. 1996. Is fish recruitment related to spawner abundance? Fishery Bulletin, 94:707-724.

Myers, R.A., Hutchings, J.A., and Barrowman, N.J. 1997. Why do fish stocks collapse? The example of cod in eastern Canada. Ecological Applications, 7:91-106.

NMFS, 1998. Effects of the CVOA on Marine Mammals (Inshore/Offshore3 document). Prepared by Alaska Region, NMFS, Juneau, Alaska.

North Pacific Fishery Management Council, November, 1996. Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions.

Signature:

10/29/98 THU 08:27 [TX/RX NO 5698]

HSUS

James W. Balsiger
Acting Regional Administrator
National Marine Fisheries Service
P.O. Box 21688
Juneau, AK 99802-1668

October 22, 1998

Dear Mr. Balsiger,

On behalf of the almost 7 million members and constituents of The Humane Society of the United States (HSUS), Earth Island Institute (EII), and the Progressive Animal Welfare Society (PAWS) combined, I write to express our concerns regarding the continued decline of the endangered Steller sea lion population in western Alaska. In particular, we believe that the pollock fisheries in the Gulf of Alaska and Bering Sea/Aleutian Islands region are seriously jeopardizing the survival and recovery of the sea lion population as well as modifying their critical habitat. Unless comprehensive actions are taken immediately to mitigate the effects of these fisheries, this population appears to be headed toward extinction in areas of Alaska's coastal wilderness which only a few decades ago supported the largest Steller sea lion population in the world. This is evidenced by the reduction of this population by 80-90 percent since the late 1960's. We offer comments which we hope will be valuable in your attempts to address this situation.

The agency's position of forestalling new protective measures until more is known is unjustifiable, unacceptable, flies directly in the face of the precautionary principle, and is a violation of the agency's responsibilities under the ESA. No new protective measures were recommended by the NMFS when the species was belatedly reclassified as endangered in May of 1997. Before that, only very limited measures were adopted to protect foraging areas around rookeries in 1990, when NMFS designated the species as threatened. These measures failed completely to reduce the high levels of trawl fishery activity in areas designated by the agency as critical habitat in 1993 and they have not reversed the decline of the population.

Measures designed to protect the full extent of critical habitat are in order and should be the agency's top management priority for Steller sea lion

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conservation at this time. Since food availability is considered to be the major limiting factor for this population, it does not make any sense to allow high-volume fishery removals of primary sea lion prey such as pollock and Atka mackerel to continue to be concentrated in critical areas. If there is to be any real hope of recovery for the endangered population, we believe the only way to ensure that the fisheries are "not likely" to have significant adverse impacts on the quantity and/or quality of primary sea lion prey, adversely modify critical habitat, or limit recovery, is to prevent the fisheries from concentrating in areas identified as essential to survival and recovery.

Therefore we urge the agency to act immediately to enact Reasonable and Prudent Alternatives (RPAs) as required under the ESA which will:

* Extend no-trawl zones year-round to at least 20 nautical miles around all rookeries and haulouts listed as critical habitat from Prince William Sound westward through the Aleutian Islands and Eastern Bering Sea.

* Extend the no-trawl zone to at least 60 nautical miles from Nov. 1 to April 30 to encompass designated aquatic foraging habitat on pollock spawning grounds off the eastern Aleutian Islands during the difficult winter months when sea lion prey are most scarce and nutritional stress is likely to be most severe.

* Prohibit the offshore factory trawl fleet from fishing for pollock at any time of year in the Catcher Vessel Operation Area (CVOA) off the eastern Aleutian Islands. This area extensively overlaps the Steller sea lion's aquatic foraging habitat in the center of its range and also encompasses the major pollock spawning grounds of the southeastern Bering Sea. This measure would achieve large reductions in catch and fishing effort from this ecologically important area while affecting a relatively small number of vessels.

* Disperse the fisheries geographically and temporally to spread out their impacts, slow down the rate of fishing, and minimize the likelihood of intense "pulse" fisheries which rapidly deplete local schools of fish before moving to new areas. Given the large size and concentration of the Bering Sea pollock fishery in ecologically sensitive areas, this fishery requires special management attention, including quarterly allocations of the allowable catch and district allocations which prevent large quantities of fish from being removed at one time or in one area.

* Reduce the Total Allowable Catch (TAC) to the extent necessitated by these measures to prevent displaced trawl effort from simply transferring the problem to other regions of the Bering Sea, Aleutian Islands and Gulf of Alaska. Existing regulations, including trawl exclusion zones of 10 nautical miles (nm) around 37 rookery sites in western Alaska, do provide some limited protection of foraging areas frequented by nursing females in the summer months, but do not protect foraging ranges of non-nursing adult females (which may comprise as much as 40% of the adult female population in any given year) and juveniles in the summer months, and do not protect foraging areas for all segments of the population in the non-breeding months when the animals disperse more widely across their range. In addition, 10 nm no-trawl zones have proven

ineffectual because the bulk of fishery removals taken within the 20 nm critical habitat zones around rookeries and haulouts have come from within the 10-20 nm range.

Reducing fishery impacts in winter foraging habitat is an essential component to any comprehensive and acceptable package of RPAs. Winter foraging ranges are more extensive, suggesting that prey is more scarce and more widely distributed. Furthermore, the effects of food limitation are likely to be greatest in the winter months for both pregnant and nursing females and juvenile sea lions. Also, as much as two-thirds of the population has been found on haulout sites in the non-breeding fall/winter months. Consequently, it is essential to protect foraging areas around both rookeries and haulouts listed as critical habitat.,

In closing, we believe that the current debate over Steller sea lion conservation presents the NMFS and the entire fishery management system with an example of managing large-scale fisheries in an ecosystem context. What appears to be sustainable management of single-species fisheries may not be sustainable for multiple large-scale fisheries. Allowing critical habitat to become the focus for the largest fisheries in North America means that foraging sea lions may be deprived of suitable prey even if overall pollock or Atka mackerel abundance is estimated to be high.

Responsible management of publicly controlled resources means protecting the integrity and biological diversity of the entire ecosystem, not just the short-term interests of a select number of fishing companies. We believe that measures designed to protect sea lions will also benefit the fisheries in the long-term by reducing fishing on spawning grounds and distributing fishing activity temporaly and geographically. These measures should be taken as reasonable precautions while appropriate forms of research continue. To do otherwise is to ignore the agency's stewardship obligations under the law to safeguard the future of this species and protect one of the richest marine ecosystems on earth.

Sincerely,

Toni Frohoff

Toni G. Frohoff, Ph.D.
Consultant to The Humane Society of the United States and Earth Island Institute

cc: John Grandy, Ph.D./Naomi Rose, Ph.D. - HSUS
Laura Seligsohn/Mark Berman - EII
Will Anderson - PAWS
Ken Stump

MIDWATER TRAWLERS COOPERATIVE

1626 N. COAST HIGHWAY • NEWPORT, OREGON 97365

MTC

October 30, 1998

Doctor James Balsiger
Alaska Regional Administrator
NMFS - NOAA
P.O. Box 21668
709 North Ninth Street, Room 401
Juneau, Alaska 99802

Dear Dr. Balsiger:

I am writing to you on behalf of Midwater Trawlers Cooperative Vessels that fish codfish and pollock in the Bering Sea. I have been informed that NMFS is proposing to shut down the winter cod fishery which occurs in January, February and March and the "A " pollock season as soon as 50% of the quota is taken in each fishing and all vessels will be forced to move well outside any grounds where pollock and cod are traditionally taken.

Our understanding is that NMFS believes that the trawl fisheries are making a competitive impact upon the pollock resources and are thus causing a decline of the Stellar Sea Lions.

We believe that there are other more compelling and supported by data arguments that refute the above conclusion by NMFS.

We have read Dr. Dayton Alverson's most recent paper in which he examines data from a variety of sources which discuss the decline of the Stellar Sea Lion.

We have also read Linda Larson's letter and arguments mailed to you on Oct. 29th, we believe those arguments have a sounder base than reasons advanced by NMFS.

It is the experience of our members that they see very, very few sea lions in their usual and accustomed grounds while they are engaged in cod and pollack fishing in the winter.

We all realize that the imposition of such a rule would be economically disastrous for all the trawlers; catcher processors, trawlers delivering to mother ships, and trawlers delivering to shore side processors. Both the cod and the pollack have to be taken while they are schooled up. The proposed rule would not allow the fleet to achieve the quotas.

I would ask you not to issue a rule that would preclude normal fishing seasons. I believe the data you have doesn't justify such a closure and finally, I believe the data that has been put forward by Dr. Alverson and Ms. Larson provide a much more compelling and data validated base for considering the problem of the decline in sea lion population.

Sincerely,

R. Barry Fisher

R. Barry Fisher
President

cc: MTC Directors

THE STELLER SEA LION AND POLLOCK–
CHANGING PERSPECTIVES
by
DAYTON L. ALVERSON

At the onset of the 1990's there was a growing concern regarding the observed declines in the Steller sea lion (*Eumetopias jubatus*) throughout much of the North Pacific. A species of marine mammal whose population levels in the Kenai to Kiska region had reached levels exceeding 100 thousand animals had declined from roughly 105 thousand animals in 1975 to about 25,000 animals in 1989 (NMFS, 1992) Figure 1. The decline in the Steller sea lion (SSL) populations had occurred concurrent with declines in some other marine mammals and sea birds in the Eastern Bering Sea, as well as in the Gulf of Alaska (Trites and Larkin, 1996).

As scientists began to examine the decline in SSL it was apparent that a general correlation could be established with the decline and the rapid expansion of commercial, first foreign and then domestic, fisheries of the region. The expansion began in the Bering Sea during the 1950's and extended into the Gulf of Alaska and south during the 1960's. Foreign catches of groundfish alone rocketed to almost three million metric tons in the late 1970's. The early foreign fisheries had initially concentrated on harvest of Bering Sea flounders and rockfishes, primarily Pacific ocean perch (*Sebates alutus*). Following the successful development of pollock surimi during the 1960's a major effort, particularly by Japanese and Korean fleets, was made to shift to the harvest of Alaska pollock in the Bering Sea and Gulf Alaska. The development of the Bering Sea pollock fisheries expanded rapidly during the late 1960's and through the 1970's while the Gulf of Alaska fisheries developed mostly in the late 1970's following significant increases pollock abundance during the later half of the decade (Alverson, 1992).

Marine scientists studying the decline in SSL were very aware of the development of a complex of commercial herring, crab, shrimp and bottom fish fisheries of the region during the time of the decline of SSL. The magnitude of the SSL decline led the National Marine Fisheries Service (NMFS) to declare SSL as a threatened species in 1990 and later the western populaiton endangered (1997), throughout much of the Gulf of Alaska and along the Aleutian Islands. Concurrently, a number of hypotheses began to emerge regarding factors leading to the species population collapse. The NMFS Recovery Team (NMFS, 1992) identified 12 potential factors that were considered possible contributors to SSL declining population (Table 1), but it became increasingly apparent that most marine mammal scientists, close to the data, felt that malnutrition was a prime suspect and it was difficult to ignore the concurrent growth of the pollock fishery and the declining sea lion population. At the same time evidence was found indicating that SSLs were smaller now fora given age compared with earlier years.

During the late 1980's and early 1990's a variety of papers began to surface in scientific and gray literature noting the importance of pollock in the diet of SSL and the relationship between pollock and the commercial fisheries (see Fritz, et al., 1991; Loughlin and Merrick, 1989; Lowery, et al., 1989; Merrick, et al., 1987; Calkins, 1988 ;and Loughlin and Merrick, 1989). Although the issue of pollock in the diet of the SSL and the relationship between the commercial trawl fisheries, as discussed by these authors differed, several major themes emerged from these early studies (a) pollock was the major prey of sea lions and reference data included observation dating back prior to the decline in the SSL population, (b) the decline in the SSL could be associated with a significant growth in the commercial fisheries of the region, (c) the fisheries of the region caused a decline in the prey as the result of localized reductions in pollock abundance or fishing resulted in the fragmentation of pollock schools thus making it more difficult for SSL to feed, and (d) environmental factors were not considered a significant factor contributing to the SSL decline (Loughlin, 1987) Table 1. Many of these views were embodied in the NMFS Sea Lion Recovery Team report of 1992.

The commentary and views of most marine mammal scientists remained largely unchallenged at the onset of the 1990's and the majority of those present at a workshop held in Anchorage, Alaska, (Alaska Sea Grant, 1991) came to the conclusion that lack of prey and nutrition was the most important factor contributing to the SSL decline. During this era, most of the scientific literature on marine mammals of the Bering Sea, sea lions in particular, resulted from the efforts of a handful of scientists working for the NMFS and ADF&G. Almost no commentary surfaced from the fisheries scientists within the NMFS, ADF&G nor the NPFMC regarding the growing debate over fisheries and SSL interactions. However, the Marasco and Aron (1991) paper on the explosive character of changes in the Alaskan groundfish fisheries and a lengthy review of commercial fishing and the Steller sea lion by Alverson, 1992 surfaced interesting questions suggesting alternative and broader interpretations of the decline of SSL populations.

The Marasco and Aron paper (ibid), which provided biomass data for pollock in the Bering Sea, made it obvious that the trends in pollock and SSL abundance were not directly related, in fact they appeared to be inversely related. Alverson (1992) suggested that (1) available scientific evidence did not support the conclusion that pollock were important in the diet of SSL prior to the 1970's, (2) the possibility that the abundance of major forage items for sea lions shifted following the mid 1970's, (3) that prior to the significant growth of the pollock populations in the Bering Sea and Gulf of Alaska (during the 1970's) small fatty fish species such as capelin, sandlances and herring, probably formed the major elements of the diet of SSL throughout most of the Gulf of Alaska, (4) there was evidence (Wooster, personal comm.) of a major environmental shift in North Pacific ocean during the mid 1970's, and (5) that pollock were unlikely to provide the quality of nutrition that was provided by small fatty fish species. Alverson (1992) also suggested that an alternate hypothesis to the pollock commercial fishery interaction-that a loss of nutritional support for SSL had occurred as the result of the declining abundance of small forage species and the increased reliance on pollock, a species with low fat content. The reviewed paper, was given little credence by many marine mammal scientists and, with the exception of a few academicians, the investigation of the decline remained almost exclusively in the hands of NMFS and ADF&G scientists.

Many members of the fishing industry felt threatened and concerned regarding the comments and literature surfacing on SSL and what appeared to be a rather narrow perspective promoted by a small group of marine mammal scientists. Thus, in the summer of 1992, John Roos, former director of the International Pacific Salmon Fisheries Commission, on behalf of significant elements of the North Pacific fishing industry requested Pacific Northwest universities submit proposals for research concerned with the impact of fisheries on the SSL. Following a response from several universities the North Pacific Universities Marine Mammal Research Consortium was formed with four participating institutions: the University of Alaska, the University of British Columbia, the

University of Washington and Oregon State University. At the onset the Consortium, was largely supported by donated funds from the fishing and associated industries and was carefully organized to insure that participating scientists were insulated from donor pressure and that the resulting science was as unbiased as possible. Scientists were asked to concentrate their initial research on the status of SSL populations and factors contributing to the species decline, including fishery/SSL interactions.

The mission of the Consortium was stated to be to undertake a long-term program of research on the relation between fisheries and marine mammals in the North Pacific Ocean and Eastern Bering Sea. Studies were to initially focus on the biology of the SSL and could include research on the effects of species interactions and oceanographic conditions on changes in sea lion abundance.

The Consortium scientists, which constituted the only major research effort outside government management agencies, found it difficult, at the onset of their efforts, to work in close collaboration with some government scientists and there appeared to be mutual mistrust on the part of both university and government scientists. Nevertheless, the Consortiums work began to probe into the issues of SSL declines and the potential impacts of fishing. It is difficult to demonstrate whether or not the efforts of the Consortium influenced the nature of the work the marine mammal scientists, but there seemed to be a frenzy of effort (perhaps in response to greater government funding), to reexamine earlier findings and conclusions and to investigate in more detail evidence regarding the effects of fishing on the SSL prey and their abundance and availability to sea lion populations.

The attempt to relate fishing activity to the decline in the SSL population dates well back into the 1980's when a number of papers focused on the heavy dependence of SSL on pollock in their diet (Trites, et al. in press). Efforts to associate the decline in SSL with fisheries soon became evident. In 1989, Loughlin and Merrick (1989) published a paper comparing sea lion counts and pollock catches for eight major rookeries and tested for time lagged effects. The results were perhaps surprising to the investigators in that few significant correlations were detected and they were both positive and negative. Later, Ferrero and Fritz (1994) tested the hypotheses that commercial catches of pollock were correlated with SSL abundance using additional rookeries and data collected after 1987 from the region between Kodiak Island and the Western Aleutian Islands. They too failed to find a relationship between the SSL abundance and pollock harvest using the available data. A third attempt, by Sampson (1996) found large winter catches of pollock occurred near sea lion rookeries that suffered large declines in the 1980's, but the report also showed sharp declines in SSL's areas in the late 1980's where no winter catches of pollock had occurred. Sampson also was unable to relate the decline to the amount of fishing effort, total catches of groundfishes, or catches of Pacific cod and Atka mackerel. In a news release from the Alaska Sea Grant researchers noted fishing is less a factor, because pollock stocks overall are high and the industry doesnt target young pollack. Dr Jeremay Collie fishery researcher at the U. of Alaska noted " in one sense, the findings exonerates the industry.We disccused pollock., but could only conclude that pollock stocks are up and sea lion are down. "

Trites, et al. (1998) commenting on the relationship between the SSL and commercial fisheries puts a philosophical touch to the debate noting "as for whether commercial fisheries have out-competed sea lions, the gross statistics of catch in the Gulf would seem to present a circumstantial case for effects on food resources for sea lions: increases in the total catch have coincided with a decline in sea lion abundance." However, as several authors have pointed out life is never so simple. For example sea lions are healthiest in southeast Alaska, an area that has the highest human activity in the Gulf. Out in the Aleutians the alarming sea lion declines occurred at a time of little fishing activity. Recently Trites and his colleagues at the University of British Columbia (1998) noted (in reference to a NMFS management proposal) "we were surprised to learn that the leading hypothesis is lack of available prey." This suggest that the SSL are starving to death; a statement that is not supported by field observations. The authors noted that if there is a relationship between SSL abundance it may be more subtle than gross statistics reveal.

The failure to find convincing evidence that pollock abundance trends, in general, could be related to the SSL decline has resulted in the gradual abandonment of this hypothesis (although the potential of localized depletion is still under investigation). Subsequently Merrick and Calkins (1994), Merrick, et al. (1997) and other investigators began to examine the importance of small, two year old and younger pollock, in the diet of SSL. The dominance of young fish in the examined stomachs seems well established. However, no supporting evidence has surfaced which suggest that the commercial fishery, which largely harvest, 3-9 year old fish has had any demonstrated impact on juvenile pollock abundance. Merrick(1995) examined and found a relationship between the 1 and 2 year old pollock and the decline in SSL populations in the Eastern Aleutian Island area, but the trend in young fish prior to 1979 is not noted. Hallowed (1991) shows that the recruitment of age 2 pollock increased more than 400% in the Gulf during this period, yet according to the Final Recovery Plan for the SSL (NMFS, 1991) the SSL population did not respond to the increase in young fish, but declined significantly. Merrick's data also can be used to show that although there was some decline in the numbers of 2 year old pollock during the 1980's in the Gulf, the actual numbers of young pollock per surviving SSL increased 28%.

The belief that pollock has traditionally been the dominate prey of the SSL seems to have gone through a rather radical shift during the past decade. Merrick, (1995) for example, confines his comments on data supporting the feeding pattern of SSL to the period of 1975 and forward, noting that these data constitute the only complete set available for comparison of temporal or area specific trends. Latter Merrick (1995) provides evidence of a major shift in the availability of food for SSL noting capelin abundance was high in the 1970's, but has since declined. Capelin also disappeared from seabird's diets in the Pribilof Islands and Gulf of Alaska beginning around 1978. Analysis of the pattern of scales deposition in sediment at Skan Bay on the north side of Unalaska (Eastern Aleutians) indicates that some small forage fish (myctophids and lumpsuckers) disappeared from the area in about 1978. The Bering Sea biomass of some other demersal species consumed by sea lions (sclulpin and eelpouts) appear to have decreased from the late 1970's to the mid 1980's.

Merrick, et al, (1997) noted that even during the period of decline there has been a significant shift in the diets of SSL. The occurrence of cod like species in scats and stomachs from the declining sea lion population in the Kodiak Island area has increased from 32% in the 1976-1978 to 60% in 1985-1986. Small schooling fish occurrence decreased from 18% in 1975 to 6% in 1990-1993. Various authors have joined to support the hypothesis that a major change in the environment occurred in the mid 1970's resulting in a shift in the food supply for SSL (e.g., Alverson, 1992; Merrick, 1995; Boyd, 1995; NRC, 1996; Springer, in press; Pritcher, et al., in press). Pritcher, et al. (in press) for example concluded that there is strong evidence that a major oceanic regime shift, characterized by increased water temperature began in the North Pacific, including the Gulf of Alaska, about 1975-1976. This regime shift apparently affected both biomass and composition of SSL prey with abrupt changes noted after 1978. Populations of small forage species such as capelin, eulachon, and Pacific sand fish declined greatly while larger, predator fishes such as walleye pollock and cod and flatfishes increased.

Dr. Michael Castellini a marine mammal biologist at the University of Alaska observed to in the Alaska Sea Grant News (Alaska SEA Grant 1991" there seems little doubt that is somehow food related" The new report, however goes on to say researchers " believe shortages of herring, capelin, sand lance , eulachon and other small forage fish favored as prey may hav e triggerded the deaths of steller sea lions and caused bith rates to drop.

Boyd (1995) notes that major shifts in forage food available to the SSL have occurred during the period of the SSL decline, but the causes of these shifts are uncertain (and probably always will be), and may be due to (1) changes in the climatic/oceanographic conditions, (2) stochastic or chaotic behavior in the main pathways of carbon flux, and (3) human intervention either through the removal of fish or sea lions or both. Some of the shifts in dominate forage species may have been fostered by climatic changes, harvesting of whales, herring, Pacific ocean perch or a combination of the above. Evidence that declines in SSL are related to groundfish or other fisheries of the region are weak, at best.

The issue of quality of prey seemed to receive little attention until Consortium scientists revealed that pollock had low nutritional value in comparison with many other species.

Trites, et al. (1998) noted that in discussing the relationship between the SSL and their decline there is a tendency to only emphasize the amount of individual fish species available to SSL or quantity removed from the environment. Little or no consideration is given to the diversity or quality of prey available to them. Pollock, the dominant prey currently available to SSL, are being consumed at the highest rates in the areas where the greatest SSL declines are noted. Further, these authors state that pollock are generally poor in energy or nutritional content. "They have about half the energy content as herring and have less usable energy due to various cost of digestion." According to Dr. David Rosen (UBC), pollock makes a lousy meal. During one trial, captive sea lions were fed exclusively on pollock and despite the fact that sea lions were fed essentially all the pollock they desired they actually lost body mass. "Your talking 16-18 kg in only two-weeks. That's a major loss of weight for an animal that only weighs about 100 kg."

Merrick (1995) also raises the possibility of the nutritional problems associated with pollock, noting that diets of SSL in areas of the Aleutians, with the highest rates of population decline, had little diversity and were typically dominated by pollock. This was in sharp contrast to the observations of diet of healthy SSL population in Southeast Alaska which included diversity of species including fatty fishes. Although the issue of the importance of nutritional value of the prey has gained momentum over the past few years its overall importance in the decline of the SSL is still under study.

Springer (in press), asks a much more fundamental question regarding the factors leading to the decline of SSL that is "is it all climate change that has been responsible for the dynamics of species at higher trophic levels in the past two to three decades?" He notes that "the two most plausible explanations for reduced prey are commercial fisheries, which expanded greatly beginning in the 1950's in the Bering Sea and Gulf of Alaska, and climate change." This issue is contentious and there is a lack of consensus about the roles fishing and climate have had in structuring marine food webs and affecting overall production in the North Pacific (NRC, 1996). However, there is growing evidence that climate is fundamentally important.......

Another problem confronting scientist had be idendification of the period of life history during which survial has declined. Attention has been focussed on both females and young, but the debate over the affects of under nutrition and its possible impacts on females and young, has at times, seem confusing and counterintuitive. For example, Merrick, et al., (1995) in a study comparing pup masses between rookeries and increasing and decreasing populations was surprised to find that the pup masses in the areas where populations were decreasing were significantly larger than those in areas with decreasing populations, leading the authors to conclude; (1) the large size of pups in the areas of decreasing populations suggest that pup condition was not compromised in the first months postpartum and that reducing juvenile survival acts after the neonatal period, and (2) the larger pup size in declining populations implies that pregnant and early postpartum females in those populations are not having difficulty finding prey. It was also observed that the greater pup mass at the rookeries with reduced populations could be a density dependent response to reduced completion between females for food.

These findings seem somewhat at odds with results reported by Calkin, et al., (1998) who found that growth of female sea lions, as measured by standard length, auxiliary girth, and mass, was reduced between the 1970's and 1980's supporting the under nutrition hypothesis. Pritcher, et al., (1998) in an investigation of pregnancy rates in females and under nutrition concluded a significant decline had occurred between early and late (within year) pregnancy rates during the 1970's and 1980's (100% to 67% in the 1970's) and (95% to 55%) in the 1980's. The between period decline was not significant, nevertheless, they concluded that there is considerable evidence suggesting nutritional stress affecting reproductive performance of the SSL during both the 1970's and the 1980's. Additionally Calkins, et al., (1998) states "The findings of reduced body size between samples of SSL's collected in the mid 1970's and the mid 1980's seemingly indicate a reduced carrying capacity because of either a reduced abundance of or availability of prey and/or in prey composition to less nutritious species." In this case it would seem to indicate that carrying capacity declined even more rapidly than the population, but these authors note that no direct link has been demonstrated between under nutrition and the actual decline in numbers.

Over the past several years factors influencing the decline in SSL have gone through a metamorphous which has embodied attempts to associate the decline (a) directly with the growth of bottom fisheries; primarily pollock fishing (b) localized depletion and disruption of pollock schools, (c) declining abundance of young pollock, (d) disruption of spawning aggregations of pollock during the winter spawning period, and (e) the general competition by fisheries for SSL prey species. The hypotheses have also included lack of food for the female SSL population and, more recently, relating the SSL decline to deaths in the younger members of the population, but the factors impacting the young remain uncertain. Additionally, predation by killer whales at currenct depressed population levels of SSLs has been suggested as one of the current problems confronting rebuilding of the SSL stocks and the possibility of disease has been rekindled. Finally, the possibility of climatic factors playing the dominant role is also being suggested. The latter bringing about an inferred lowering of the carrying capacity for SSL in the North Pacific region. Nutritional deficiency remains a major factor believed to have brought about the collapse of the SSL population, but the involvement of fisheries in the decline is much less certain. The contemporary situation seems rather obtuse and confused by historical changes in the environment and ecological structure of the ecosystem and the likely changing importance of the underlying causes of decline over time.

In regard to the nutritional hypothesis, Boyd (1995) concludes that "circumstantial evidence exist to suggest that changes in food availability could have been a cause of the decline, but that this may no longer be the main cause. Density-dependent responses, in terms of population size and the condition of pups, are possibly being observed amongst SSLs in the Eastern Aleutians." Also in respect to pollock forming the dominate portion of food of SSLs, there is strong evidence which supports that pollock have constituted a significant percentage of their diet since the mid 1970's (Merrick, 1995). Prior to the early 1970's there is growing evidence that small forage species (herring, capelin, candlefish, and sandfish) were the key food items (Alverson, 1992; Merrick, 1995; Pritcher, et al. 1998). There is additional evidence that the shift to pollock during the late 1970's may have had the result of SSL opting for prey having much lower nutritional value than the small forage species which they had depended upon during years of high abundance (Trites, et al. 1998).

The new evidence and views regarding the SSL have led scientists to question further regulation of fisheries as a means to reverse the decline in SSL numbers in the Gulf of Alaska and to assist in population recovery.

Boyd (1995), for example, notes "there have been substantial fisheries in areas designated as critical habitat for SSL, but unless the magnitude of these fisheries is expressed in terms of available biomass and there is an indication in the rate of flux of prey between critical and non-critical habitat, it is difficult to come to any conclusions about the potential impact of fisheries on sea lions even within the current exclusion zones. New research is required to examine the effects of changes in the rates at which sea lions encounter prey under different levels of fishing. There is a need for more information about fish behavior collected at the same spatial and temporal scales as data about sea lion behavior."

Boyd, (ibid.) further states that "a strong precautionary principle should be adopted towards sea lion-fisheries interactions. This is exemplified by the fishery exclusion zones now in place around SSL rookeries. Despite this there is support for the view that fisheries and sea lions do not compete directly since the fisheries are, in general, targeted at species or age classes that are not highly important in the diet of sea lions. Although this may result from competitive exclusion of sea lions by fisheries there must also be some doubt that management measures, other than the type already in place, introduced in an attempt to reduce the effects of the indirect links between fisheries and SSLs will achieve the objective of aiding in the recovery of the sea lion population. Our knowledge of the ecosystem processes is so rudimentary that such measures may have as much chance of being harmful as aiding recovery."

Springer (in press) concludes his paper on climate change by noting that "the role of climate as a force in population dynamics of species at higher trophic levels must be carefully weighed against the role of other factors, e.g., commercial fisheries, in setting management approaches that affect the lives of people and wildlife."

Trites, et al. (1998) in their comments on a NMFS proposal to more equally distribute the fishing for pollock in the Gulf of Alaska concluded that many of the statements made about SSLs and the impact of pollock fishing in the Federal Register are misleading. The potential problem in the SSL diet is not the lack of available prey, but rather the lack of appropriate prey. Exactly what constitutes appropriate prey is still under investigation. The effect of changing the timing of pollock harvest on SSL and therefore, changes in TAC and its allotment should be implemented cautiously. Given the current population decline, the results of the proposed changes in pollock management strategy are unpredictable and may produce unexpected and unwanted results.

The establishment of the North Pacific University Marine Mammal Research Consortium along with increased funding for marine mammal research has led to a much broader and more quantitative examination of the decline of the SSL albeit the increase in knowledge has made it more difficult to evaluate future management options. In a report currently under preparation by Consortium scientists (Trites personal comm.), ecosystem modeling failed to account-for changes that occurred between 1950 and 1980 through trophic interactions alone.

These scientists (Trites, personal comm.) concluded that "environmental change likely explains the build up of flatfish and the decline of pelagic fishes. Changes in the abundance of these key species can in turn affect the abundance of other species in the food web. Their model suggest that increased fishing pressure on pollock has a minimal affect on the adult biomass due to increased replenishment from the juvenile stock. Juvenile pollock benefit from reduced cannibalism and the model predicts that seals, sea lions and piscivorous birds would increase due to an increase in the abundance of juvenile pollock. On the other hand, over fishing of pollock could lead to the extinction of seabirds that consume juvenile pollock. Nevertheless, according to the UBC consortium scientists, reducing the adult biomass 50% would have a positive affect on seals, sea lions and piscivorous birds because the abundance of juvenile pollock which they consume , increases as cannibalism by adult pollock is reduced. Reducing pollock fishing results in a larger adult population and a smaller juvenile pollock population.

Merrick (1995) discusses two possible interventions that could be considered to alter the decline in the SSL population. One would be to maintain high fishing effort on some species "emulate K-selected species and reduce variability in ecosystem biomass and the alternative to reduce fishing effort to allow stocks of K species to rebuild. In the discussion of these options the author points out potential problems underlie both approaches and concludes that "what is clear is that the SSL probably will not recover unless a fundamental change occurs in the prey availability in the North Pacific Ocean." We are left with the question of will the climate of the ocean change over the next several decades and reverse the observed decline in SSL or are there steps that managers can take to enhance the abundance and types of prey that might be important to increasing SSL populations? Unfortunately we don't seem to know the answer to either of these questions.

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GREENPEACE

October 29, 1998

James W. Balsiger
Acting Regional Administrator
National Marine Fisheries Service
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Juneau, AK 99802-1668

Re: Comments on Proposed Reasonable and Prudent Alternative

Dear Mr. Balsiger:

On August 17, 1998, Greenpeace and American Oceans Campaign submitted comprehensive proposals for the Bering Sea and Gulf of Alaska groundfish fisheries to reduce the likelihood of jeopardizing Steller sea lions and to reduce the likely negative impacts of these large fisheries on the North Pacific ecosystem. We reiterate the analyses submitted with these proposals and incorporate them by reference into these comments.

The Reasonable and Prudent Alternative (RPA) proposed by NMFS at public meetings in Seattle and Anchorage falls far short of insuring that these fisheries will not likely jeopardize Steller sea lions or adversely modify this species' critical habitat. These comments outline some of the major deficiencies in the proposed RPA.

I. NMFS SHOULD PREPARE THE BIOLOGICAL OPINION BASED ON THE BEST SCIENTIFIC AND COMMERCIAL DATA AVAILABLE.

The content and conclusions of the Biological Opinion should be determined by NMFS alone, based solely on "the best scientific and commercial data available." 16 U.S.C. § 1536 (a)(2). While we welcome public involvement in reviewing this data and the reasonable conclusions to be drawn therefrom, the public meetings NMFS has held appear to have been designed more to allow potentially affected interests to generate pressure rather than to contribute meaningfully to the scientific judgments required under the law. Rather than providing a draft Biological Opinion and requesting comments focused on the relevant issues under the Endangered Species Act, NMFS has sought general reactions to and suggestions for its potential RPA. This process appears more appropriate to policy decisions rather than a Biological Opinion.

In this regard, we note our concern over suggestions that the North Pacific Fishery Management Council or its committees might be involved in determining the

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conclusions of the Biological Opinion. There is no such role for the Council or any other political body under the Endangered Species Act; indeed, involving the Council in reaching the opinions required by the Act would be illegal.

II. THE ENDANGERED SPECIES ACT AND THE BEST SCIENTIFIC DATA AVAILABLE REQUIRE FINDINGS OF JEOPARDY AND ADVERSE MODIFICATION.

The Endangered Species Act requires that NMFS "insure" that these fisheries are not likely to jeopardize the continued existence of sea lions or adversely modify their critical habitat. 15 U.S.C. § 1536(a)(1). Section 7 reflects an explicit Congressional decision to give first priority to conserving endangered species, a priority that overrides the other missions of the federal agencies. TVA v. Hill, 437 U.S. 153, 185 (1978); see also, Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687, 699 (1995) ("The plain intent of [the ESA] was to halt and reverse the trend toward species extinction, whatever the cost."). In applying Section 7, "the burden is on the action agency" to demonstrate that its action likely will not jeopardize the species or adversely modify its critical habitat, and the agency must "give the benefit of the doubt to the species." H. R. Rep. No. 697, 96th Cong., 1st Sess. 12 (1979), reprinted in 1979 U.S. Code Cong. & Admin. News 2557, 2572.

Thus, the statute requires reasonable judgments based on the best information available. The relevant issue is not whether certainty has been achieved, as it rarely is concerning biological interactions and relationships, but, rather, whether NMFS has insured that these fisheries are not likely jeopardizing the species or adversely modifying critical habitat.

In light of these standards, the only defensible conclusions for the Biological Opinion are that the giant pollock fisheries likely are jeopardizing the continued existence of Steller sea lions and adversely modifying their critical habitat. In brief, it is established that lack of available food is the leading explanation for the precipitous decline in the Western population of sea lions. A primary determinant of critical habitat was its importance to sea lions's foraging -- NMFS has recognized that adequate food availability is "the single most important feature" of this critical habitat. It also is well-established that pollock, Atka mackerel, and other groundfish targeted by the fisheries are the primary prey of sea lions. Nonetheless, since sea lions were listed under the Endangered Species Act, these giant fisheries have become concentrated in sea lion critical habitat, to the point where about 80% of the pollock catch in the Bering Sea, and about 70% of the total groundfish catch, occurred in critical habitat. Moreover, these fisheries are concentrated into a few months, including the crucial winter period, heightening their likely adverse effects.

The Western population of Steller sea lions was reclassified from threatened to endangered over a year ago. The latest trend counts show continued significant declines in this population, declines that must be reversed if this species is to avoid extinction. NMFS must make significant changes in the groundfish trawl fisheries to insure that these federally-authorized actions do not further jeopardize this species and to promote a recovery.

III. THE PROPOSED RPA DOES NOT INSURE THAT THE POLLOCK FISHERIES ARE NOT LIKELY TO JEOPARDIZE SEA LIONS OR ADVERSELY MODIFY CRITICAL HABITAT.

The proposed RPA fails far short of what is required to insure that the pollock trawl fisheries are not likely to jeopardize the species and or adversely modify critical habitat. Major shortcomings include the following:

1. Inadequate seasonal apportionments of the TAC to spread out the impact more evenly across the year and avoid concentrating catches in the most difficult times of the year for foraging sea lions;

2. Inadequate nearshore trawl exclusion zones which fail to protect large portions of critical habitat proximal to rookeries and haulout sites in the Gulf of Alaska and Aleutian Islands west of 170W longitude;

3. Lack of real protections for winter foraging habitat in the large aquatic foraging zone off the eastern Aleutian Islands, overlapping the CVOA, where record levels of 50-70% of the giant eastern Bering Sea pollock catch have been extracted in the 1990s;

4. In light of low stock abundance, recruitment trends, and concerns for sea lion prey availability in the AI, there should be a moratorium on the directed fishery at this time and assurances that any future fishery would be managed under the same time-area regime as in the Bering Sea and Gulf of Alaska. Under the RPA proposal, however, there would be a complete absence of time-area management in the AI pollock fishery; and

5. Failure to include precautionary reductions in TAC to prevent displaced trawl effort from transferring problems associated with spatial-temporal concentration of the catch in designated critical habitats to other areas.

These points are discussed in more detail below.

1. <u>A Minimum of Quarterly TAC Allocations Is Required</u>.

A key weakness of existing NMFS sea lion conservation measures is that the agency never recommended the same time-area apportionment scheme of the BS/AI pollock TAC as was adopted in the GOA pollock fishery, in order to minimize the risk of pulse fishing and localized depletions of this single most important prey item in the sea lion diet throughout much of western Alaska. However, NMFS' proposed RPA would institute a seasonal allocation of the pollock TACs using a fatally flawed trimester apportionment formula which would concentrate these fisheries in the times of year identified by NMFS as the most difficult for foraging Steller sea lions. The history of the Section 7 consultation record and the established facts concerning sea lion biology and fishery interactions in critical sea lion foraging habitat demonstrate that quarterly allocations of the pollock TACs for the BS/AI and Gulf of Alaska are a fundamental component of comprehensive sea lion conservation measures that will reduce the likelihood of jeopardizing sea lions, adversely modifying their critical habitat, and limiting their recovery.

NMFS frequently has recognized the importance of a quarterly allocation. Notably, a memo of 10 March 1993 from Aron to Pennoyer strongly opposed a proposal for making an A/B seasonal pollock division in the GOA as in the BS/AI, because it would increase catches in the winter roe fishery and because it would violate the strategy of temporal allocation of the fishery:

"*The quarterly approach is fundamental to the NMFS conservation strategy of temporal and spatial allocation of the pollock TAC to minimize sea lion impacts. That NMFS took this approach was probably a fundamental reason why the U.S. District Court and the Court of Appeals found in favor of the Service in the complaint filed by Greenpeace over the 1991 walleye pollock GOA TAC. Adoption of the BSAI approach would contradict past actions by NMFS, without allowing the strategy [i.e., quarterly allocations in the GOA] sufficient time to have positive effects on the sea lion population.*"

We strongly oppose the proposed institution of the trimester allocation scheme in the draft RPAs for both the GOA and BS/AI. NMFS has provided no biological justification for reducing the temporal spacing of the se fisheries from quarters to trimesters.

Moreover, under both the existing Gulf trimester scheme and the proposed Gulf/Bering Sea pollock trimester scheme, most of the TAC would be concentrated in the fall and winter, the times of year identified by NMFS as most difficult for foraging sea lions.

The Section 7 record is replete with concerns for this fall-winter period. For instance, the 30 March 1993 Memorandum from Coogan, summarized general Steller sea lion/fishery conflict issues and goals of past management measures. In that memo, the importance of the November through April period was identified as a time of higher stress for sea lions, hence any measure that concentrates fishing in this period is a problem:

> "*Because of stress associated with winter weather, weaning season, gestation, and reduced prey diversity and availability, anything that increases fishing effort at known haulouts or rookeries from November through April may require formal consultation.*"

The 4 April 1993 Memorandum of William Aron to Steven Pennoyer further emphasizes the need to avoid concentrating the pollock TAC in the fall months. In that consultation, AFSC staff assessed the effect of a GOA pollock third quarter starting date of September 1 with respect to effects on Steller sea lions:

> "*This starting date is likely to cause adverse impacts on Steller sea lions by concentrating fishing effort in the fall and winter when juvenile sea lions may be vulnerable to shortages of prey resources.*"
>
> "*In contrast, the compression of fishing effort during June and July under the current*

Gulf of Alaska quarter system is not considered to be a problem because sea lions are offered some protection by the 10 nm buffer zones, pups are not foraging yet, and the animals may be less stressed under generally milder environmental conditions....
"We do not support a September 1 third quarter starting date in the Gulf of Alaska pollock fishery and retain support of our previous recommendation of January 20, June 1, August 15 and October 1 quarterly starting dates with equal TAC releases in each quarter."

Despite these repeated concerns in the Section 7 record, however, the Gulf pollock fishery has been allocated on a trimester basis since 1996 as approved in Amendment 45 to the Gulf of Alaska FMP, in which the former third and fourth quarter allocations were combined into one TAC release on September 1, comprising 50% of the annual TAC. When combined with the 25% TAC release in the first trimester, beginning January 20, 75% of the TAC was concentrated in the fall and winter months.

Amendment 45 to the Gulf of Alaska FMP constituted a major step backward for NMFS sea lion conservation policy. The fact that pollock fishery removals in the GOA have occurred principally within 20 nm of rookeries and major haulouts in critical habitat led NMFS to propose an emergency regulatory amendment to the Gulf pollock trimester apportionment whereby 10% of the third trimester TAC was reapportioned to the second (summer) trimester, changing the seasonal allocation to 25-35-40%. This measure was taken in response to a 60% increase in the west-central Gulf of Alaska TAC for 1998, which would lead to large increases in third trimester pollock removals from critical habitat:

"A 60 percent increase in the W/C GOA pollock TAC for 1998 could have an impact on Steller sea lions. With the current temporal apportionment of pollock TAC in the W/C GOA, significantly more fish would be removed during the fall months. Sea lion biologists believe that conservative action needs to be taken to reduce the pollock allocation during that critical period, when sea lion pups are beginning their transition to solid food and adult females are both lactating and in early stages of pregnancy." [NMFS Draft EA/RIR to Change the Percentages of Pollock TAC Apportioned to Each Fishing Season in the W/C Regulatory Areas of the Gulf of Alaska, January 1998.]

The draft RPA trimester apportionment scheme in which the TAC would be allocated 35-15-50% across the three seasons would actually INCREASE the amount of the TAC taken during the times of year identified by NMFS as most difficult to foraging Steller sea lions. Given the enormous size of these fisheries and their continued concentration in and near Steller sea lion habitats, as well as the temporal concentration of Gulf pollock TAC in the fall-winter period under the current trimester management scheme, at a minimum these TACs should be allocated on a quarterly basis and the fall-winter allocation must be reduced substantially. A quarterly allocation of the TAC is the bare minimum of seasonal divisions which will ensure that at least half of the catch is directed away from the fall-winter months, and a strong case exists for dividing these large fishery quotas into even smaller seasonal apportionments to truly ensure that the impacts of big pulse fisheries are spread evenly across the year.

Quarterly apportionments are not a panacea. Data from the Gulf of Alaska pollock and Aleutian Atka mackerel fisheries indicate that these kinds of broad spatial/temporal allocations do not address the localized nature of the fisheries in question and their likely impacts on sea lion prey availability and foraging success. They altogether failed to reduce fishery removals in critical habitat or prevent them from increasing substantially. But, when combined with a comprehensive strategy of year-round trawl exclusion zones, they serve to further reduce the likely adverse impacts of high-volume pulse fishing by spreading out the effort and catches across the year.

2. Year-Round 20 NM Trawl Exclusion Zones Are Needed Around All Sites Listed As Critical Habitat In Western Alaska.

Time-area management of the large groundfish trawl fisheries is an important but insufficient component of sea lion conservation. Without year-round trawl closure areas in the critical habitat zones adjacent to rookeries and haulouts, groundfish trawl catches of primary sea lion prey will continue to remain concentrated in areas proximal to land-based sites, increasing the likelihood of jeopardy and adverse modification by depleting the local prey base.

The draft RPAs propose an expanded trawl exclusion strategy which includes no-trawl zones around haulout sites where >200 animals have ever been counted in any season, as defined in the 1993 final rule designating critical habitat. Expanded no-trawl zones out to 20 nm in the eastern Bering Sea/eastern Aleutian region (between 164-170W) would provide year-round protection to the full extent of critical foraging habitats adjacent to rookeries and haulouts and would mark an important step forward in sea lion conservation, but the zones would only extend to 10 nm in the Gulf of Alaska and Aleutian Islands west of 170W longitude.

It is abundantly clear from NMFS fishery data and the Section 7 record that the existing 10 nm rookery zones have been completely inadequate, in large part because very little trawling previously occurred within 10 nm. Much larger trawl fishery removals have been concentrated in critical habitat zones from 10.1 to 20 nm, leading the National Research Council (1996) to conclude that the 10 nm zones are "too small to effectively separate the local effects of trawlers on sea lion prey from foraging sea lions."

NMFS provides no biological rationale for denying protection to these areas between 10.1 and 20 nm in designated critical habitat in the GOA and AI, rather, it proposes to continue the failed strategy of the recent past by recommending 10 nm trawl exclusion zones. The rationale given for 10 or 20 nm no-trawl zones is the length of the shelf areas in each region, but the shelf area in both the Gulf of Alaska and the Aleutian Islands extends to at least 20 nm and, in many areas, to considerably greater than 20 nm.

In the GOA, an additional proposed restriction would limit the Gulf pollock fleet to no more than 33% of the *aggregate* B and C season TAC from within 10-20 nm of critical habitat sites and Shelikof Strait foraging area to prevent the fleet from concentrating all its effort on the boundary of the 10 nm trawl exclusion zones. While this measure may alleviate some of the competitive fishery pressure on critical habitats between 10.1 and 20 nm, it is not an adequate substitute for full protection of these areas of critical habitat. It also is deceptive, because 33% of a simple *aggregate* of B and C-season TACs may translate into very large removals during one season and very small removals in another. Finally, since observer coverage for the Gulf pollock fleet is considerably less than 100%, it is unclear how well the fleet will comply with the measure.

3. <u>Greater Protection Of Sea Lion Aquatic Foraging Habitat Off The Eastern Aleutian Islands Is Needed</u>.

In 1992, following the closure of the Bogoslof Island management area (518), a large amount of pollock "A" season effort shifted to the CVOA. The Bogoslof area, which overlaps the western portion of the sea lion aquatic foraging area off the EAI out to 170W longitude, has remained closed to directed pollock fishing in response to very low (and declining) pollock biomass since 1992, as part of the Donut Hole treaty with Russia. When considering remedies to the overexploitation of the CVOA/critical habitat it is important to remember that the Bogoslof portion of sea lion aquatic foraging habitat has *already* been depleted. If anything, there is a strong case to make for excluding ALL trawl fishing in the CVOA/sea lion aquatic foraging area before it too goes the way of the Bogoslof fishery.

The draft RPAs would include a 10% reduction in the current A-season roe pollock allocation (from 45% to 35% of the TAC) and limit the A-season harvest from the CVOA to no more than 50% of the total A-season catch. NMFS says the A-season catch from the CVOA averages about 75% in recent years, thus there would be some reduction in catch from the Area under the proposed measure. However, the critical habitat area off the eastern Aleutian Islands would continue to be the focus of a very large, intense fishery on spawning pollock at the time of year when sea lions are known to fatten up on energy-rich, readily available schools of roe-laden fish.

The draft RPAs do not provide any basis for concluding that the proposed measures are adequate to prevent jeopardy or adverse modification of critical habitat. We urge the agency to adopt a more comprehensive approach combining (1) quarterly allocations, (2) area-specific limits on catch, (3) seasonal 60 nm no-trawl zones and (4) reductions in fishing effort to provide some real assurance that these critical foraging areas which constitute the center of the Steller sea lion range are not being adversely modified or that the fishery is not posing a significant competitive limit to the recovery of the population.

A. <u>The Need For Seasonal 60 nm Trawl Exclusion Zone in the EAI</u>

In the BS/AI during the 1990s, the A-B seasonal allocation of the pollock TAC has resulted in an approximately ten-fold increase in the catch from the winter months and on spawning grounds in the large sea lion aquatic foraging habitat area from Unimak Island to Islands of the Four Mountains. This area was the population center of the Steller sea lion range-wide distribution only thirty years ago, but the population has since declined by about

90% and shows renewed declines of 18% from 1994-1998 after a brief rebound in the trend counts from 1989 -1994.

It is highly unlikely that the population of this large-bodied, long-lived top predator would plunge so drastically in the center of its range in response to natural variations in oceanographic conditions to which the species is well-adapted -- especially considering the species' adaptability to a wide range of latitudes and the slow but steady recovery of Steller sea lion populations in the eastern stock from Southeast Alaska to the Oregon/California border during the same period, following the end of bounty programs. The development of a very large pollock fishery with cumulative removals approaching 40 million metric tons biomass since 1964, most of it concentrated in this area of the eastern Bering Sea, constitutes an unprecedented shift in the fishing regime of western Alaska as well as a serious competitive threat to the historically large populations of pollock predators in the region, particularly northern fur seals and Steller sea lions.

The large at-sea foraging areas were first recommended as critical by the Steller Sea Lion Recovery Team in 1991 and encompass major pollock spawning grounds in the Gulf of Alaska (Shelikof Strait) and eastern Aleutian Islands (from Unimak Island to Islands of the Four Mountains, 164-170W longitude) as well as Atka mackerel spawning grounds in Seguam Pass. The Recovery Team also noted that nutritional factors appeared to be involved in the sea lion population decline and emphasized the need for designating at-sea areas adjacent to population centers where sea lions were commonly known to forage, and where the groundfish fisheries, particularly for pollock, were heavily concentrated (SSLRT 1991). The Recovery Team recommendation led to designation as critical habitat by NMFS in 1993:

> *"These sites were selected because of their geographic location relative to Steller sea lion abundance centers, their importance as Steller sea lion foraging areas, their present or historical importance as habitat for large concentrations of Steller sea lion prey items that are essential to the species' survival, and because of the need for special consideration of Steller sea lion prey and foraging requirements in the management of large commercial fisheries that occur in these areas."* (NMFS 1993)

The designated 20 nm rookery and haulout areas protect vital nearshore areas but do not begin to encompass the extensive seasonal movements and foraging ranges of the Steller sea lion in the fall-winter months, when prey are more scarce and many prey fish move offshore to deeper waters. In the EA/RIR for Amendments 20 and 25 to the BS/AI and GOA Fishery Management Plans (Proposed Prohibition to Groundfish Trawling in the Vicinity of Steller Sea Lion Rookeries, 1991), NMFS determined that a seasonal trawl closure strategy comprised of 20 nm closures in summer and 60 nm closures in winter (Oct 1-Apr 30) would best approximate Steller sea lion seasonal foraging patterns:

> *"This alternative approximates the maximum observed foraging distance of females with pups during the breeding season, and provides a large closed area during winter to better encompass winter foraging habitats and compensate for increased nutritional need and stresses."* (NPFMC/NMFS 1991)

The agency has acknowledged that the existing rookery no-trawl zones are inadequate, not only for failing to protect winter foraging habitat proximal to haulout sites but for failing to protect accustomed winter foraging grounds farther offshore, which are necessary for the survival and recovery of the species in the CVOA region. These repeated agency findings underscore the need for trawl closure areas in both the nearshore habitats *and* in the larger aquatic foraging areas. The draft RPAs fail to address this need, particularly in the heavily exploited CVOA/critical habitat area. The RPA proposal to limit the A-season pollock catch in the CVOA to no more than 50% of the large A-season roe pollock TAC would still result in a major pulse fishery concentrated in the heart of accustomed sea lion winter foraging grounds on schools of prespawning and spawning pollock.

In addition to concerns about the localized effects of this large pulse fishery on the availability of energy-rich, roe-laden pollock in winter foraging habitat of Steller sea lions during the difficult winter months, NMFS has not considered possibly large *indirect effects* that roe fisheries may have on pollock year-class size and the annual production of juvenile pollock, which are a prime food source for many other groundfish as well as declining seabird colonies and populations of endangered Steller sea lions, depleted northern fur seals and depleted (but unprotected) Pacific harbor seals in the eastern Bering Sea:

> "*Roe fisheries could reduce the number of small pollock available to marine mammals and sea birds simply by reducing the number of spawners, by disrupting spawning behavior, and by removing a disproportionate number of female fish. These second-order fishery effects may have substantial impacts on North Pacific Ocean ecosystems and should be the subject of further research.*" (Merrick 1995)

Aside from concerns for sea lions and other pollock predators, the scale of the roe pollock fishery should be cause for immediate measures to reduce the A-season fishery in the interests of protecting a steadily declining spawning stock. Densely-schooling spawning aggregations are more vulnerable to overfishing, and pollock is no exception. Episodes of intense fishing on spawning stocks in the Shelikof Strait (1981-1985) and Bogoslof Island (1987-1991) have been followed by steep declines in pollock abundance in each of those areas.

The 4 November 1991 Aron memo notes that the southeastern Bering Sea shelf is an important pollock spawning ground and suggests that the spawning stock may benefit from reduced catches in the area: "*Due to the predominant currents and drift of pollock eggs and larvae, this area probably contributes more to successful recruitment to the pollock population of the Eastern Bering Sea than spawning ground northwest of the Pribilofs. Consequently, from a pollock management perspective alone, it might be prudent to direct effort away from the Area.*"

For all of these reasons, a seasonal 60 nm trawl closure area in eastern Aleutian critical habitat is reasonable, prudent and essential to minimize the risk that this giant fishery is jeopardizing Steller sea lions or adversely modifying their critical habitat. Without this constraint there is no reasonable assurance that the fishery is not posing a significant competitive limit on recovery of the endangered population.

B. The Need for a Year-Round CVOA

During the fall "B" season, the Catcher Vessel Operation Area (CVOA) affords some limitation on effort and catch by excluding the offshore component of the pollock fleet, but the CVOA is not in effect during the winter roe pollock fishery when both offshore and inshore sectors concentrate their effort in the Area (and in critical sea lion foraging habitat) at the time when pollock aggregate for spawning. A year-round CVOA is the only way to prevent a continued race for fish by an overcapitalized high tech fishing fleet whose fish-catching capacity will continue to exceed the available quota.

The Inshore/Offshore-3 EA/RIR (NMFS 1998) evidenced the efficacy of the proposal to establish the CVOA throughout the pollock fishing year as a means of reducing excessive fishing pressure in this ecologically sensitive area:

- Section 6.4.3 indicated that exclusion of the offshore sector from the CVOA in the "A" season "would likely result in the greatest reduction in pollock removals." Section 5.3.1 indicates that exclusion of factory trawlers would provide the single greatest reduction from the CVOA: about 23%, from 554,628 mt down to 426,111 mt. By excluding catcher vessels delivering to true motherships, the reduction in A-season CVOA catch goes to 40% -- to 333,558 mt. These two measures combined would result in the biggest reductions in CVOA/CH catch during the "A" season.
- By excluding catcher vessels delivering to true motherships in the "B" season catch of pollock will "likely" be reduced (Section 6.4.3, p. 217). That portion of the fleet represents about 100,000 metric tons or approximately 10% of the TAC in recent years.

The Inshore/Offshore 3 EA/RIR noted that during years with extensive ice coverage vessel may have to fish close to the ice edge "or perhaps even forgo harvesting the pollock while roe is prime to avoid the ice." However, that document assumes a status quo A-B seasonal split. When quarterly allocations and reductions in catch for critical habitat protection are considered, the likely impacts of excluding the offshore sectors of the fleet can be seen as the least disruptive to the pollock industry. The inshore fleet could continue to fish in this area within the framework of quarterly and area limits and protection of critical foraging habitat areas, including expanded no-trawl zones.

4. The Need For A Moratorium On Aleutian Islands Pollock Fishing.

In light of low stock abundance, recruitment trends, and concerns for second prey availability, a moratorium on directed pollock fishing in the AI is needed. If eventual recovery of the stock led to renewed fishing in the future, the same seasonal allocation regime being applied in the eastern Bering Sea should be applied to the AI, as well as spatial allocation of the TAC. However, the draft RPAs do not recommend even a de minimis spatial allocation according the three broad management subareas in the Aleutian Islands (Districts 541, 542, and 543), much less temporal allocation. The omission of time-area regulations for the fishery is a glaring inconsistency.

For management purposes, the Bering Sea pollock stock is divided into eastern Bering Sea, Aleutian Basin and Aleutian Island "stocks." However, there are large uncertainties regarding the appropriateness of defining Aleutian Island and Aleutian Basin pollock as separate stocks (Wespestad et al. 1997). Since strong year classes of pollock in the latter two regions have been similar to those in the eastern Bering Sea, it may be that a density-dependent "spillover" effect from large year classes spawned on the EBS shelf is necessary to replenish the outlying regions. If so, the declining population on the EBS shelf and the absence of extremely large year classes in the 1990s may be the limiting factor in the recovery of pollock in the Aleutians (Wespestad et al. 1997).

In the Preliminary Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands as Projected for 1997, Summary Section (p. 8), the BS/AI Plan Team recommended a moratorium on directed fishing for AI pollock:

> "*...the Plan Team believes that the Aleutian pollock fishery should be managed on a bycatch-only basis for the following reasons: 1) the trawl survey time series indicates that the Aleutian pollock biomass has declined sharply and consistently since 1983, and gives no reason to expect an upturn in the foreseeable future; 2) some fish captured in the Aleutian Islands region may be part of the Aleutian Basin stock, a stock on which fishery impacts should be minimized; and 3) pollock has been shown to be an important prey item for Steller sea lions breeding on rookeries just to the east of the Aleutian Islands management area, rookeries which recently have fared better than those for which the availability of prey consists largely of Atka mackerel.*" (NPFMC, 1996).

The Aleutian Islands pollock fishery has declined steadily from about 80,000 metric tons in 1990-1991 to <25,000 metric tons in 1998 as the estimates of pollock abundance have declined. Based on current trends in the EBS, the likelihood of rebuilding depleted pollock populations elsewhere may be slim. Large uncertainties about stock structure and dynamics require a more precautionary approach to exploitation of the diminished EBS stock, as well as an immediate moratorium on fishing for the depleted Aleutian pollock stock in order avoid the risk of a fishery-induced collapse.

The draft RPAs fail to address these concerns or to apply the same management principles to this component of the pollock fisheries.

5. The Need For TAC Reductions.

The failure to reduce the TAC in proportion to the amount of the catch displaced by the closure of the Bogoslof area (518) to directed pollock fishing in 1992-93 resulted in intensified exploitation of the CVOA/critical habitat, especially in the first quarter of the year on spawning pollock, and contributed to the concentrated pulse fishery that must now be addressed. Concurrent with the implementation of the other measures needed to avoid jeopardy and adverse modification, the allowable catch should be reduced to prevent displaced effort from creating new problems elsewhere.

We appreciate your consideration of these comments. We will continue to monitor the agency's progress, and look forward to prompt and significant action on this matter.

Sincerely,

Susan J. Sabella
Greenpeace

Michael C. Barnette
American Oceans Campaign

Cc: Andrew A. Rosenberg, Deputy Assistant Administrator, NMFS
Hilda Diaz-Soltero, Director, Office of Protected Resources, NMFS

Attachment # 5

GREENPEACE

James W. Balsiger
Acting Regional Administrator
National Marine Fisheries Service
PO Box 21688
Juneau, AK 99802-1668

October 23, 1998

The information provided today has previously been presented by Greenpeace as testimony to the NPFMC in December 1997, and as amendment proposals for the Atka Mackerel, and GOA and BS/AI pollock FMPs in 1998.

Central to Greenpeace's position is the concern that overfishing in a single species context may actually be occurring, and that overfishing in an ecosystem context is having a severe detrimental impact on endangered Steller sea lions in the Eastern Bering Sea.

Greenpeace has previously noted that the BS/AI pollock fishery continues to be plagued by repeated targeting of a few strong year classes; the risk of recruitment overfishing; large uncertainties about stock structure and stock rebuilding; spatial and temporal compression of the pollock fishery; and soaring catches in Steller sea lion critical habitat.

As has been previously suggested, the spatial and temporal compression of the pollock fishery in Steller sea lion critical habitat and aquatic foraging areas will lead to the inevitable localized depletion of pollock stocks. Even if the overall pollock exploitation rate appears conservative, in a temporal and spatial context the fishery is not sustainable at these high rates. Reasonable and prudent efforts to save the endangered Steller sea lion call for a restructuring of the management of the pollock fishery, to save pollock stocks and reduce this compression.

To reiterate our previous recommendations, there appears to be no other viable way to reduce the impacts of shrinking pollock stock and concentration of this fishery in sensitive wildlife foraging habitats than to make a significant reduction in the Eastern Bering Sea pollock quota. Furthermore, to relieve the temporal and spatial compression of the pollock fishery, Greenpeace recommends:

1. a seasonal allocation, at least quarterly, of the pollock fishery, to reduce the first quarter pollock roe fishery to no more than 25% of the BS/AI TAC, in order to spread the fishery out seasonally. Especially, given the stock decline, it makes no sense to continue to hammer on spawning stocks at current rates.
2. The CVOA should be established year round, setting aside the offshore trawl sector portion of the CVOA catch in order to decrease 1st quarter catch and increase prey availability in Steller sea lion critical habitat which is extensively overlapped by the CVOA boundary.
3. An extension of year-round trawl exclusion zones out to 20 nm around Steller sea lion rookeries and haulouts listed as critical habitat in BS/AI management area.
4. Apply the same trawl exclusion zones around major haulout sites at which more than 100 animals have been counted but which are not currently listed as critical habitat.

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5. Expand no trawl zones to 60 nm seasonally or year-round to protect the full extent of the eastern Aleutian Island aquatic foraging area from Unimak Pass to Islands of the Four Mountains.
6. Protect EBS pollock spawning and nursery grounds in CVOA/critical habitat in the areas north and west of Unimak Island.

All of this information has previously been presented by Greenpeace to the Council and Plan Team. We have repeatedly addressed the problem of overfishing in a single species context over the past several years; now, to stop overfishing in an ecosystem context, the burden is placed on the agency to protect the endangered Steller sea lion. The Steller sea lion was listed as "endangered" over a year ago, but as yet the agency has taken no significant steps to reverse this decline in population. Taking clear action to protect the Steller will send a clear signal of how serious the Agency's commitment is to fulfilling their obligations not only under NEPA but under the ESA as well.

Paul Clarke
Greenpeace Oceans Campaign

Brent C. Paine
Executive Director

UNITED CATCHER BOATS
U C B
Washington · Oregon · California · Alaska

Steve Hughes
Technical Director

October 29, 1998

James W. Balsiger
Acting Regional Administrator
Alaska Regional Office
National Marine Fisheries Service
709 W. 9th Street, #401
Juneau, Alaska 99802

Re: **Fisheries Management Plans for BS/AI and GOA Groundfish Fisheries - Endangered Species Act Issues Related to Steller Sea Lions and 1999 Pollock Management Measures**

Dear Dr. Balsiger:

This letter is written on behalf of United Catcher Boats, At-sea Processors Association, Pacific Seafood Processors Association, Trident Seafoods and Tyson Seafoods. We are writing to state our concerns about the National Marine Fisheries Service's Section 7 consultation pursuant to the Endangered Species Act with respect to the potential impacts of the 1999 pollock fisheries in the Bering Sea/Aleutian Islands and Gulf of Alaska on the endangered Steller sea lion (SSL). We request that this letter and its attachments be made part of the administrative record for that consultation.

Representatives of our organizations attended the scoping meetings held by NMFS on this issue on October 23 and 26, 1998. From the discussions at those meetings, it appears to us that a finding by NMFS that the 1999 pollock fisheries are likely to jeopardize the western population of SSL may be imminent. We do not believe that the best available scientific and commercial data support such a conclusion for the reasons outlined below and in the enclosed paper by Dr. Dayton L. Alverson entitled *The Steller Sea Lion and Pollock --- Perspectives on Fisheries Interaction* (Attachment 1).

In evaluating the potential impacts of the pollock fisheries, NMFS must consider whether the fisheries reasonably may be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of SSLs by reducing the reproduction, numbers, or distribution of the species. NMFS' guidance states that it is the policy of the agency to "(1) evaluate all scientific and other information used to ensure

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that it is reliable, credible, and represents the best scientific and commercial data available [and] (2) gather and impartially evaluate biological, ecological, and other information disputing official positions, decisions, and actions proposed or taken by the Services" (emphasis added). *Final ESA Section 7 Consultation Handbook, March 1998, p. xi.*

In this instance, while NMFS is under compressed timelines as a result of litigation, it is also reviewing an issue which it has considered on an annual basis for the last several years. As discussed in Dr. Alverson's paper, there is a growing body of knowledge about SSLs and that information suggests that the pollock fisheries are not the cause of the initial decline nor a critical factor in the continued decline of the SSL, and that conducting the 1999 fisheries in the same manner as the 1998 fisheries is not likely directly or indirectly to reduce the reproduction, numbers or distribution of the SSL or to adversely modify SSL critical habitat. The best available science, as analyzed in Dr. Trite's paper (provided under separate cover), indicates that the major contributor to SSL declines is the unsuitable quality of available prey rather than the abundance of prey. Put simply, current information suggests that SSL are eating more than enough low-fat pollock but not enough high-fat herring, sandlance, capelin and other small forage fish. Further, several scientists postulate that rather than degrading critical habitat, the groundfish fishery in critical habitat may indirectly benefit SSL by removing adult pollock which would otherwise cannibalize the young pollock upon which SSL, especially juvenile SSL, feed (Attachment 2).

NMFS has not cited any new data or information that would suggest that the potential impacts of the 1999 fishery are any different from the potential impacts of the 1998 or previous fisheries for which NMFS made a finding of no jeopardy. The potential interactions between SSL and the fishery have not changed. The fishery targets larger, older pollock while SSL eat smaller, younger pollock (Attachment 3). The fishery trawls at greater depths than the relatively shallow depths to which juvenile SSL dive to feed (Attachment 4). As demonstrated in Dr. Alverson's paper, there is little if any evidence to suggest that localized fishing has led to negative impacts on the overall SSL population in the region where the species has been declared endangered.

The potential impacts of the pollock fishery cannot be considered in isolation. Although a number of scientists believe that nutritional problems are at the heart of the SSL decline, very few write off other potential causes as contributing to the decline, such as disease, disturbance, subsistence harvest, predation, illegal killing and incidental catch (Attachment 5). If, as current information suggests, nutritional stress due to inadequate consumption of fatty fish by SSL is at the heart of the SSL decline, increasing the quantities of young pollock available to the SSL population is unlikely to improve the survivability of juvenile or adult SSLs. There is little or no evidence to support the theory that the trawl fishery in SSL critical habitat results in localized depletion of young pollock, and no information upon which to base a conclusion that the fishery appreciably diminishes the value of constituent elements essential to the SSL population's conservation. In fact, the best scientific information clearly shows an inverse relationship between SSL decline and increased pollock harvest from SSL critical habitat (Attachment 6).

In summary, we continue to believe that the best scientific and commercial data available support a finding of no jeopardy and no adverse modification of critical habitat for the 1999 pollock fisheries. Nevertheless, we understand that NMFS is engaged in developing reasonable and prudent alternatives (RPAs) that include fisheries management measures that would be incorporated into the 1999 fisheries if a jeopardy finding is made. We are deeply concerned that the draft RPAs discussed at the scoping meetings will not achieve the regulatory goal of avoiding the likelihood of jeopardizing the continued existence of SSLs or the destruction or adverse modification of their designated critical habitat. Further, we do not believe that the agency's draft RPAs are economically and technologically feasible. Consequently, although the best available data does not support a jeopardy finding or the imposition of RPAs, we have enclosed a chart outlining management alternatives that meet the criteria for RPAs and should be considered by the agency if a jeopardy finding is made (Attachment 7).

In addition, we are concerned that the agency's current process is not taking into account the very real changes that will take place in the pollock fisheries as a result of the passage of S 1221. To the extent that the agency is concerned about dispersing the fishery in order to avoid the potential for localized reductions in pollock populations, it should recognize the temporal dispersion that will occur as a result of S 1221. As large catcher/processors are removed from the fishery and the quota is shifted to smaller shore-based catcher vessels, daily catch rates will decline fleet-wide and the lengths of the seasons will be extended (Attachment 8).

We appreciate your consideration of our concerns, and will be available to discuss this issue further with you and your staff as the management measures for the 1999 pollock season are developed.

Very truly yours,

Steve Hughes by [illegible]

Steve Hughes
Technical Director

Attachments

ATTACHMENT 1

(THIS PAPER ALREADY INCLUDED
W/ MIDWATER TRAWLER COMMENT)

ATTACHMENT 2

Vol. 102: 205–215, 1993 | MARINE ECOLOGY PROGRESS SERIES Mar. Ecol. Prog. Ser. | Published December 30

Importance of predation by groundfish, marine mammals and birds on walleye pollock *Theragra chalcogramma* and Pacific herring *Clupea pallasi* in the eastern Bering Sea

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ABSTRACT: Consumption of walleye pollock *Theragra chalcogramma* and Pacific herring *Clupea pallasi* by groundfish predators in the eastern Bering Sea was quantified and described using data obtained in 1985–88. Groundfish predators considered here include walleye pollock *Theragra chalcogramma*; Pacific cod *Gadus macrocephalus*; yellowfin sole *Pleuronectes asper*; flathead sole *Hippoglossoides elassodon*; rock sole *Pleuronectes bilineatus*; Alaska plaice *Pleuronectes quadrituberculatus*; arrowtooth flounder *Atheresthes stomias*; and Greenland turbot *Reinhardtius hippoglossoides*. Marine mammal and bird consumption of pollock and herring was estimated for 1985 and compared with groundfish consumption. Groundfish predation on pollock during this time period was dominated by cannibalism on age-0 pollock by adult pollock. The highest predation rate occurred in 1985 when the largest pollock year class, as assessed at age 1, during the time period was produced. Predation mortality estimates by age on the 1985 year class were higher than adjacent year classes. Apparently, predators responded to the increased abundance of the 1985 pollock year class by switching to predation on that year class. The impact of this predation appeared to dampen the size of the 1985 year class at age 3 relative to other adjacent year classes. Marine mammal and bird predation on pollock was small relative to pollock cannibalism. However, marine mammal predation on older pollock was more important, almost doubling the estimated predation mortality rate of age-2 fish. Herring consumption by groundfish predators tended to be sporadic in time and space and may have depended on encounter rates of herring schools rather than overall biomass. Pacific cod was the most consistent groundfish predator on herring. There was no apparent relationship between biomass of herring consumed by groundfish predators and cohort analysis estimates of herring biomass in a given year, suggesting no density-dependent predator response. Marine mammal and bird predation on herring was approximately the same as that by groundfish in terms of weight and about half in terms of numbers. Total predation removals of herring were not large relative to exploitable stock size, indicating that predation of juvenile herring, at least during summer periods typically sampled, was not an important source of herring mortality.

KEY WORDS: Groundfish predation · Marine birds · Marine mammals

INTRODUCTION

Walleye pollock *Theragra chalcogramma* and Pacific herring *Clupea pallasi* are prey to some marine fish, birds, and mammals in the eastern Bering Sea (Hunt et al. 1981, Lowry & Frost 1985, Livingston et al. 1986, Dwyer et al. 1987). Pollock, in particular, has been a major food item in the diets of most of these predators during certain study periods, which typically lasted 1 to 2 yr. However, the abundance trends of pollock and Pacific herring in the eastern Bering Sea over the last 25 to 30 yr have been cyclic in nature, with the biomass of each species showing 2 major periods of increase and decrease (Wespestad 1991, Wespestad & Dawson 1991) (Fig. 1). Furthermore, the recruitment of particular year classes has fluctuated even more widely from year to year (Fig. 2). With the exception of northern fur seals *Callorhinus ursinus* during the 1960–74 period,

Table 5. Estimated removals of walleye pollock and Pacific herring from the eastern Bering Sea by fishery, marine mammals, birds and fish using 1985 data where it was available

Source of removal	Walleye pollock		Pacific herring	
	Estimated biomass removed (t)	Estimated number removed (× 10⁶)	Estimated biomass removed (t)	Estimated number removed (× 10⁶)
Fishery	1 179 000[a]	2292[a]	36 625[g]	104[g]
Marine mammals	257 000[b]	9 568[c]	18 300[b]	161[h]
Fur seals	137 600	6744	0	0
Sea lions	56 000	167	0	0
Other pinnipeds	63 400	2657	18 300	161
Marine birds	272 000[d]	23 706[e]	908[i]	30[i]
Marine fish	3 865 000[f]	1 062 000[f]	19 300[j]	305[j]
Walleye pollock	3 487 000	1 016 000	0	0
Pacific cod	202 000	6 000	19 200	305
Other groundfish	176 000	41 000	100	1
Total	5 573 000	1 097 568	75 131	603
Exploitable stock size (age 3+)	9 425 000[a]	22 217[a]	448 000[g]	2416[g]

[a]Wespestad & Dawson (1991)

[b]Total food consumption estimated from energetic values in Perez et al. (1990) and mammal population sizes in Perez (1990). Diet percentages of walleye pollock and Pacific herring for fur seals and sea lions during 1985 were taken from Sinclair (1988) and unpublished data of the National Marine Mammal Laboratory, 7600 Sand Point Way NE, Seattle, WA 98115, USA, collected by P. Gearin. Diet percentages of walleye pollock and Pacific herring for other pinnipeds were not available for 1985 so long-term averages in Perez (1990) were used

[c]Estimated for fur seals using the walleye pollock prey size frequency in fur seal stomachs taken in 1985 reported in Sinclair (1988). Sea lions were assumed to eat in proportion to the sizes of pollock available (L. Fritz, Alaska Fisheries Science Center, Seattle, WA, pers. comm.) so the walleye pollock prey size frequency for sea lions was the combined population size frequency from the 1985 bottom and midwater trawl survey in Walters et al. (1988). Size frequency of walleye pollock catch by other pinnipeds was not available for 1985 so values reported by Frost & Lowry (1986) were used

[d]No data were available for 1985 so values reported in Kajimura & Fowler (1984) from studies performed by Hunt et al. (1981) from 1975 to 1978 were used

[e]Size frequency of walleye pollock in marine birds was assumed to be the same as those reported for black-legged kittiwakes (combined over months) reported by Hunt et al. (1981)

[f]Includes consumption estimates for all groundfish from May through September and for walleye pollock cannibalism for May through December

[g]Wespestad (1991)

[h]Assuming Pacific herring consumed by pinnipeds were the same sizes as those consumed by Pacific cod in 1985

[i]Assuming Pacific herring was consumed only by common and thick-billed murres on St. Matthew and Hall Islands (Springer et al. 1986) using diet percentages for 1983 and assuming a residence period of 300 and 330 d, respectively (Hunt et al. 1981). Assumed average individual weight of Pacific herring consumed was 30 g (Springer et al. 1986)

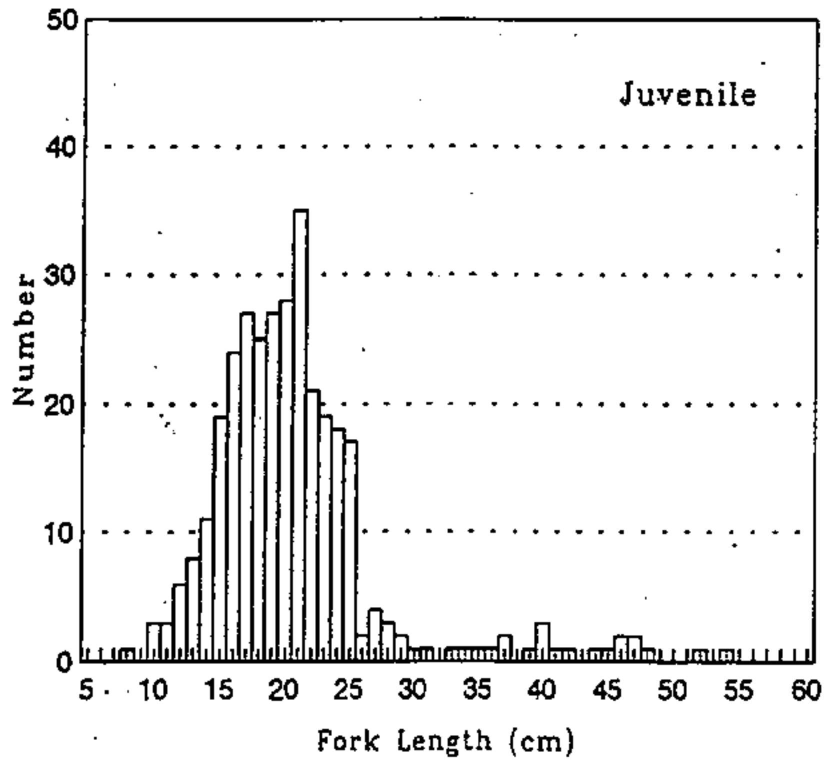
[j]Estimates of Pacific herring consumption by groundfish for the period May through September only

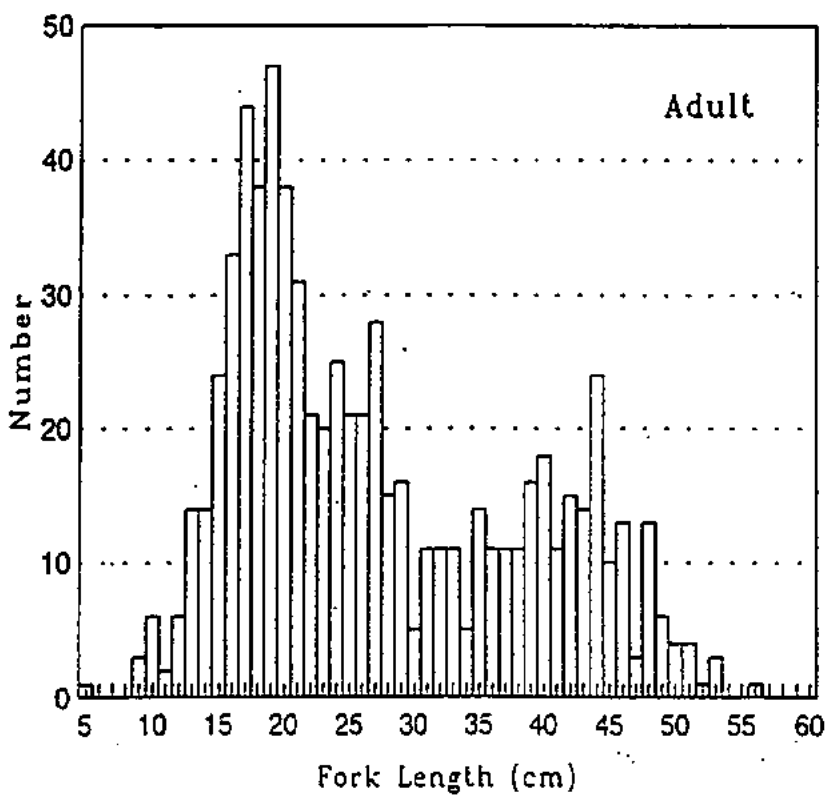
preference. Total removal of pollock biomass is more than half the exploitable (age 3+) stock biomass, while total removal of pollock in terms of number is 2 orders of magnitude greater than the number in the exploitable stock. Consumption of age-0 pollock due to cannibalism was a dominant part of biomass removals but consumption of age-1 (ca 10 to 19 cm) fish was more evenly distributed between fish, pinnipeds and birds. Fish, pinnipeds, and the fishery were the primary removers of pollock >25 cm. Most pollock >40 cm were taken by the fishery.

The estimate of pollock biomass consumption by marine mammals was about half that estimated by Kajimura & Fowler (1984), who used mammal population estimates and estimates of pollock contribution to the diet from pre-1980 data sources. Pinniped populations and the amount of pollock in their diet were larger prior to 1980, which would explain the higher pollock consumption by mammals during that period. In the present study, mammal population estimates are more up-to-date but only the estimates for fur seal and sea lion predation were actually based on 1985 food

ATTACHMENT 3

Size distribution (cm) of walleye pollock consumed by juvenile and adult Steller sea lions in the Kodiak Island area of the Gulf of Alaska in 1985.





SOURCE: NMFS

	A Season		B Season	
	Mean Length	% < 25cm	Mean length	% < 25cm
1992	48.3	0.35%	41.6	0.02%
1993	45.1	0.01%	43.8	0.02%
1994	44.9	0.03%	47.2	0.00%
1995	45.9	0.03%	48.9	0.00%
1996	47.7	0.02%	49.4	0.15%
1997	47.4	0.29%	50.4	0.07%

% in terms of numbers

BS/AI Pollock mean length from all commercial fisheries.

SOURCE: NMFS

ATTACHMENT 4

SEA STATE

Ph: (206)567-5239
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To: Paul MacGregor

From: Karl Haflinger

Re: Localized depletion in the A season pollock fishery and analysis of catch at depth

- Localized Depletion During the A-Season

The analysis is based on catch information from catcher processors and motherships participating in the offshore pollock fishery in the 1995-1998 A seasons. The objective of the analysis is to determine whether catch per unit effort data in the BSAI pollock A-season fishery could be considered consistent with localized depletion of pollock. It has been argued that localized depletion will not be evident in CPUE expressed as catch per hour because the fleet will always be fishing on high-CPUE concentrations of fish. That is to say, if a vessel is unable to find areas of high-CPUE fishing, it will search until it does find fish, and then re-start fishing operations that achieve a high CPUE. Thus, catch rates per vessel per fishing hour would never show the localized depletion that is hypothesized.

In contrast, catch per day by the entire fleet should show some evidence of localized depletion, if indeed it does occur, as catch per day would be lower as the fleet spends more and more time searching for high CPUE fishing. However, catch per day for the offshore fleet can vary after the first week of fishing since some vessels leave the grounds for days at a time to offload. For example, it is not uncommon to have 50% of the fleet off the grounds for several days and then for the fishery to run at 100% capacity for a week after all vessels resume fishing. As such, CPUE expressed as catch per day will reflect in part the number of boats on the grounds rather than just pollock abundance. Also, the type of boats on the grounds can influence catch per day since high volume surimi boats can catch and process more fish than smaller fillet boats.

To deal with these issues, I developed a "fishing success" index which is computed for each day a vessel is on the grounds. The measure is calculated as the ratio of vessel daily catch to vessel average daily catch for the entire season:

Success = (Daily Catch) / (Season average daily catch)

If the ratio equals 1.00, then catch for that day is equal to vessel season average daily catch. If the ratio is less than 1.00, then the vessel is not matching its average. If the ratio is greater than 1.00, then the vessel is doing better than its season average. If, as the season progresses, more and more search time is required to locate high-CPUE fishing, then the ratio should fall below 1.00 since the vessel daily average catch is reduced due to search time.

To arrive at a fleetwide index of fishing success, I average the measures for each vessel for each day, but only for those vessels that fished an entire day. Thus, for any given day, the fleetwide success index is:

Fleet success =
(Sum of indexes for vessels fishing that day) / (Number of vessels fishing that day)

For any given day, I eliminated vessels from the average if they were leaving from or returning to the grounds from an offload. In these circumstances daily catch is reduced since the vessel is not fishing for 24 hours each day, and such a reduction could appear as lowered success due to searching for fish. Thus, for some days there may be as few as 10 vessel indexes contributing to the fleet average, but all of the indexes are for the vessels that fished for the entire day. If depletion is occurring as the season progresses, then average daily catches measured in this way should decrease.

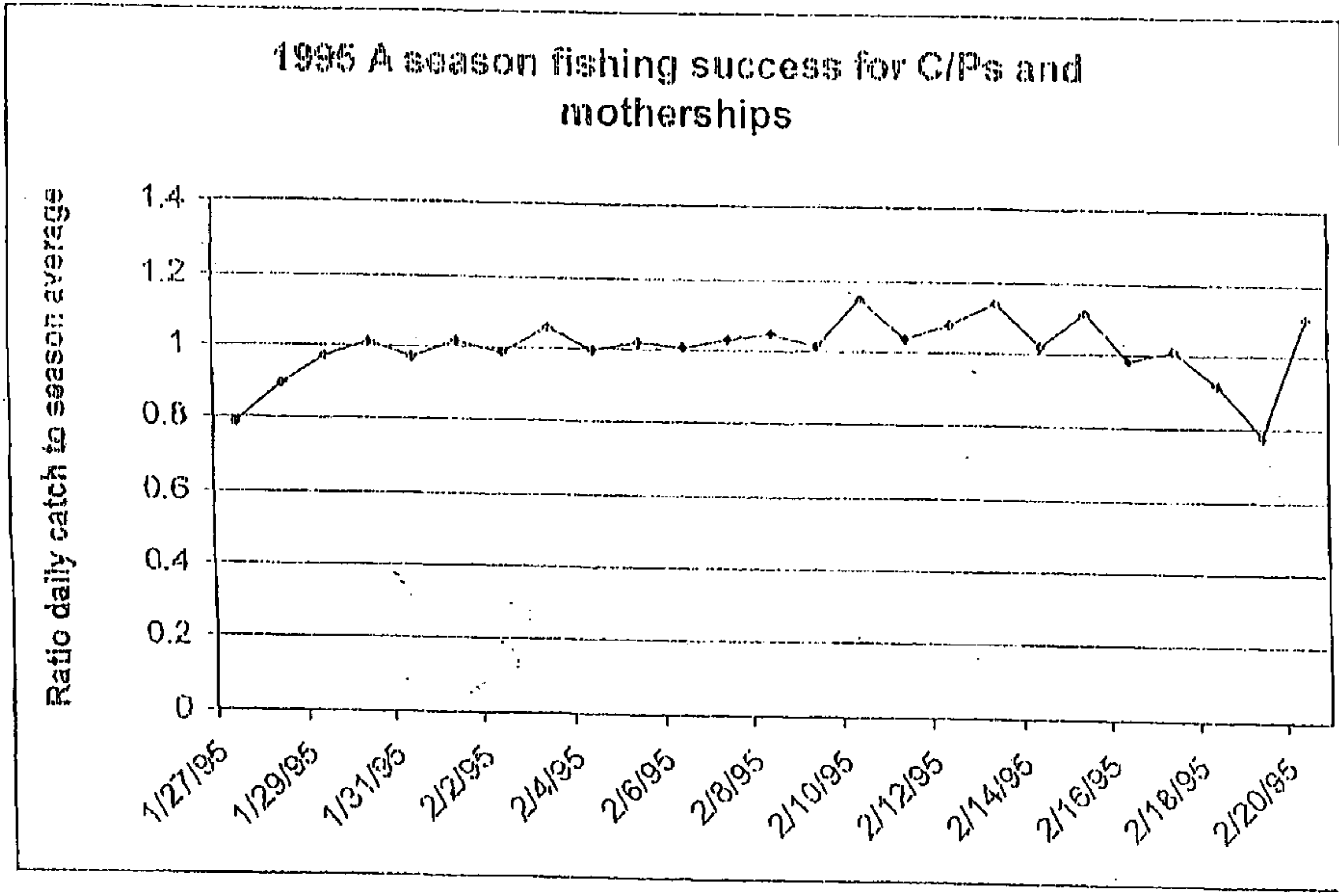
I have included plots of the results for 1995, 1996, 1997 and 1998. In all but 1996 it is clear that fishing success rose quickly and stayed fairly constant throughout the A season. In all of these plots there is a drop near the end of the A season, and this is likely due to partial offloads. Full offloads always take boats out for more than a day, so it is easy to remove the effect of full offloads by removing the partial days on either side of a gap in delivery dates. For example, if a boat shows no catch for 2/10/98, then I removed 2/9 and 2/11 as well, as the boat probably only fished on part of those days. However, near the end of the season many boats will make a quick trip to port for a partial offload. Since there is often no break in days fished (the boat may leave the grounds one evening and return the next afternoon), it is not possible to eliminate those vessel-days from the analysis, and so it could appear as if a boat had poor fishing for several days when in fact it was traveling and not fishing.

To appreciate how vessel travel time can reduce the measure of fishing success developed here, the data for 1996 can be analyzed. The year 1996 appears to show less constant fishing success. In fact, in 1996 there is a decrease in early February, followed by a subsequent increase between 2/10 – 2/15. At the time this occurred, the fleet discovered substantial concentrations of fish further onto the shelf and up towards the Pribilofs. Both offshore and onshore fleets moved out of the CVOA and up towards the Pribilofs to complete the season. This shows that regardless of whether or not the fleet can fish in the CVOA, they will leave the area if the fish are not there. The implication here is that the measure of success I have calculated is probably a conservative proxy for pollock abundance.

- Catch at Depths Greater Than 50 Meters

The catch at depth analysis shows catches made over deep water but at a fishing depth less than 50 meters, and catches made where water depth was less than 50 meters. For catches made over deep water, but at a depth less than 50 meters, the 1998 A-Season catches show the most fish so caught, but these catches were only 10% of the total catch. The analysis shows that only very small amounts of pollock catch come from areas where the water depth is less than 50 meters.

Karl


1995 A season fishing success for C/Ps and motherships
Ratio daily catch to season average
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/27/95
1/29/95
1/31/95
2/2/95
2/4/95
2/6/95
2/8/95
2/10/95
2/12/95
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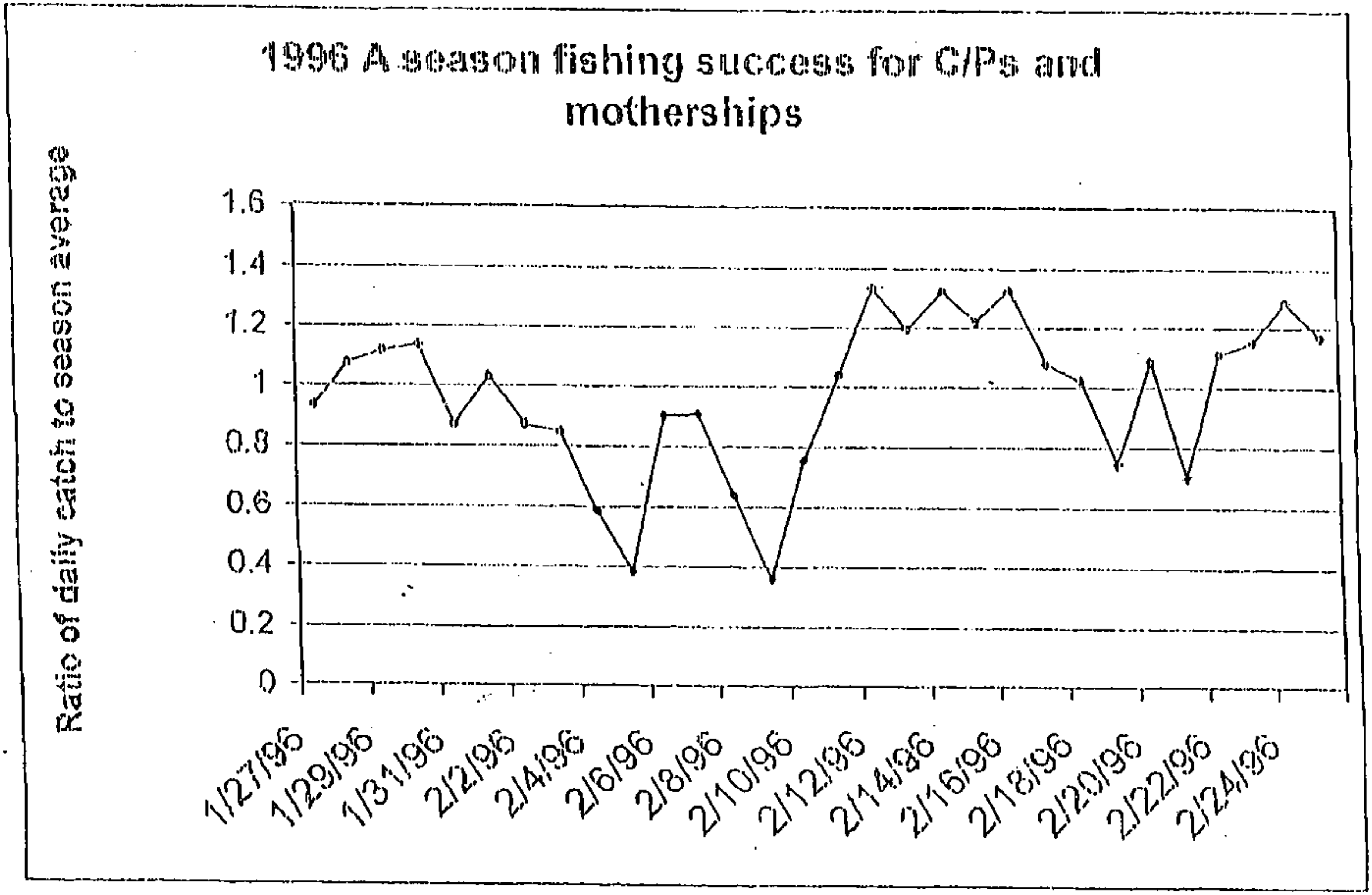
2/16/95
2/18/95
2/20/95



1996 A season fishing success for C/Ps and motherships
Ratio of daily catch to season average
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/27/96
1/29/96
1/31/96
2/2/96
2/4/96
2/6/96
2/8/96
2/10/96
2/12/96
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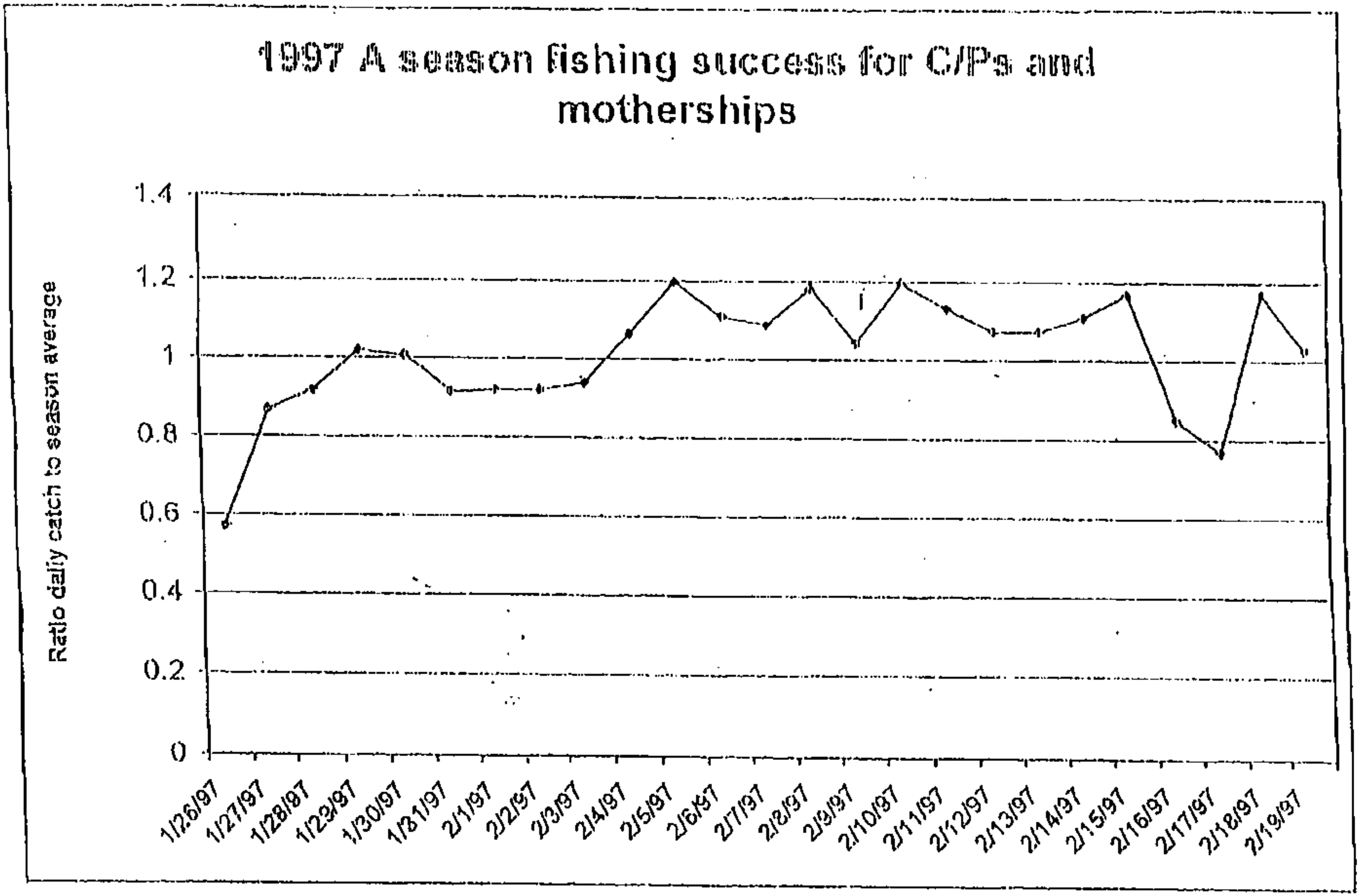
2/20/96
2/22/96
2/24/96



1997 A season fishing success for C/Ps and motherships
Ratio daily catch to season average
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/26/97
1/27/97
1/28/97
1/29/97
1/30/97
1/31/97
2/1/97
2/2/97
2/3/97
2/4/97
2/5/97
2/6/97
2/7/97
2/8/97
2/9/97
2/10/97
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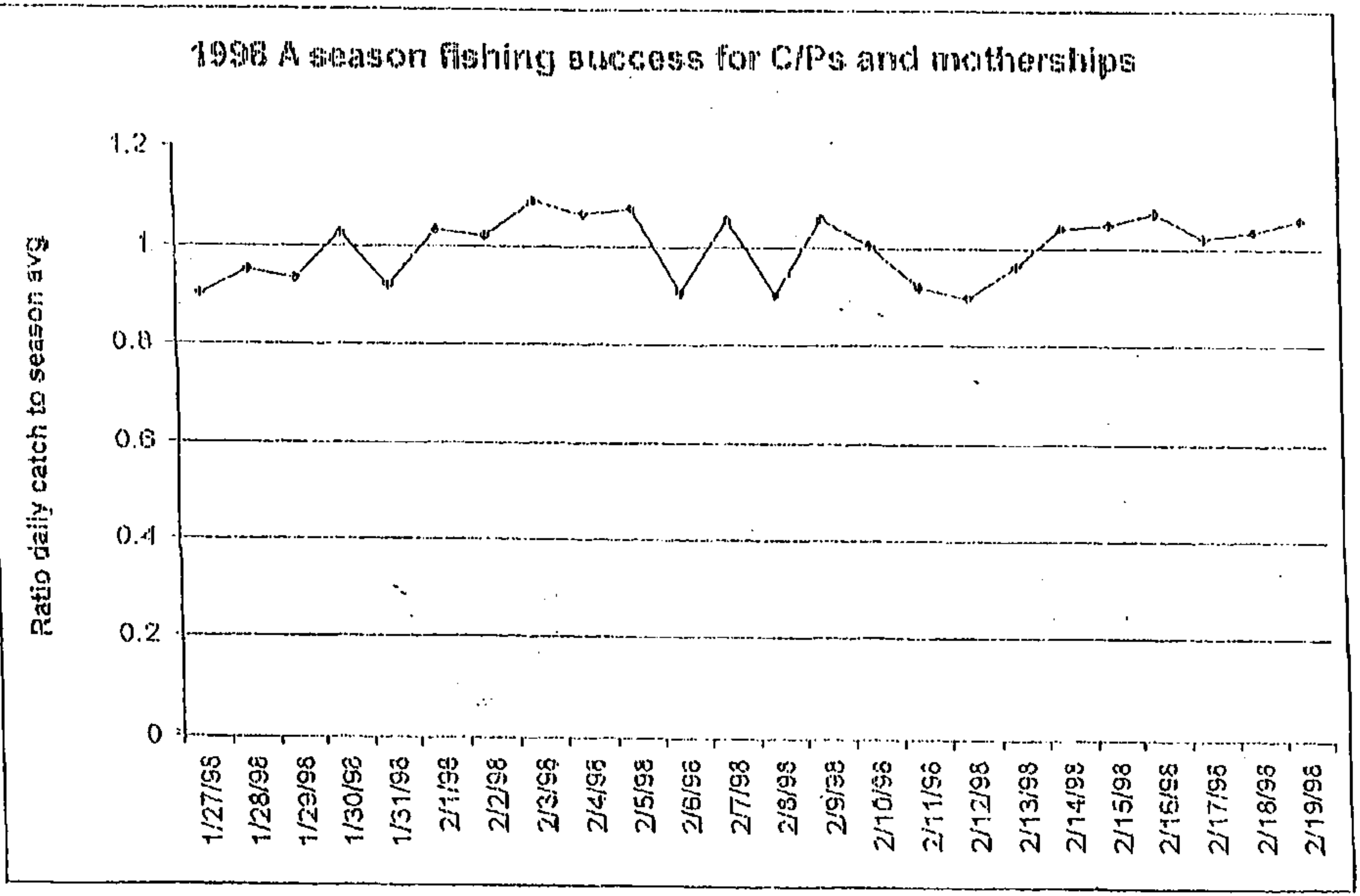
2/18/97
2/19/97


1998 A season fishing success for C/Ps and motherships
Ratio daily catch to season avg
1.2
1
0.8
0.6
0.4
0.2
0
1/27/98
1/28/98
1/29/98
1/30/98
1/31/98
2/1/98
2/2/98
2/3/98
2/4/98
2/5/98
2/6/98
2/7/98
2/8/98
2/9/98
2/10/98
2/11/98
2/12/98
2/13/98
2/14/98
2/15/98
2/16/98
2/17/98
2/18/98
2/19/98

Official total catch for tows made at a fishing depth greater or less than 50 m

Based on C/P and mothership observer data provided to SeaState

1998

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	286,932		
SHAL	33,731	320,664	10.52%

1997

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	362,978		
SHAL	8,081	371,059	2.18%

1996

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	295,769		
SHAL	19,080	314,849	6.06%

1995

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	389,557		
SHAL	8,603	398,160	2.16%

Official total catch for tows made at a location with a bottom depth greater or less than 50
Based on C/P and mothership observer data provided to SeaState

1998

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	318,665		
SHAL	1,999	320,664	0.62%

1997

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	371,059	371,059	0.00%

1996

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	313,493		
SHAL	1,355	314,349	0.43%

1995

Depth	Total catch	Deep + shallow	Percentage from shallow
DEEP	387,916		
SHAL	10,245	398,160	2.57%

ATTACHMENT 5

Steller sea lion research

A report prepared for the

U.S. National Marine Fisheries Service

National Marine Mammal Laboratory

Seattle.

I.L. Boyd

British Antarctic Survey
Natural Environment Research Council
Cambridge
UK

DEC _ 1995

Contents

Summary

1. Intense interest surrounds the potential causes of the current and historical decline in the abundance of Steller sea lions. Under U.S. legislation, the decline of such a key species can invoke management measures that could have wide-ranging economic and social consequences. This document reviews the research being undertaken on sea lions within the context of the evidence that exists for the main causes of the decline. Recommendations about the structure of research are provided that may help in the revision of the Steller Sea Lion Recovery Plan.

2. A range of proximate factors may have affected the decline. These include disease, disturbance, food availability (possibly mediated by changes in food chain structure) legal killing (including "subsistence" harvests), predation, illegal killing and incidental catch. All these factors are likely to have affected the decline historically to different degrees and at different temporal and spatial scales. Only incidental killing in fisheries can now be excluded as a current cause of the decline.

3. At present, there are only three proximate factors that can be managed to promote recovery. These are disturbance, "subsistence" hunting/illegal killing and specific aspects of commercial fisheries. In general, other factors are beyond our capacity to influence. Research should concentrate on those factors most likely to be useful in the management of the species, whether or not they can be shown to be the root cause of the decline. It is possible that the original cause(s) of the decline may not be the current cause.

4. The only proximate cause of the decline that has been quantified irrefutably is that of "subsistence" harvest which is currently 3% annually of the western subpopulation. Indiscriminate shooting could have been a major cause of the decline historically and previously its effects are likely to have been underestimated. In the past, officially sanctioned policies of localised extermination of sea lions has probably led to an attitude amongst fishermen that sea lions were fair game. Amongst scientists there has been a tendency to discount the effects of illegal shooting because there are few supporting data, but few people would dispute that shooting occurred and that it continues, albeit at a reduced level. A lack of data is more indicative of the problems associated with collecting the data than of any lack of importance of shooting as a factor influencing the decline. Illegal killing is also, therefore, likely to be a potential cause of the current decline.

5. Most of the current research effort is concentrated on examining the links between food

availability and the decline. Major shifts in the forage food available to Steller sea lions have occurred during the period of decline. The causes of these shifts are uncertain (and probably always will be) but may be due to (I) changes in climatic/oceanographic conditions; (II) stochastic or chaotic behavior in the main pathways of carbon flux; and/or (iii) human intervention either through the removal of fish or sea lions or both. Carrying out research to unravel this complex set of variables and interactions has appeal as a scientific problem but it may not provide answers to the question of how best to manage the Steller sea lions to optimise the chances of recovery.

6. Weak evidence exists to link the decline with reduced food availability. Two main arguments have tended to focus recent hypotheses. These are that (I) the condition of adults declined between the mid-1970's and the mid-1980's when the rate of decline was maximal in the area where sampling was carried out and (II) the population age structure suggested that low juvenile survival was the principal ultimate cause of the decline. Both these conclusions are based on culled samples from the population that are subject to potentially important biases of an unknown nature and scale. Although much work remains to be done, no additional evidence of low food availability inducing low juvenile survival has been forthcoming in recent years. In fact, there is also evidence to support the hypothesis that there has been low adult female survival (Appendix II).

7. There have been substantial fisheries in areas designated as critical habitat for Steller sea lions but, unless the magnitude of these fisheries is expressed in terms of the available biomass and there is an indication of the rate of flux of prey between critical and non-critical habitat, it is difficult to come to any conclusions about the potential impact of fisheries on sea lions even within the current exclusion zones. New research is required to examine the effects of changes in the rates at which sea lions encounter prey under different levels of fishing. There is a need for more information about fish behavior collected at the same spatial and temporal scales as data about sea lion behavior (Appendix V).

8. Circumstantial evidence exists to suggest that changes in food availability could have been a cause of the decline but that this may no longer be the main cause. Density-dependent responses, in terms of population size and the condition of pups, are possibly being observed amongst Steller sea lions in the Eastern Aleutians.

9. A strong precautionary principle should be adopted towards sea lion - fisheries interactions. This is exemplified by the fishery exclusion zones now in place around sea lion rookeries. Despite this, there is support for the view that fisheries and sea

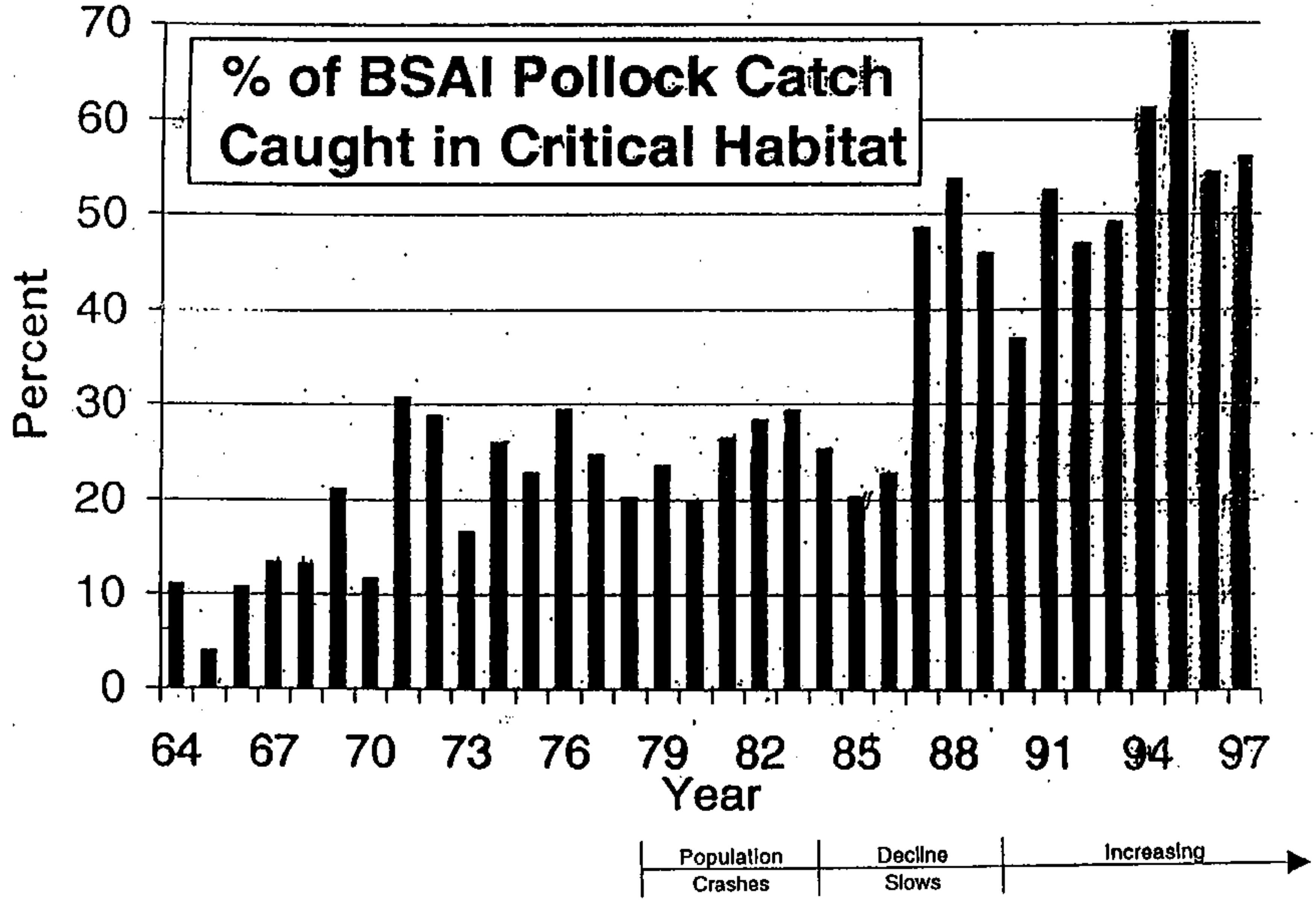
lions do not compete directly since the fisheries are, in general, targeted at species or age classes that are not highly important in the diet of sea lions. Although this may result from competitive exclusion of sea lions by the fisheries, there must also be some doubt that management measures, other than the type already in place, introduced in an attempt to reduce the effects of the indirect links between fisheries and Steller sea lions will achieve the objective of aiding recovery of the sea lion populations. Our knowledge of ecosystem processes is so rudimentary that such measures may have as much chance of being harmful as of aiding recovery.

10. Taken together, this information suggests that, while academically stimulating, much of the current emphasis on food-based linkages in the ecosystem may not be fruitful in terms of producing practical management advice. There is also a need to concentrate upon current and known factors influencing the decline rather than to expend effort attempting to understand the historical context. Although the historical perspective can provide useful insights, only by *a priori* testing of newly derived data against formalised hypotheses can valuable insights be obtained. Some examples of this approach are given (Appendix III & Appendix V).

11. Research should explicitly include considerations of scale. For practical reasons, almost all data are collected at the scale of the haulout but are frequently interpreted at a regional or even larger scale. There should be an increased focus on the behavior and ecology of sea lions at haulouts (including rookeries as specific types of haulouts), underpinned by aerial surveys involving improved methods.

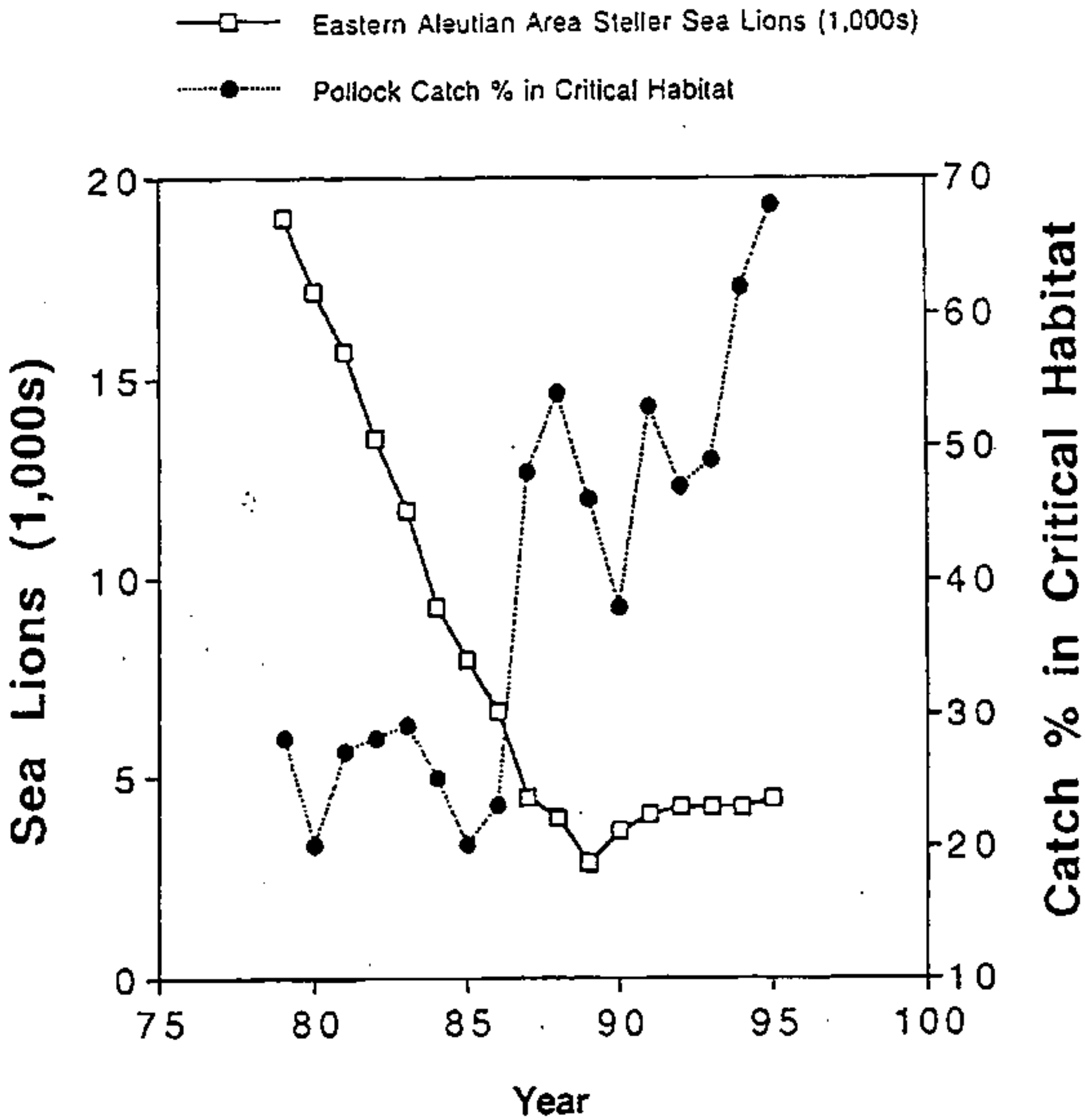
12. To undertake this research effectively throughout the range of the Steller sea lion a higher degree of coordination between research groups is required. A new consultative and planning structure is proposed that, while retaining the independence and responsibilities of each research group, would ensure that previous misunderstandings are discussed and resolved in an appropriate forum. Additional suggestions are made about the overall approach to data interpretation.

ATTACHMENT 6



SSL Population Trend vs. % Pollock in CH

SOURCE: NMFS/NRC



SOURCE: NMFS/NRC

Regression Summary
Sea lions (1,000s) vs. Catch % in critical habitat

Count	17
Num. Missing	0
R	.701
R Squared	.492
Adjusted R Squared	.458
RMS Residual	3.919

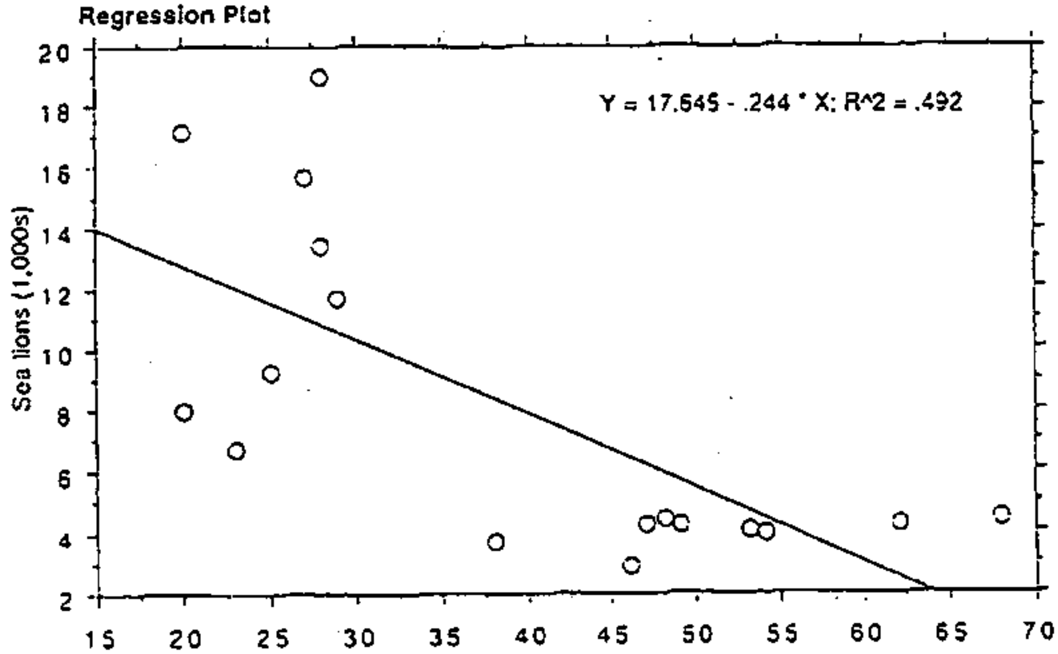
ANOVA Table
Sea lions (1,000s) vs. Catch % in critical habitat

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	223.024	223.024	14.524	.0017
Residual	15	230.336	15.356		
Total	16	453.360			

Regression Coefficients
Sea lions (1,000s) vs. Catch % in critical habitat

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	17.645	2.679	17.645	6.587	<.0001
Catch % in critical habitat	-.244	.064	-.701	-3.811	.0017

Regression Plot



SOURCE: NMFS/NRC

ATTACHMENT 7

Reasonable and Prudent Alternatives in the Bering Sea/Aleutian Islands

I. Temporal Distribution of BSAI Pollock Fishery

Management Action	Rationale
45% "A" season apportionment	▪ Effective Jan. 1, 1999, measures contained in the American Fisheries Act (SB 1221) will reduce the daily removal levels during the pollock A season and stretch out the total season length of the inshore catcher vessels – vessels that have a lower catch rate than C/Ps. ▪ Increased CDQ fishery spreads out effort even further ▪ Harvest of larger fish found in CVOA will reduce cannibalism on younger pollock ▪ "A" season pollock distribution not consistent with NMFS summer survey data ▪ CPUE data show rate of harvest and size of fish remain constant throughout A season. ▪ Best available biological & commercial data do not suggest localized depletion of pollock
Staggered start dates • Shoreside – 1/20 • Catcher Processors – 1/26 • Motherships – 2/1	• Will contribute to temporal enhancements, including those obtained through SB 1221
55% – "B" Season Apportionment (no C season)	
Staggered start dates • Shoreside – 8/1 • Catcher Processors – 8/15 • Motherships – 9/1	▪ Minimizes bycatch problems inherent in the three season proposal – particularly for chum salmon ▪ Lower weight of July pollock would mean fishery would have to harvest more fish to achieve quota ▪ July pollock fishery would result in lower yields and poorer quality
C) Delay 11/1 Closure date	▪ Accommodates extended seasons for small-boat catcher vessel fleet ▪ Promotes temporal distribution

II. Spatial Distribution of BSAI Pollock Fishery

Management Action	Rationale
Preferred Option: ▪ **Establish no trawl zone for pollock in near-shore critical habitat areas where depth is 50 meters or less** ▪ **Leave existing (6) rookery closure areas as they are – no expansion in "B" season**	▪ Smaller pollock (preyed upon by juvenile Steller sea lion) predominantly occur in depths less than 50 meters ▪ Data demonstrate that juvenile SSLs rarely dive below 50 meters ▪ Commercial fishery targets on larger fish at greater depths (98% of commercial harvest consist of fish larger than those consumed by juvenile sea lions)
▪ **The existing rookery closure areas should be closed to all groundfish fisheries and gear types, including halibut - they should not be expanded, nor should new closure areas be created**	▪ Enhances diversity of prey for SSLs ▪ Minimizes opportunities for illegal shooting of SSLs
Alternative Option: Closure of additional haul out and rookery areas Evaluate need to close areas around additional haul outs and rookeries on a case by case basis ▪ Criteria for determining exclusion zones should be based on evidence of 200 or more SSLs counted in any year since 1980. New areas to be added based on the 200-plus criterion as and if they are identified. ▪ Establish experimental controls to test closure hypothesis → Vary radii of zones → Close to some fisheries and not others → Leave some areas open to all fisheries	▪ NMFS proposal for wholesale expansion of exclusion zones is arbitrary and capricious, inconsistent with ESA Section 7 guidance, and based on outdated information ▪ This Alternative Option identifies haul-outs with some evidence of recent dependence ▪ This Alternative Option will enable marine mammal scientists to test efficacy of buffer zones insofar as rebuilding of Steller sea lion population is concerned

III. Other Fisheries

Explore issues regarding directed commercial fisheries on important forage fish in state and federal waters (e.g., herring, capelin, sand lance and other fatty fishes)	▪ Ample evidence that diversity and quality of diet play key roles in health of SSLs ▪ Herring, in particular, along with capelin and sand lance are important to Steller sea lion dietary needs ▪ Large state herring fisheries occur within SSL critical habitat

IV. Other Considerations

- Evaluate impact of subsistence removals of Steller sea lions
- Enforce prohibition against illegal shooting and harassment of SSLs
- Public education campaign concerning illegal shooting and possible repercussions for salmon fishery
- Evaluate impact of killer whale predation on SSLs
- Evaluate bycatch implications of RPAs
- Industry-funded research on distribution of pollock biomass during "A" season

ATTACHMENT 8

Projected Temporal Impacts of S. 1221 on the Bering Sea Pollock Fishery

- Projections are based on average catches during 1994-1997 but include the effects of a smaller 1.0 million mt TAC

- Projections include the effects of decapitalization measures contained in S. 1221 – measures that will remove 9 vessels from the offshore sector (18% of the offshore catcher-processor capacity) and shift 15% of the BSAI TAC to the inshore sector

- Projections do not include the increase in Community Development Quota (CDQ); the CDQ pollcok catch can be expected to further spread out the fishery over time

- Projections include S.1221 reallocation and sector staggered starts as outlined in the RPA options presented by industry

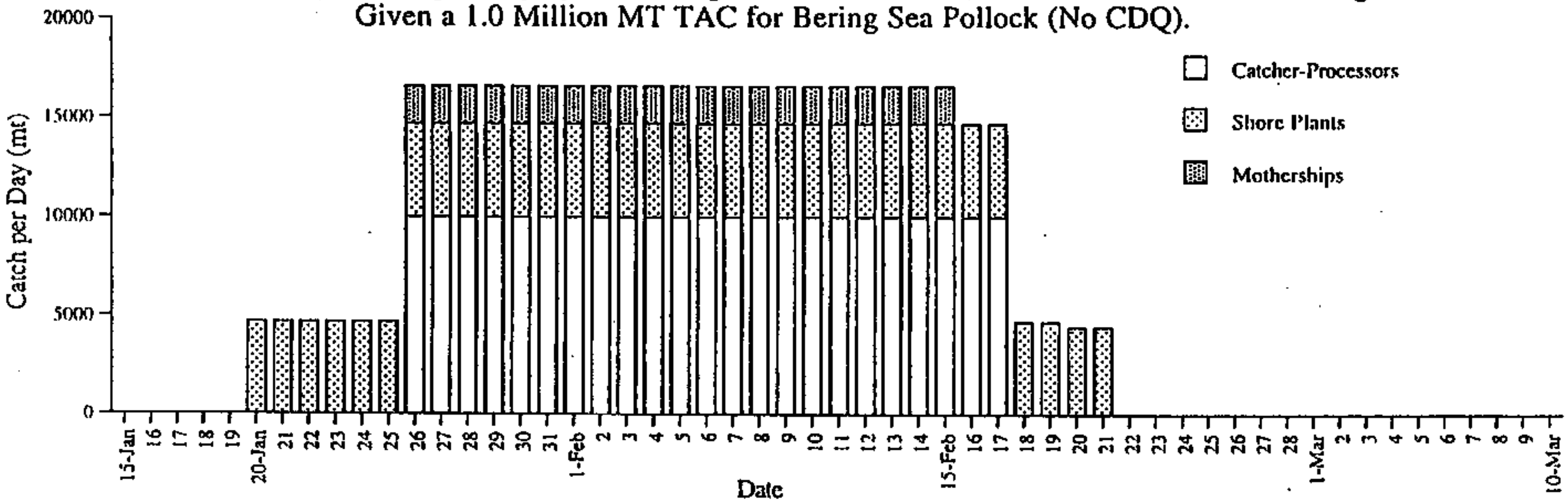
- Industry-proposed staggered starts are focused on reducing the potential for localized depletion, especially during the B-season. Compared with average 1994-1997 catch rates, B-season projected per-day harvest rates, under S.1221 and a staggered start, are decreased by 45% and the length of the combined B-season fishery increases to 64 days from 37 days – an increase of more than 70%

- Decapitalization offshore also reduces the potential for localized depletion during the A-season. Compared with average 1994-1997 catch rates, A-season projected fishery-wide per-day harvest rates, under S.1221 and a staggered start, are lowered by 30% on average, and the length of the combined A-season fishery increases to 43 days from 31 days

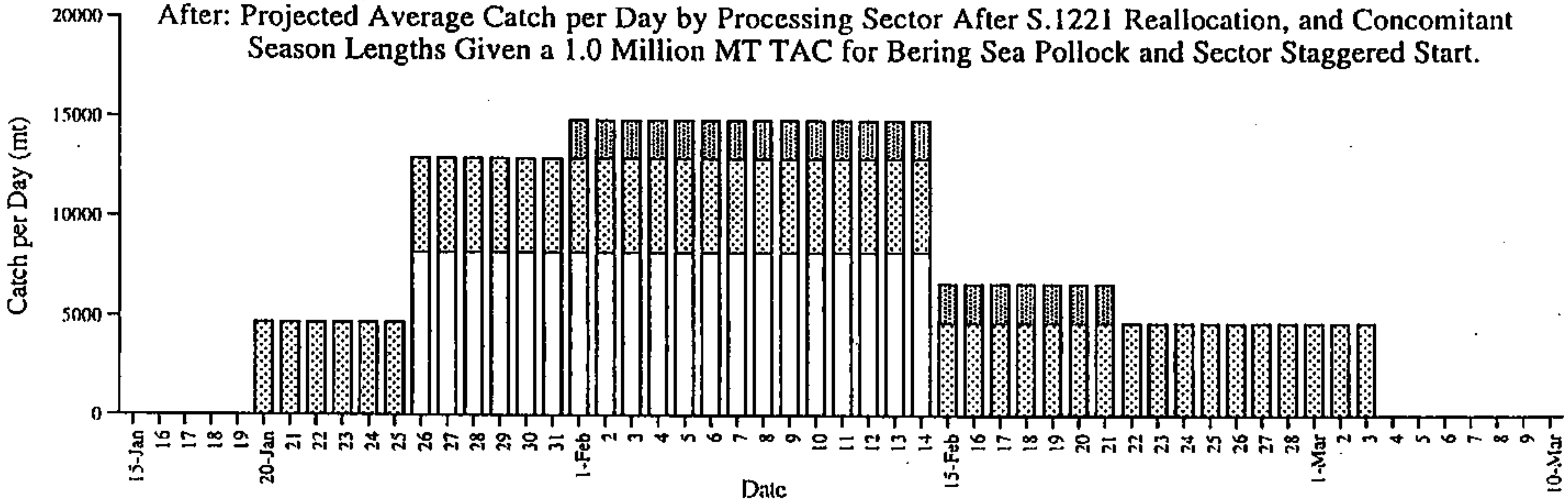
- Projections do not include any market driven fishery changes as might occur, e.g., via harvest cooperative arrangements among industry sectors as sanctioned by S. 1221

Bering Sea Pollock A-Season Daily Catches Before and After Implementation of S.1221

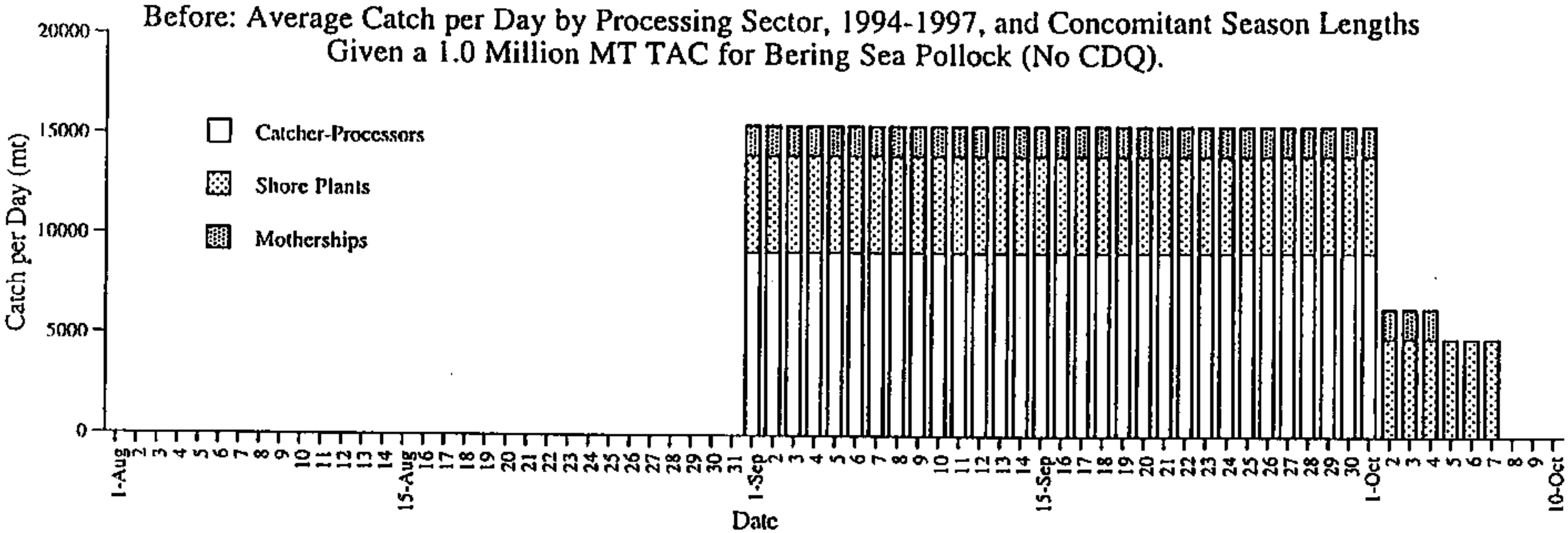
Before: Average Catch per Day by Processing Sector, 1994-1997, and Concomitant Season Lengths Given a 1.0 Million MT TAC for Bering Sea Pollock (No CDQ).

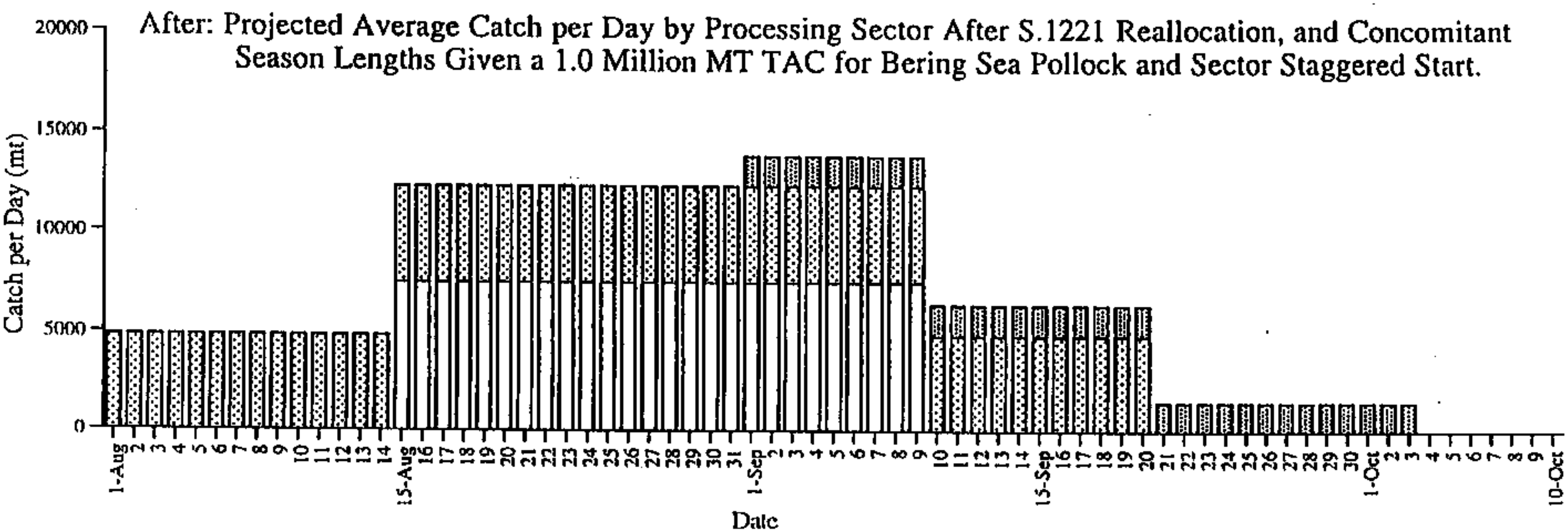


After: Projected Average Catch per Day by Processing Sector After S.1221 Reallocation, and Concomitant Season Lengths Given a 1.0 Million MT TAC for Bering Sea Pollock and Sector Staggered Start.

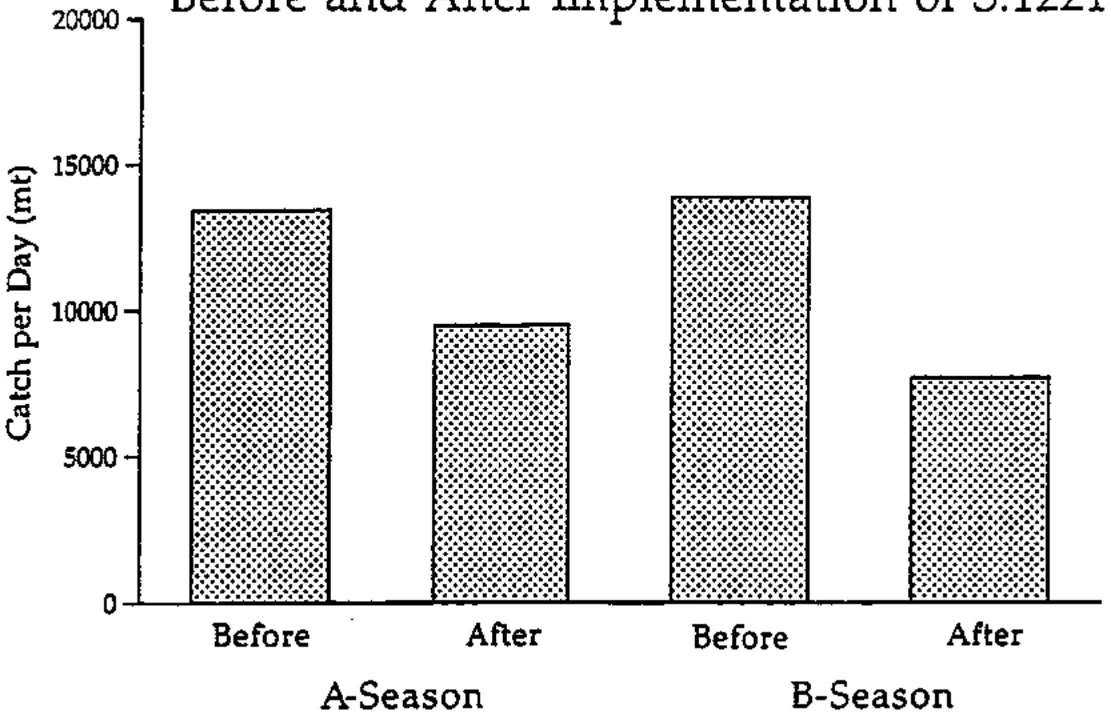


Bering Sea Pollock B-Season Daily Catches Before and After Implementation of S.1221

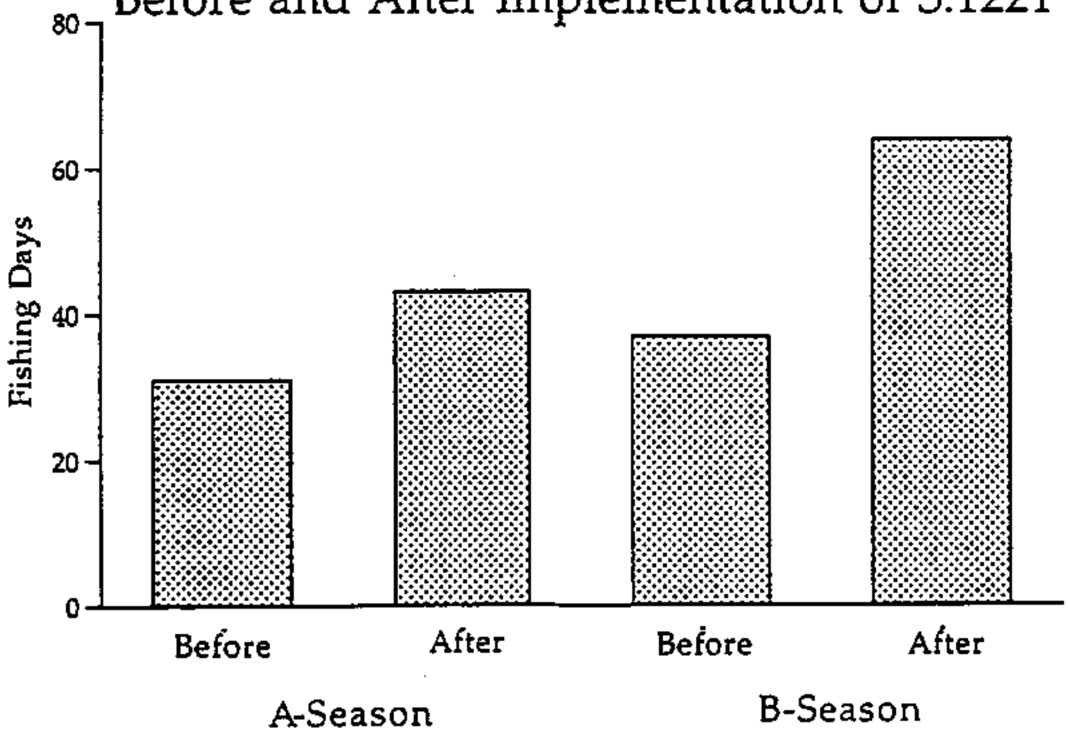




Bering Sea Pollock Average Daily Catch Before and After Implementation of S.1221*



Bering Sea Pollock Fishing Days Before and After Implementation of S.1221*



* Projections of daily catch rates and fishing days do not include any market driven fishery changes as might occur, e.g., via industry agreements to fish cooperatively

October 29, 1998

Dr. Jim Balsiger
Acting Regional Director
P.O. Box 21668
NOAA Fisheries
Juneau, Alaska 99802

Re: Stellar sea lion issue and alternative RPA

Dear Jim:

The purpose of this letter is to offer some thoughts on the issue of reasonable and prudent alternatives (RPA) which might be applied as management actions in addressing the Stellar sea lion (SSL) problem.

These alternative RPA should not be construed as an acceptance on our part of a determination of jeopardy under a Section 7 consultation for the 1999 pollock fishery. Much to the contrary recent papers by Alverson, Merrick, Trites, Boyd and others, have convinced us that the dramatic decline of SSL is not an indirect result of the pollock fishery, but rather the cumulative impact of other factors over time. Those of particular note are the substantial reduction in the availability of small forage species, such as herring and capelin, together with a shift in the sea lion's diet to pollock, which has a much lower nutritional value; a general reduction in diet diversity; SSL removals by killer whales; and subsistence harvests which have remained high despite the decline in sea lion stocks. Further evidence for ruling out the pollock fishery as jeopardizing the survival of SSL is the fact that juvenile and female SSL feed on juvenile pollock at depths much shallower (< 50 m) than that at which the commercial fishery operates; and the age and size composition of pollock taken in the commercial fishery is greater than what has been found in sea lion stomachs. Moreover, the percentage of juvenile pollock (<30 cm) taken in the commercial fishery is minute (< 1%), and the sea lion aggregations are most robust in areas of low pollock abundance. These latter observations further weaken the argument that the pollock fishery is responsible for the decline of SSL.

The purpose of this letter, though, is not to argue against a jeopardy determination which we feel does not have merit. Rather it is my intent to offer some alternative RPA which I feel do have merit in addressing the alleged problem of localized depletion of pollock within the critical habitat for SSL in a manner that would minimize economic hardship for the commercial pollock fishery, particularly the catcher processor sector.

These RPA are based on the assumption that any localized depletion is a function of the removals of appropriately sized pollock over time and the relationship of those removals to the feeding opportunities for SSL. In other words if fishing is occurring in an area, the availability of pollock of appropriate size should not be reduced by fishing such that the pollock densities are reduced below the minimal threshold for SSL to forage successfully. In trying to understand the possible impact of pollock removals by the commercial fishery one must also take into consideration that pollock move in and out of an area over time. Approaching the problem from this perspective we can move away from the static concept of total removals of pollock from the critical habitat and instead focus on the impact that fishing may or may not have on the densities of pollock of proper size for consumption by SSL at different times of the year.

A-season TAC percentage should remain at 45% – It is has been documented by resource and egg and larvae surveys that the greatest concentrations of pollock occur in the SE Bering Sea during the winter spawning period. The distribution of the commercial fishery during the A-season further demonstrates that in most years adult pollock are primarily concentrated inside the CVOA. If concentrations of pollock were available in areas other than the CVOA, the commercial fishery would have fished on them as they did in 1996.

The total removals of pollock from the population during the winter season are relatively low. Given an exploitation rate of 20 percent and an A-season TAC portion of 45 percent, the total removals from the population of pollock ages 3 and older, which during A-season are primarily distributed within the CVOA, only amounts to 9 percent of the exploitable population.

During the winter fishery (A-season) the ratio of the vessel average daily catch to the vessel seasonal average daily catch as a measure of "fishing success" shows remarkably little change throughout the A-season (Mr. Karl Haflinger, personal communication, Figures 1and 2). The absence of a decline in this measure of fishing success during the winter fishery (A-season) argues strongly against any localized depletion occurring in the CVOA at that time of the year.

In light of the above evidence on the concentration of the exploitable portion of the eastern Bering Sea pollock stock in the CVOA, the low probability of localized depletion during the A-season, and the fact that the SSL and the commercial fishery target different segments of the pollock population and at different depths, it is not reasonable nor prudent to be lowering the percentage of the TAC taken in A-season. In fact based on the existing evidence, an argument could be made for increasing the percentage of the TAC taken during the A-season, not reducing it.

CVOA restrictions should not be invoked in the A-season fishery – It is imprudent and unreasonable to place artificial restrictions on the pollock fishery relative to the CVOA during A-season. As noted above, during most years the majority of the adult pollock biomass is concentrated within the CVOA and the probability of localized depletions is negligible. Therefore, it makes absolutely no sense to force the fishery to operate in areas outside the CVOA where pollock concentrations are likely to be quite low, salmon and herring bycatch would most likely go up, vessel safety would be compromised, gear conflicts would be heightened, and the economics of the fishery could be severely impacted. Not only could CPUEs diminish dramatically, but those forced to fish outside the CVOA when the fish are inside that area will suffer economic hardship.

For these reasons restrictions on access to the CVOA should not be implemented for the A-season. This strategy will allow the fishery to continue to distribute itself efficiently in proportion to the concentrations of pollock, which have shown different annual distribution patterns relative to the CVOA. Thus, the fishery will operate in a manner that will avoid the creation of localized depletions. .

Any B-season measures must take into consideration the distribution of pollock at that time of the year and the operational realities and economics of the fishery - The B-season is a different situation entirely. Resource surveys of adult pollock indicate that the majority of the pollock biomass is outside of the CVOA during that time of the year. This is borne out by past fishing patterns. For example during the summer fishery (B season) in 1991 before the CVOA closure was in place the fishery was distributed primarily outside of the CVOA area..

With the pollock distributing themselves throughout the eastern Bering Sea in the summer period, the biomass in the CVOA is much lower. Furthermore, contrary to the A-season, the pollock in B-season are harvested disproportionately to their biomass distribution. Harvest rates in the CVOA during the B-season (when the proportion of the exploitable biomass in the CVOA can be as low as 10 percent) have been shown to be as high as 50 percent. Additionally, CPUE data indicate that the fishery operating within the CVOA may be causing localized depletions. Thus, an argument can be made for reducing the removals of pollock in the SE portion of the Bering Sea or within the CVOA itself during the B-season.

The trimester TAC distribution proposed as an RPA at the recent workshop is unacceptable because of the negative impacts it would have on the industry from an operational and yield standpoint. Fishing during the proposed B-season (July) when the fish are in such poor condition, will increase the number of fish harvested to reach the same tonnage figure. Additionally, the start up staging costs for the small fishery proposed in July will be prohibitive, especially for the catcher processor and mothership sectors.

A more acceptable alternative would be to bifurcate the fishery and stagger the starting times of each sector as discussed in the next section. Nevertheless, if a seasonal split in the TAC still must be pursued as a management action, then we would propose that the B and C-seasons be split-up as shown below.

B (Aug 1 – Aug 30): 20 percent

C (Sept 1 – Oct 31): 35 percent

If the initial spatial distribution of no more than 50 percent east of 170W is also included as a proposed RPA, then we would strongly urge that this action be a frameworked regulation that could be modified based on the results of the summer resource survey or the performance of the fishery. In any case extreme care should be given to the development of this RPA so as to minimize any adverse impacts to the economics of the fishery.

The American Fisheries Act and the bifurcation of the three sectors must be considered as an RPA – The recently enacted American Fisheries Act will result in enormous changes to the pollock fishery that will slow down the fishery and reduce the perceived conflicts with the SSL aggregations in the Bering Sea and Aleutian Islands. This legislation has divided the pollock quota among the three sectors in the fishery (shoreside - 50 percent, mothership - 10 percent and catcher processor – 40 percent). This 15 percent reallocation from the offshore sector to the shoreside sector has resulted in a 27 percent decrease in the catcher processor quota while the shoreside quota has been increased by 43 percent. The mothership quota has remained approximately the same percentage of the TAC. Furthermore, nine catcher processors have been removed from the fishery and restrictions have been placed on any further entrants to the fishery.

In the past the catcher processor's daily catch rate has been about double that of the shoreside sector. This significant redistribution of the quota and the restructuring of the participants in the pollock fishery outlined above will automatically lengthen the number of fishing days and reduce the daily removals of pollock by the fishery. This action will certainly lessen substantially the possibility for localized depletion. If it is deemed necessary to reduce the pace of the fishery further, the start dates for each of the three sectors could be staggered.

It is imperative that the beneficial impacts that this restructuring will have on the availability of pollock for foraging by sea lions be taken into consideration before more onerous RPA actions are considered.

The 50 meter isobath and minimal fishing depth as a Stellar sea lion protective measure – It has been proposed that 20 nm closures be placed around any rookeries or haulouts on which 200 or more sea lions may have been counted in addition to those protective measures already in place. This measure would result in the unnecessary closure of certain productive fishing grounds with resulting negative impacts on the pollock and other fisheries and their participants.

As was stated earlier, juvenile and adult female pollock do not appear to dive below 50 meters. That being the case it would seem to be more reasonable to instead close the areas inside the 50 m isobath to all fishing.

Additionally, "active" pollock fishing could be restricted to depths greater than 50 meters which is beyond the maximum depth at which all foraging by juvenile SSL and most females occurs. The pollock fishery itself takes place primarily at depths greater than 50 meters therefore fishery impacts would be minimal. This suite of 50-meter trawl exclusion zones would afford the sea lions much greater protection than just closing the areas out to 20 nm.

I appreciate the opportunity to provide you with some alternative RPAs that will provide relief to Stellar sea lions from perceived localized depletion problems while taking into consideration the impact of these management measures on the pollock fishery itself. If the RPA are going to be truly reasonable and prudent management actions, then it would seem to me that there is an obligation to develop the final suite of management actions accordingly.

Sincerely,

Walter T. Pereyra, Ph. D.
Chairman

THE UNIVERSITY OF BRITISH COLUMBIA

Fisheries Centre
2204 Main Mall
Vancouver, B.C. Canada V6T 1Z4
Director: Professor Tony J. Pitcher
Tel: (604) 822-2731 Fax: (604) 822-8934
E-Mail: office@fisheries.com

October 30, 1998

Dr. James W. Balsiger
Acting Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way, N.E.
Seattle, WA 98115-0070

Dear Dr. Balsiger:

On October 23, 1998, the National Marine Fisheries Service (NMFS) conducted a scoping meeting to discuss the potential impact of the pollock fisheries in the Gulf of Alaska and Bering Sea / Aleutian Islands on Steller sea lions and their critical habitat (63 Fed. Reg. 55366). I presented an oral statement at that scoping session addressing this issue and requested that my written comments be made part of that Record. I am enclosing a copy of my written comments.

I will send you a copy of the literature cited in my paper under separate cover. It is an integral part of the paper and should be included in the Administrative Record as part of my paper.

Yours truly,

Andrew W. Trites, Ph.D.,
Director, UBC Marine Mammal Research Unit

enc.

NOTE: DR. TRITES' PAPER WAS COPIED + DISTRIBUTED TO THE COUNCIL PREVIOUSLY)

Melvin Larsen
F/V Temptation
P.O. Box 33
Sand Point, AK 99661-0033
Phone (907) 383-2262
Fax (907) 383-2252

November 1, 1998

Mr. Tim Ragen
National Marine Fisheries Service
Juneau, AK
(907) 586-7249

Dear Mr. Ragen,

I am the owner and operator of the 58' vessel Temptation which participates in the fisheries in area 610 and 620. I have great concerns about action being considered by National Marine Fisheries Service in regards to creating 10 mile radius around sea lion haul outs.

Action being considered will eliminate 80 percent of the area fished by the small boats and allocate this fish to the larger Bering Sea vessels who have the capability of harvesting the quota off shore due to their ability to fish in weather that keeps the smaller boats near shore.

I feel the smaller boats, with smaller nets and less power, have little impact on the sea lions and should be able to fish the traditional areas.

Dwindling salmon prices, political decisions regarding regulations and low bottom fish prices has had a great impact on our area. This action will cause greater personal and community hardships, as much of the economy now depends on the trawl fisheries.

Please consider the proposals submitted by Peninsula Marketing Association and the impact our area will have if you place the 10 mile radius around the haul outs. I whole heartily support these recommendations and believe smaller vessels and sea lions can live together.

Sincerely,

Melvin R Larsen

STEVENS VILLAGE TRIBAL GOVERNMENT
NATURAL RESOURCE PROGRAM
P.O. BOX 74016
STEVENS VILLAGE, AK 99774
PH. 907-478-7420 FAX 907-478-7845

MEMO

To: State and Federal Agencies Directors
Fr: Randy Mayo, 1st chief, Stevens Village Tribal Government
Dewey Schwalenberg, Natural Resource Director
Date: October 28, 1998
Re: State and Federal Fisheries Disaster Relief

Attached to this correspondence you will find a copy of the response from the Alaska Department of Military and Veterans Affairs that denies the subsistence fishers application for Economic disaster relief for Essential Living Expenses(ELE). The denial was based on the fact that the subsistence fishers do not posses a commercial fishing license, were not crew members, or worked in a cannery or processing plant. We have taken exception to this ruling and have written the enclosed letter to the Governor. If you should consider commenting on this correspondence or the ideas that have been incorporated into our response feel free to contact us at the Resource Program office-907-478-7420. Perhaps the topic of WORKFARE and community assistance and the type of programs that your agencies could offer would be an agenda item for our next meeting. Thanks.

STEVENS VILLAGE TRIBAL GOVERNMENT
P.O. BOX 74016
STEVENS VILLAGE, AK 99774
PH. 907-478-7228 FAX 907-478-7229

October 27, 1998

Hon. Governor Tony Knowles
Office of the Governor
P.O. Box 11001
Juneau, AK 99811

Honorable Governor Knowles;

It has recently been brought to my attention that the subsistence fishers of Stevens Village have been refused participation in the ESSENTIAL LIVING EXPENSE (ELE) PROGRAM that you have personally touted as the economic disaster relief package for persons affected by the fishing collapse of the Yukon River. It would seem that after all the time and expense that the state and federal agencies disaster relief team put into traveling to rural villages, like Stevens Village, to recruit and screen potential applicants for economic disaster relief, that they should have made it clear that subsistence fishers did not qualify. Instead, the subsistence fishers were led to believe that they would be assisted and made to complete the entire bureaucratic process to apply for assistance that they apparently were not eligible to receive. Now we find out that ONLY commercial fishing permit holders, crew members, and fish processing plant workers are eligible. I find this situation a disgrace to your administration here in our community, a personal affront to our community members who in many cases swallowed their pride to participate in good faith in your process, and an affront to the Tribal Government who, also in good faith, advised our members to participate in this demeaning process. This situation is totally unacceptable for the following reasons:

1) We believe that discrimination against subsistence fishers on the upper Yukon River in favor of the commercial interests has long been the rule rather than the exception under the State management system. This latest economic discrimination is yet one more example of how the State is out of compliance with the supreme law of the land by not recognizing subsistence use as the top priority of the fishery. This decision further fails to recognize the community economy value of the subsistence resources, which in Stevens Village is significantly more valuable than that associated with the limited commercial harvest. Loss of this subsistence harvest is a greater economic hardship for this community and its members than the loss of the commercial revenue.

2) The State of Alaska, through regulations that limited the subsistence harvest of Summer and Fall Salmon has caused a major decline in the locally harvested fish resource. These regulations, first and foremost, were contrary to Federal subsistence priority law. These regulations were also established with no input from the Tribal Governments. As a result they failed to include the wishes of the local subsistence fishers on even such a small issue as whether or not a 24 hour opening one day per week could be two 12 hour openings two days per week instead! We believe that the lack of adequate management of the resource is undoubtedly the more likely cause of the recent "Fisheries Disasters". However, the most damaging missing element to the future well-being of the fisheries resource is the lack of support for a Co-management system that fully recognizes the need to encourage Tribal Governments to participate as Co-managers of the fisheries resource. Tribal Governments need to assume the responsibility of collecting and sharing the information and knowledge that their members have that is so important to the management of the fisheries resource. Synonymous with Co-management responsibility must be the opportunity for Tribal governments to build their local capacity to operate viable management systems. These systems will require adequate funding to hire local community members to do the work. Education and training will be an important part of this development. Thus far, these systems are ill-defined, inadequately funded, and not directly coordinated with the Tribal governments.

3) Economic Disaster Relief, in our minds, is nothing more than **FISH WELFARE!!!** and does not represent a viable way to operate a fishery or a community. We oppose any system of payment that creates a dependency by our people on State or Federal agencies to pay bills for them. We rather believe that any form of assistance should lead to local self-determination. With this program the State appears to have chosen to buck the national trend of "Workfare instead of Welfare". The Tribal Council is in a unique position to receive and use such assistance funding to create jobs for local people and to pay wages to those people that are willing and able to work so that they can pay their own bills. Work that would be accomplished with this type of funding here in Stevens Village would be resource management related. Collection of traditional harvest data, biological assessments of the fish populations, direct involvement by local people in the management decision making process, development of local Tribal codes and ordinances, and conservation law enforcement activities are all jobs that are well suited to the local people and their traditional way of life. Applying assistance funding to jobs associated with these types of activities could lead to some very real management applications that undoubtedly would improve the fishery. Continued FISH WELFARE programs will only lead to a greater dependency by our local people on the ANNUAL ECONOMIC DISASTER RELIEF CHECK and will, I fear, induce people through negative economic incentives to limit their traditional subsistence activities. Our culture and way of life will surely suffer as a result.

In conclusion, I can fully appreciate your concern for the people in this region who are suffering through these hard economic times. It is not easy living in rural Alaska. But let me reiterate my concern that we develop a community development system that incorporates the maximum respect for OUR form of governance that we choose to live under with the best form of long term resource management, protection, and preservation possible. Any support and assistance must stimulate the community members to take action and can best be accomplished through appropriate economic incentives that will serve to achieve the best possible traditional and cultural lifestyle available. Unfortunately, I believe you and your agencies have dropped the ball on this potential opportunity.

Sincerely,
Stevens Village Council

Randy Mayo

Randy Mayo, First Chief

cc.
Yukon Flats Tribal Gov'ts.
CATG
John Shively, DNR
Frank Rue, ADF&G
ELE Appeal Officer
Dept of Military and Veterans Affairs
Niles Cesar, BIA
Will Mayo,TCC
NMFS
USFWS

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

DEPARTMENT OF MILITARY AND VETERANS AFFAIRS

P.O. BOX 5750
FT. RICHARDSON, ALASKA 99505-5750
PHONE: 1-888-388-3473
FAX: 1-800-478-9525

THIS IS THE LETTER SENT TO SUBSISTENCE FISHERS ...

Po Box
Stevens Village, Ak 99774

October 13, 1998
Disaster No. 99-189
Control # L013

Dear Applicant:

We have reviewed your disaster application and have found that you are not eligible for assistance from the Essential Living Expense (ELE) Program for the following reason (s):

✓ We cannot verify your 1997 or 1998 Commercial Fishing Permit or Crewmembers License.

✓ We cannot verify your 1997 or 1998 employment in a cannery or fish processing plant.

_____ You are not a permanent resident of the declared disaster area.

_____ You have been provided ELE assistance on another application for your household.

_____ Your household has already received the maximum award of $5,000.00.

_____ Your 1998 Crewmember License was not purchased prior to the disaster declaration date of July 30, 1998, and you did not have a 1997 Crewmember License.

_____ Your 1998 Commercial Fishing Permit was not purchased prior to the disaster declaration date of July 30, 1998, and you did not have a 1997 Permit.

Although you do not qualify for the Essential Living Expenses Program, other programs may be available to assist you. I am enclosing a list of other assistance programs that we know of at this time. The State is also seeking additional federal assistance for residents of the disaster areas.

You may appeal this decision within 60 days from the date of this letter. Your appeal must be in writing and contain documentation to assist in your appeal claim. Please send to:

ELE APPEAL OFFICER
DIVISION OF EMERGENCY SERVICES
P.O. BOX 5750
FORT RICHARDSON, AK 99505-5750

If you have any questions, need additional information, or need to speak with someone who can speak Yupik, please call our toll-free number at 1-888-388-3473, or in Anchorage 428-7077.

Sincerely,

Jennifer Dooc
Program Manager

Yugtun qantuliimek Caliscetangqertuq. Apyuteng qerkuvet cali qayagauqina wavet 1-888-388-3473.

Programs that May Assist Residents of the Disaster Area

Dept. of Health and Social Services
Division of Public Assistance 1-800-478-4372
1-800-478-4362

- Two – Parent Family Temporary Assistance (Financial Assistance)
- Food Stamps (Food)
- General Relief Assistance (Shelter, Utilities, Food and Clothing Assistance)
- Medical Assistance
- Adult Public Assistance (for people 65 years or older and disabled)
- Mental Health services

Division of Energy Assistance (907) 465-4364
Contact Local Fee Agent or Village Office
Status Line 1-888-804-6330

Women, Infant and Children (Nutrition) 1-800-764-6459

Dept. of Labor (Unemployment Assistance) (907) 269-4700

Bureau of Indian Affairs, General Assistance (907) 586-7628
(Food, Clothing and Shelter Assistance)
Contact Local Tribal Office or Consortium

- Must be ¼ Blood Quantum of a Federally Recognized Tribe
- Must have applied to other assistance programs and been denied assistance.

RurAL CAP - Weatherization Program (907) 279-2511

Alaska Housing Finance Corporation 1-800-478-4585
(Emergency Housing and Home Grants)

The Association of Village Council Presidents 1-800-478-4687
Regional Housing Authority (Credit and Finance Dept.)

Alaska Division of Investments
Commercial Fishing Loan Program (Disaster Assistance)

- Commercial Fishing Revolving Loan Fund 1-800-478-5626
  Loan Extensions or Refinancing, Applications 1-800-478-3521

- AK Business Development Center (Financial Assistance) 1-800-478-3474

Small Business Administration (Low Interest Business Loans) 1-800-488-5323

Internal Revenue Service 1-800-829-0933

Alaska Student Loan, Post Secondary Education Loans 1-800-441-2962

Credit Counseling Centers of America 1-800-764-6459
(Assist in preparing a plan for paying creditors)

CENTRAL BERING SEA FISHERMEN'S ASSOCIATION

☐ 700 W. 41st Avenue, Suite 201
Anchorage, Alaska 99503
(907) 279-6566 • Fax (907) 279-6228

☐ P.O. Box 288
St. Paul Island, Alaska 99660
(907) 546-2597 • Fax (907) 546-2450

Oct 30, 1998

Mr. Jim Balsiger
Acting Regional Director
Alaska Regional Office
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802

Subject: Stellar Sealions

Dear Mr. Balsiger

WAFDA members are very concerned about the health of Stellar sealion population. Our residents have a close and dependent relationship with this species as subsistance users and residents of the Bering Sea ecosystem. We are also participants in the Bering Sea pollock fishery.

While the evidence points strongly to nutritional deficiency as the cause of sea lion population declines, there is at best a weak relationship between pollock fishing and that nutritional deficiency. There is also significant information that points to other possible causes (sea lion feeding studies, the "cascade hypothesis). We are concerned that the agency focus efforts primarily on determining the cause of decline through directed research and minimize the "just do something" reaction.

This issue has been apparent for years, and we are very concerned that the agency seems not to have done enough to measure the effects of the measures already taken, such as no trawl zones. One of the key findings of the 1996 National Research Council review of the Bering Sea ecosystem was the need for adaptive management applied to determining the best size for no-trawl zones (pg.255).

The last major component that does not appear to have been analyzed in NMFS's development of its RPA is the effect of S.1221 on the spatial and temporal distribution of pollock fishing effort. The effects are numerous and substantial, at least the following.

1. A significant reduction in overall effort through the removal of nine factory trawlers.

2. Shift of the effort those vessels represent from the offshore to the onshore sector with

attendant spatial, temporal and vessel size affects.

3. The likely stretching of seasons that will result if co-ops are formed in the various sectors.

4. The effect of an shift of 2.5% of TAC from the "co-op" fisheries to CDQs>

We do not have a specific alternative to the draft RPA, but we question whether the changes to the pollock fishery need to be as significant as proposed given the facts listed and the uncertainty in effects. We also urge the agency to commit to a major increase in research to determine the effectiveness of measures it does take, and to work with indigenous people and the affected industry on that research.

We appreciate the opportunity to comment. Please contact me if you have any questions.

Sincerely,

Carl W. Merculief
President
Central Bering Sea Fishermens Association
St. Paul Island, Alaska 99660

NATIVE VILLAGE OF GAMBELL

P.O. Box 90 • Gambell, Alaska 99742 • (907) 985-5346 • FAX (907) 985-5014

Dr. James Balsiger
Acting Regional Administration
National Marine Fisheries Service
PO Box 21688
Juneau, Alaska 99802

Dear Dr. Balsiger,

This letter is in opposition of the draft proposal submitted by the Alaska Marine Conservation Council for the 20 mile no trawl zone around South East Cape and South West Cape of Saint Lawrence Island. We have not seen a decline of the Stellar Sea Lions in this area in so many years. We are also reluctant to support this proposal on the grounds that it could hamper our subsistence lifestyle of hunting and gathering.

Sincerely,

Gerald Soonagrook, Sr.,
President

cc: file

Western Alaska Fisheries Development Association

Coastal Villages Region Fund • Yukon Delta Fisheries Development Association • Central Bering Sea Fishermen's Association • Norton Sound Economic Development Corporation • Bristol Bay Economic Development Corp.

October 30, 1998

Mr. Jim Balsiger
Acting Regional Director
Alaska Regional Office
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802

Dear Mr. Balsiger,

On behalf of the Western Alaska Fisheries Development Association (WAFDA), I wish to express our concern regarding the health of the Steller sea lion population in the Bering Sea. Our members have a close and dependent relationship with the Steller sea lion both as subsistence users and as residents of the Bering Sea ecosystem. In addition, we are also participants in the Bering Sea pollock fishery.

While scientific evidence strongly points to nutritional deficiency as the cause of reduced populations, there is at best a weak relationship between pollock fishing and nutritional deficiency in Steller sea lions. We recognize that there are a number of factors that may be contributing to the decline in sea lion populations, but we are concerned that NMFS is responding to the problem with a "just do something" approach rather than determining the cause of the reduced populations through directed research.

This issue has been apparent for several years and WAFDA is concerned that NMFS has not done enough work to evaluate the effects of conservation measures—such as no-trawl zones—already in place. One of the key findings of the 1996 National Research Council review of the Bering Sea ecosystem was the need to apply adaptive management strategies to determine the best size for no-trawl zones (p. 255).

Finally, NMFS has not included an analysis of the effects of S. 1221 on the spatial and temporal distribution of pollock fishing effort in the development of its RPA. In our opinion, the effects of S. 1221 are numerous and substantial and include:

1) a significant reduction in the overall effort through the removal of nine factory trawlers;
2) a shift in the fishing effort as a result of a reduced factory trawl fleet from the offshore sector to the onshore sector with attendant spatial, temporal and vessel size affects;
3) an extension in the length of fishing seasons that will result from the formation of fishing co-ops in the offshore and onshore sectors;
4) and the effect of a shift of 2.5 percent of the TAC from the "co-op" fisheries to the CDQ program.

310 K Street, Suite 200 • Anchorage, Alaska 99501 • (907) 264-6619 • fax (907) 264-6622

WAFDA does not have a specific alternative to the draft RPA, but we question whether the changes to the pollock fishery need to be as significant as proposed given the facts listed and the uncertainty of outcomes. We also urge NMFS to commit to a major increase in research to determine the effectiveness in measures it does take to address the sea lion population decline and to work with Native Alaskans and the industry.

We appreciate the opportunity to comment. Please contact me if you have further questions.

Sincerely,

Mary L. McBurney
Executive Director

cc: Tim Ragen, Protected Resources Division

CENTER FOR
MARINE
CONSERVATION

1725 DeSales Street, NW
Suite 600
Washington, DC 20036
Phone: (202) 429-5609
Fax: (202) 872-0619
Web: www.cmc-ocean.org

October 29, 1998

Mr. James Balsiger
Acting Regional Administrator
National Marine Fisheries Service
PO Box 21688
Juneau, AK 99802
FAX: (907) 586-7131

RE: Request for extension of comment period for Draft Supplemental Environmental Impact Statement on Alaskan Groundfish Fishery Management Plans

Dear Mr. Balsiger:

The Center for Marine Conservation (CMC) hereby requests that the National Marine Fisheries Service (NMFS) extend the comment period for the September 1998 Draft Supplemental Environmental Impact Statement (DSEIS) on Alaskan Groundfish fishery management plans (FMP's). An extension would provide two important benefits to NMFS and the public. An additional 45 days or more would allow NMFS to coordinate its National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) responsibilities. Moreover, an extension would give concerned members of the public adequate time to read, analyze, and respond to the DSEIS.

The DSEIS was prepared to satisfy NMFS' NEPA responsibilities. However, it is incomplete without a Section 7 Biological Opinion to address NMFS' responsibilities under the ESA. Council on Environmental Quality (CEQ) regulations implementing NEPA state that agencies shall, "[t]o the fullest extent possible, ... prepare draft environmental impact statements concurrently and integrated with environmental impact analyses and related surveys and studies required by ... the Endangered Species Act ...." 40 C.F.R. Section 1502.25(a). Moreover, NMFS's own regulations state that it should "provide a coordinated review and analysis of all environmental requirements" where "consultation ... procedures under section 7 may be consolidated with ... other statutes such as the National Environmental Policy Act." 51 *Fed. Reg.* 19958-9 (June 3, 1986). When such reviews have been coordinated, "the results should be included in the documents required by those statutes." *Id.*

NEPA requirements are intended to provide the public with the opportunity to participate in federal decisions. Thus, these requirements obligate federal agencies to provide substantial information on actions and their potential consequences, and to allow for meaningful public comments. Specifically, CEQ NEPA regulations state that federal agencies "shall to the fullest extent possible ... [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment." 40 C.F.R. Section 1500.2(d).

NMFS cannot adequately address the environmental impacts of groundfish FMP's in the Gulf of Alaska and the Bering Sea without discussing the potential impact of fisheries management on the endangered Steller sea lion and its critical habitat. Moreover, the public is unable to fully evaluate the DSEIS without being informed of these potential impacts. A biological opinion on these impacts is now under preparation. NMFS must take that opinion into account as part of the DSEIS and provide the public with the information resulting from the biological opinion and an opportunity to comment on it in the context of the DSEIS.

NMFS has only allowed 45 days for public comment on their DSEIS on Alaskan Groundfish FMPs. This timeframe is inadequate for the public to read, analyze, and respond to the DSEIS. The content of the DSEIS is extremely complex and lengthy. The nearly 700 page document addresses ecosystems containing over 500 species that may be directly or indirectly affected by these federal actions. NMFS itself took over one and a half years to prepare this document and it is unrealistic to expect the public to work through it in a mere 45 days. CMC plans to provide substantive comments on several aspects of the DSEIS, and an extension of the comment period would allow us to do so more thoroughly and constructively.

Thank you for your consideration of our request. We trust you will recognize the value to NMFS, the affected ecosystems and communities, and the nation, of extending the deadline for public comment by 45 days or more.

Sincerely,

Wm. Robert Irvin
Vice President for Marine Wildlife
Conservation and General Counsel

Cc: Hon. Kathleen McGinty, Chair, Council on Environmental Quality
Hon. Terry Garcia, Assistant Secretary for Oceans and Atmosphere, Department of Commerce

Reasonable and prudent alternatives (RPAs)

- Protective
  - No-trawl zones
  - (TAC reduction)
- Dispersive
  - Time-area management
- Research or experimental
  - Surveys
  - Control zones

Draft Center Recommendation

EBS

Temporal

3 seasons - Jan 20 (35%), Jul1 (15%), Sep 1 (50%)

Spatial

Short-term

A season - Max of 50% TAC from CH

B&C seasons - TAC distributed using surveys

Long-term

All seasons - TAC distributed using surveys

Protective zones

20 nm around sites with >200 animals counted (ever)

Draft Center Recommendation

AI

Temporal

No change

Spatial

Long-term - TAC inside and outside CH based on surveys

Protective zones

10 nm around sites with >200 animals counted (ever)

Draft Center Recommendation

GOA

Temporal

3 seasons - Jan 20 (35%), Jul1 (15%), Sep 1 (50%)

Spatial (by management area)

Short-term

A season - Max of 50% TAC from combined CH foraging area and 20-nm of sites with >200 animals ever

B&C seasons - No more than 33% of aggregate B&C TAC from combined CH foraging area and 20-nm of sites with >200 animals ever

Long-term

All seasons - TAC distributed using areas, seasons, CH, and surveys

Protective zones

144-164 W. long - 10 nm around sites with >200 animals counted (ever)

164-170 W. long - 20 nm around sites with > 200 animals counted (ever)

Temporal dispersion

- Multiple seasons
- Multiple starting dates
- Day catch limits
- Gear limitations
- Stagger starts
- Consider AFA

Spatial dispersion

- Use stock distribution to allocate TAC
- Reduce catch in CVOA
- Change access of vessel types in CVOA
- Impose CVOA in (A, B, All seasons)

Protection zones

- Exclude (all, trawl, pollock) fishing
- Base zones on 50-m isobath
- Close Aleutian Islands
- Change size and locations seasonally
- Use (historical, recent) data

Research

- Include control areas
- Increase survey effort
- Measure efficacy of no trawl zones

Other

- Increase public involvement
- Consider other fisheries
- Consider other human activities
- Consider AFA
- Comprehensive set of RPAs
- Reduce (seasonal, annual) TAC
- Increase observer coverage
- Be more proactive
- Continue protection until fully recovered
- Incorporate Russian data
- Support development of coastal communities
- Increase educational efforts

Reasonable and prudent alternatives (RPAs)

- Protective
  - No-trawl zones
  - (TAC reduction)
- Dispersive
  - Time-area management
- Research or experimental
  - Surveys
  - Control zones

Draft Center Recommendation

EBS

Temporal

3 seasons - Jan 20 (35%), Jul1 (15%), Sep 1 (50%)

Spatial

Short-term

A season - Max of 50% TAC from CH

B&C seasons - TAC distributed using surveys

Long-term

All seasons - TAC distributed using surveys

Protective zones

20 nm around sites with >200 animals counted (ever)

Draft Center Recommendation

AI

Temporal

No change

Spatial

Long-term - TAC inside and outside CH based on surveys

Protective zones

10 nm around sites with >200 animals counted (ever)

Draft Center Recommendation

GOA

Temporal

3 seasons - Jan 20 (35%), Jul1 (15%), Sep 1 (50%)

Spatial (by management area)

Short-term

A season - Max of 50% TAC from combined CH foraging area and 20-nm of sites with >200 animals ever

B&C seasons - No more than 33% of aggregate B&C TAC from combined CH foraging area and 20-nm of sites with >200 animals ever

Long-term

All seasons - TAC distributed using areas, seasons, CH, and surveys

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