MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: September 19, 1991

SUBJECT: Marine Mammals

ACTION REQUIRED

(a) Proposed amendments to Marine Mammal Protection Act.

(b) Report on northern sea lion surveys.

(c) Protective measures for sea lions for 1992.

BACKGROUND

MMPA Amendments

NMFS has developed a preferred regime to govern the incidental take of marine mammals in commercial fisheries after October 1, 1993, when the current five-year agreement, developed through amendment to the Marine Mammal Protection Act in 1988, will expire. The accompanying Draft Legislative Environmental Impact Statement was sent to the SSC on July 29 and to the Council and AP on September 5. Tables summarizing the alternatives and other information in the DLEIS are in item C-1(a).

A workgroup of Council members met on September 17 to review the analysis and provide comments for Council incorporation into a letter to NMFS. These comments will be available at meeting time. Draft comments from the Pacific Council and industry are provided under this tab as items C-1(b) and (c). We need to send our comments ASAP to NMFS. The deadline is September 23. NMFS will be preparing a revised DLEIS to be available in October.

Northern Sea Lion Surveys

NMFS will report on marine mammal surveys conducted this summer. A preliminary summary report is provided under item C-1(d).

Protective Measures for Sea Lions for 1992

Protective measures for sea lions in the Gulf of Alaska were instituted by Emergency Rule in 1991. The original Emergency Rule expired on September 17 and has been extended to cover the remainder of 1991.

Sea lion protective measures included in this Emergency Rule are:

1. A division of the Western/Central pollock quota at 154°W longitude into two subareas to prevent localized depletions. The result is that the TAC is allocated equally between Area 63 and Areas 61 and 62 combined.

2. A provision to equally apportion the subarea TACs by quarter over the fishing year, with a limit on the amount which could be rolled over from one quarter to the next.

3. No-trawl zones around several rookery sites in the Gulf of Alaska. No trawling is allowed within 10 nautical miles of these sites.

At this meeting environmental assessments will be provided which, if approved, would put in place the sea lion protective measures on a permanent basis beginning with the 1992 fishing year. These include the measures outlined above, as well as inclusion of some Bering Sea areas as protected rookery sites. The Council would need to give final approval to these measures at this meeting in order to have them in place for 1992. Item C-1(e) is a letter from NMFS with details on implementing these measures.

Staff will be on hand to provide more detail on the environmental assessment documents.

Table E.1

Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Scope of Proposal	Applies to all commercial fishing under U.S. jurisdiction, with the ETP tuna fishery treated as a special case. Affects marine mammal stocks that interact with these fisheries. Does not directly affect other MMPA taking authorizations.	Applies to all commercial fishing under U.S. jurisdiction except the ETP tuna fishery and treaty fisheries. Affects marine mammal stocks that interact with these fisheries. Does not directly affect other MMPA taking authorization.	Applies to all commercial fishing under U.S. jurisdiction except the ETP tuna fishery. Affects marine mammal stocks that interact with these fisheries. Affects other activities that interact with these stocks, including subsistence, display, research and enhancement.	Applies to all commercial fishing under U.S. jurisdiction except the ETP tuna fishery. Affects marine mammal stocks that interact with these fisheries. Affects other activities that interact with these stocks, including display, research and enhancement.
Optimum Sustainable Population (OSP) as a criterion for authorizing marine mammal take	Retains OSP goal; necessary to determine that all stocks within OSP to allow incidental take.	Does not consider OSP goal; not necessary to determine OSP to allow incidental take.	Retains OSP goal; necessary to determine OSP to allow incidental take; temporary authorization for stocks of uncertain status.	Retains OSP goal; not necessary to determine OSP to allow incidental take; uses qualitative judgements of status.
Monitoring Marine Mammals Stocks	No explicit requirements; need monitoring to authorize incidental take.	No explicit requirements; need monitoring to assess impacts of incidental takes.	Long-term monitoring of stocks required to verify incidental takes do not cause stocks to be reduced below OSP.	Long-term monitoring of stocks required to develop data on abundance and status to provide better basis for decisions.

(continued)

Table E.1 (continued)

Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Calculating Allowable Biological Removal (ABR) Levels	ABRs not established; necessary to determine that incidental take will not reduce stock below OSP.	ABRs not established; no limits for incidental take unless the take has significant adverse impact on the stock.	For stocks within OSP, ABR will not reduce stock below OSP. For depleted stocks, ABR will have negligible impact on stock: • No take if stock less than 3,000 animals or 30 percent of historic abundance; • For stocks not known to be increasing, ABR is 0.5 percent of ratio of current to historic stock size; • For stocks with known rate of increase, ABR is the annual replacement times the ratio of current to historic stock size; • For stocks with unknown rate of increase, ABR is 0.5 percent of the minimum abundance estimate. For stocks of uncertain status, ABR is 1 percent of the minimum abundance estimate.	ABR is the minimum abundance estimate times the maximum net productivity times a recovery factor. If not known, maximum net productivity is six percent for pinnipeds and sea otters and two percent for cetaceans and manatees. Recovery factor is 0.9 for stocks believed to be above 2/3 of carrying capacity; 0.5 for stocks between 1/3 and 2/3 of carrying capacity; and 0.1 for stocks below 1/3 of carrying capacity. If there is no information to make a qualitative judgement, the recovery factor is 0.1.

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Table E.1 (continued)

Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Process for Establishing ABRs	Formal rulemaking, with an opportunity for an Administrative Law Judge (ALJ) hearing.	Not applicable.	Process must provide for full scrutiny of the evidence, independent review of the data, and an explanation of rationale for decision.	Every three years, NMFS drafts Stock Assessment Reports that are reviewed by appointed Scientific Review Groups. Revised draft Reports available for public comment. The determinations in the final Stock Assessment Reports are used to calculate the ABR for each stock.
Zero Mortality Rate Goal	Retains goal but provides no specific guidance on how it should be attained.	Retains goal but provides no specific guidance on how it should be attained.	Fishermen required to take all measures practicable to reduce incidental mortality and serious injury of marine mammals. NMFS convenes workshops to evaluate measures to reduce mortality.	NMFS establishes program to evaluate fisheries to determine ways to reduce mortalities. Measures implemented by Fishery Management Councils, states, and/or NMFS.

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Table E.1 (continued)

Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Taking of Depleted Marine Mammal Stocks	Incidental taking prohibited.	Incidental taking allowed, except southern sea otters, unless determined to have significant adverse impact.	Incidental taking allowed if: • Conservation plan adopted; • Taking will not delay recovery by more than 10 percent; • Monitoring will insure the authorized take will not be exceeded; • Taking will be reduced to as near zero as practicable.	Incidental taking allowed in compliance with conservation plan that addressed impacts and measures to reduce impacts.
Conflicting Provisions Between the MMPA and the Endangered Species Act (ESA)	Under ESA, taking of marine mammals incidental to fishing allowed only in territorial sea under Section 10.	Under ESA, taking of marine mammals incidental to fishing allowed only in territorial sea under Section 10.	Either amend ESA to allow taking of marine mammals incidental to fishing under Sections 7 and 10; or amend MMPA to state that ESA authorization not required.	Amend ESA to allow taking of marine mammals incidental to fishing under Sections 7 and 10.

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Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Allocation of ABR Among User Groups	Not applicable.	Not applicable; no more than 50 northern fur seals and 1,350 Steller sea lions can be killed incidental to commercial fishing.	A mechanism would be needed to equitably allocate an ABR among user groups.	NMFS annually allocates ABR among "controllable" user groups, after deducting "uncontrollable" mortalities. Allocations based on an assessment of needs and impacts and other factors, after considering public comments on proposed allocations.
Incidental Removal Quotas for Fisheries	Quotas established in general permits based on requested level of take provided this level would not disadvantage stock.	Not applicable.	A mechanism would be needed to establish quotas for fisheries.	Regional Quota Boards recommend quotas based on an assessment of needs and impacts and other factors after considering public comments. NMFS accepts or modifies recommendation and establishes quotas.
Intentional Non-Lethal Taking of Marine Mammals	Authorized to protect catch, gear, or person.	Authorized to protect catch, gear, or person.	Not addressed.	Authorized to ensure personal safety; authorized to protect catch or gear only if NMFS determines by regulation that stocks will not be significantly affected.

(continued)

Table E.1 (continued)

Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Intentional Lethal Taking of Marine Mammals	Authorized if non-lethal measures fail.	Authorized if non-lethal measures fail, except on intentional lethal taking of Steller sea lions, California sea otters, cetaceans, and depleted stocks.	Not addressed.	Authorized to ensure personal safety; can be authorized to protect catch or gear only upon request if NMFS determines lethal take is necessary to mitigate a demonstrable negative impact on fishery, if the take falls within quota, and if take is monitored.
MMPA Authorization to Fish and Take Mammals	No authorization to fish needed. General permit or small take exemption required to take marine mammals.	Authorization to fish required. No separate authorization to take marine mammals required.	Authorization to fish required. Separate authorization required to take marine mammals.	Authorization to fish required. No separate authorization to take marine mammals required.
Categories of Fisheries	Categorized by gear type.	Three categories based on likelihood of individual vessels incidentally taking marine mammal; vessels in Categories I and II fisheries required to register.	Not required; only vessels in fisheries with more than a remote possibility of incidental takes required to register.	Two categories based on the likelihood of a fishery interacting with or adversely affecting marine mammals; only vessels in Category I required to register.

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Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Monitoring Removals of Marine Mammals	Authority to place observers unclear. Fishermen required to report all takes.	Place observers to monitor 20 to 35 percent of fishing operations in Category I. NMFS can establish alternative monitoring programs for other fisheries. Fishermen must keep daily fishing logs and submit annual reports in Category I and II fisheries.	Authority to place observers on any fishing vessel. Degree of coverage determined by NMFS. Fishermen required to report; requirements should be streamlined.	Authority to place observers on any fishing vessel. Degree of coverage determined by NMFS. Authority to require fishermen's reports; type of reports determined by NMFS.
Enforcing Quotas	Quotas enforced by prohibiting further incidental takes.	If any quota will be exceeded, NMFS issues an emergency rule to prevent further taking to the maximum extent practicable.	When a quota will be reached, changes in the fishery to avoid or minimize further mortalities would be needed.	When a quota will be reached, NMFS would restrict or close fisheries to prevent or sufficiently reduce further mortalities.
User Fees	Reasonable fees charged for issuing permits; funds deposited in General Treasury.	Standard registration fee charged to cover administrative costs of registration system.	Funds to ensure adequate monitoring provided through federal funding and/or user fees.	Standard registration fee to cover administrative costs and variable user fee optional to supplement monitoring costs.
Implementation Date of Management Regime	Immediately.	Immediately.	Not addressed.	Proposed regime implemented in a step-wise manner over two years.

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Comparison of Main Alternative Management Regimes[a]

Issues	Main Alternative Management Regimes			
	A: MMPA Prior to 1988	B: Interim Exemption	C: MMC Guidelines	D: NMFS Proposal
Applicability of Management Regime to Native Americans	Unclear whether or not incidental take provisions apply to treaty Indian tribes.	Unclear whether or not incidental take provisions apply to treaty Indian tribes.	Not addressed.	Amend MMPA to clarify if incidental take provisions apply to treaty Indian tribes.

Footnote:

[a] This table should be used for comparison purposes only; more complete descriptions of these and other alternatives for each issue are contained in Part 2.0 of this DLEIS.

Table 2.2

Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Species (Stock)	Geographic Area Considered in Estimate[a]	Minimum Abundance Estimate	MMPA/ESA Status[b] (Bin)[c]	Allowable Biological Removal Level					Estimated Annual Removal	
				MMPA (pre-1988)[d]	Interim Exemp.[e]	MMC Rate	NMFS Prefer.[f]	Constant Rate	Total[g]	(US/EEZ)[h]
Steller Sea Lion	Alaska	39,396[q]	T (1)	0	1,350	0	236[f]	2,363	<300	(<60)
	Continental U.S.	5,410[q]	T (1)	0		0	32[f]	324	<5	(<5)
California Sea Lion	CA, OR, WA	67,000[r]	N (2)	0	*	335	2,010	4,020	<1,000	(<1,000)
Northern Fur Seal	E. Bering Sea	871,000[s]	D (2)	0	50	4,355	17,420[f]	34,840	~11,500[i]	(<15)
	San Miguel	4,000[s]	N (2)	0		20	80	160	<3	(<3)
Harbor Seal	Alaska	unknown[j,t]	N (2)	0	*	--	--	--	<3,000[k]	(<300)
	Puget Sound	6,062[t]	N (2)	0	*	60	181	363	<200	(<200)
	WA/OR Coast	12,390[t]	N (2)	0	*	123	371	743	<400	(<400)
	California	19,622[t]	N (2)	0	*	196	588	1,177	<500	(<500)
Spotted Seal	Alaska	unknown[l,u]	N (?)	0	*	--	--	--	<5,000[k]	(<10)
N. Elephant Seal	CA, OR, WA, AK	60,000[v]	O (3)	3,600	*	3,600	3,240	3,600	<50	(<50)
Hawaiian Monk Seal	Hawaii	1,488	E (1)	0	*	0	9[f]	90	?	(?)
Bearded Seal	Alaska	unknown	N (?)	0	*	--	--	--	<4,000[k]	(<5)
Ringed Seal	Alaska	unknown	N (?)	0	*	--	--	--	<16,000[k]	(<5)

(continued)

Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Species (Stock)	Geographic Area Considered in Estimate[a]	Minimum Abundance Estimate	MMPA/ESA Status[b] (Bin)[c]	Allowable Biological Removal Level					Estimated Annual Removal	
				MMPA (pre-1988)[d]	Interim Exemp.[e]	MMC Rate	NMFS Prefer.[f]	Constant Rate	Total[g]	(US/EEZ)[h]
Ribbon Seal	Alaska	unknown	N (?)	0	*	--	--	--	<4,500[k]	(<5)
Walrus	N. Pacific	234,020	O (3)	7,020	*	7,020	6,318	7,020	6,850[p]	(<20)
No. Sea Otter	Alaska	100,000	O (3)	6,000	*	6,000	5,400	6,000	?	(?)
So. Sea Otter	California	1,941	T (1)	0	0	0	9[f]	90	<10	(<10)
Beaked Whales (Family Ziphiidae)	N. Pacific	unknown	N (?)	0	*	--	--	--	<10	(<10)
Sperm Whale	N. Pacific[o]	930,000[w]	E (3)	0	*	4,650	16,740[f]	18,600	0	(0)
Beluga	Gulf of AK	500[x]	N (2)	0	*	5	5	10	<50	(<10)
	W. Arctic	13,500	N (3)	0	*	135	243	270	<400	(<20)
Rough-Toothed Dolphin	N. Pacific	unknown	N (?)	0	*	--	--	--	>1	(>1)
Common Dolphin (Long and short snout stocks)	California	15,448[y]	N (3)	0	*	154	278	308	-500[l]	(<50)
Bottlenose Dolphin (Pacific)	Coastal	240[z]	N (3)	0	*	2	4	4	<1	(<1)
	Offshore	unknown	N (?)	0	*	--	--	--	<1	(<1)

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Table 2.2 (Continued)

Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Species (Stock)	Geographic Area Considered in Estimate[a]	Minimum Abundance Estimate	MMPA/ESA Status[b] (Bln)[c]	Allowable Biological Removal Level					Estimated Annual Removal	
				MMPA (pre-1988)[d]	Interim Exemp.[e]	MMC Rate	NMFS Prefer.[f]	Constant Rate	Total[g]	(US/EEZ)[h]
Northern Right Whale Dolphin	N. Pacific	unknown	N (?)	0	*	--	--	--	~19,000[i]	(<50)
Pacific White-sided Dolphin	N. Pacific	unknown	N (?)	0	*	--	--	--	~11,000[i]	(<50)
Killer Whale	Gulf of AK/ S.E. AK[m]	286[aa]	N (3)	0	*	2	5	5	<1	(<1)
	Aleutians/ Bering Sea	unknown	N (?)	0	*	--	--	--	<1	(<1)
	WA, OR, CA[n]	260[aa]	N (3)	0	*	2	4	5	0	(0)
Grampus (Pacific)	N. Pacific	unknown	N (?)	0	*	--	--	--	>-500	<10)
False Killer Whale	N. Pacific	unknown	N (?)	0	*	--	--	--	>1	(>1)
Short-finned Pilot Whale	N. Pacific	unknown	N (?)	0	*	--	--	--	<10	(<10)

(continued)

Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Species (Stock)	Geographic Area Considered in Estimate[a]	Minimum Abundance Estimate	MMPA/ESA Status[b] (Bin)[c]	Allowable Biological Removal Level					Estimated Annual Removal	
				MMPA (pre-1988)[d]	Interim Exemp.[e]	MMC Rate	NMFS Prefer.[f]	Constant Rate	Total[g]	(US/EEZ)[h]
Harbor Porpoise (Pacific)	California	4,924[bb]	O (3)	98	*	98	88	98	<100	(<100)
	WA, OR Coast	366[bb]	N (3)	0	*	3	6	7	<50	(<50)
	WA Inland Waters	unknown	N (?)	0	*	--	--	--	<10	(<10)
	Alaska	unknown	N (?)	0	*	--	--	--	<100	(<100)
Dall's Porpoise	Bering Sea	216,118[cc]	O (3)	4,322	*	4,322	3,890	4,322	~900	(<10)
	Western N. Pacific	692,854[cc]	O (3)	13,857	*	13,857	12,476	13,857	~6,000[i]	(<10)
	Eastern N. Pacific & Gulf of AK	608,000[cc]	N (2)	0	*	6,080	6,080	12,160	<10	(<10)
Gray Whale	N. Pacific	19,737[dd]	E (3)	0	*	98	354[f]	394	<200	(<10)
Humpback Whale	N. Pacific	1,398[ee]	E (1)	0	*	0	2[f]	27	<1	(<1)
Minke Whale	N. Pacific	unknown	N (?)	0	*	--	--	--	<10	(<10)

Note:

This table contains much preliminary information which has not been subject to peer review, and should not be considered as a final NMFS determination. These figures are likely to change based on a further evaluation of existing data and on new information as it becomes available.

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Table 2.2 (continued)

Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Footnotes:

[a] In some cases the abundance estimates include areas outside the U.S. EEZ, in others, separate estimates have been made for various stocks or regions within the EEZ. This column identifies the area to which the abundance estimate and the calculated ABR values refer.

[b] N = No special status
O = OSP, Determined to be at or above OSP
D = Depleted under MMPA
E = Endangered under ESA
T = Threatened under ESA

[c] "Bin" refers to the recovery factor used in the NMFS preferred alternative according to the following criteria:
Bin 1 = Below 1/3 of K (0.1 recovery factor)
Bin 2 = Between 1/3 and 2/3 of K (0.5 recovery factor)
Bin 3 = Above 2/3 of K (0.9 recovery factor)
? = Unknown

[d] A zero (0) in this column indicates that no takes could be allowed under general permits; in some cases public display and scientific research takes would be authorized and small incidental takes could be authorized for non-depleted stocks if the taking would have a negligible impact on the stock. Negligible impact could be interpreted to mean .005 times the minimum estimate of stock abundance.

[e] Under the Interim Exemption, there would be no limit for most stocks unless it were determined that the removals would have a significant adverse impact on the stock.

[f] For depleted, endangered, or threatened stocks, the conservation or recovery plan would set allowable takes; this ABR level is used as a default for this DLEIS.

[g] Total estimated annual removals include domestic and foreign incidental mortalities in the EEZ; mortalities that occur outside the EEZ (e.g., high seas incidental takes), but within the range of the stock; subsistence takes; other uncontrolled takes; and removals for public display and scientific research.

[h] Estimated annual incidental removals in fisheries within the EEZ. This number is included in the total.

[i] Estimate is primarily based on a gross estimate of incidental take in the high seas drift gillnet fishery.

[j] An estimate of 270,000 was made by Alaska Department of Fish and Game (ADF&G) in the late 1970s, but is considered no longer valid given significant decreases in numbers noted since the late 1970s by Pitcher (1990).

[k] Estimate is primarily subsistence takes.

[l] Burns (1973) estimates 200,000 to 250,000 but is not considered valid for the purposes of determining ABRs.

[m] Includes only three areas - Prince William Sound, Southeast Alaska, and Shelikof Straits.

[n] Includes British Columbia.

[o] Principally includes areas outside the EEZ (i.e., it is a range-wide estimate for the North Pacific).

[p] Based on subsistence harvest data for 1980 - 1989; does not include walrus that are struck and lost, which is estimated to be as high as 40 percent of total.

[q] NMFS, Unpublished data.

[r] Boveng (1988a).

[s] Report of the North Pacific Fur Seal Commission, 1984.

[t] Oregon and Washington Coast: Boveng (1988b)
Puget Sound/Inland waters: Calambokidis et al. (1985), Boveng (1988b)
California: Miller et al. (1983a, b), Hanan et al. (1985b, 1986a, 1986b, and 1987).

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Comparison of Allowable Biological Removal Alternatives for West Coast and Hawaii Marine Mammal Stocks

Footnotes (continued):

u Burns (1973).
v Boveng (1988c).
w Rice (1988).
x Hazard (1988).
y Dohl et al. (1983).
z Hansen (1990).
aa Alaska: Leatherwood et al. (1984b).
Washington and British Columbia: Bigg (1982).
bb Washington Coast: Calambokidis (1990).
California and Oregon: Barlow (1987a).
cc Bouchet et al. (1986), Jones et al. (1986), Turnock (1987).
dd Brelwick et al. (1988).
ee Reported as one North Pacific stock, but counts are from separate wintering grounds:
Hawaiian winter grounds: Perry et al. (1990).
Mexican winter grounds: Alverez et al. (1990).

DRAFT

September 13, 1991

Dr. Charles Karnella
Office of Protected Species
National Marine Fisheries Service
1335 East-West Highway
Silver Spring, MD 20910

RE: MMPA-Proposed Amendments

Dear Charles:

The Pacific Fishery Management Council has reviewed with great interest the NMFS Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations. We appreciate the opportunity to comment, and understand a revised version by NMFS is expected in early October. The Council looks forward to an opportunity to comment again, and trust you'll give due consideration to our evaluation of the first draft when preparing the second draft.

Your proposal contains several positive aspects which spark optimism in the Council that NMFS has the insight to acknowledge that marine mammals are a living marine resource capable of, and in need of, management in an ecosystem that must balance wildlife with the Nation's valuable seafood industry.

These positive aspects are (a) choosing not to include amendments to the Magnuson Act which would explicitly prioritize the use of fish as food to assure levels of mammal populations that occurred prior to the presence of modern man; (b) admitting that several previous administrative procedures have been burdensome; (c) tolerating a reasonable time for mammal stocks to rebuild to OSP; (d) accepting the legitimacy of takes from stocks that are depleted, threatened, endangered or whose status is unknown; (e) acknowledging that there are detrimental economic impacts to the seafood industry and coastal communities if no takes are allowed; and (f) treating California sea otters no differently than other mammals.

However, as much as the Council would like to see NMFS use these positive points to move forward with an amended MMPA, we believe that the Nation is not yet prepared to do so. It is premature until the information gathered by the 1988 amendments (the Interim Exemption Program) is available for analysis. These amendments were designed to document the nature and extent of takes by the commercial harvesting industry and to evaluate the methodology used to verify takes, to place observers onboard, to issue permits, to collect fees, to enforce, etc.

Only after this information is available, as well as the status and trends of mammal stocks, are we able to begin to ask - - What are the problems?, and How should they be practically resolved through amendment of MMPA?

We recognize that the statute gave NMFS a January 1, 1992 deadline, **BUT** we stand behind you in explaining to Congress that it is premature to fabricate significant changes without the benefit of information that is available for collection.

Fundamentally, we ask if there are in fact REAL problems with fishery/mammal interactions such that STOCKS of mammals (not a few individuals) are significantly impacted? We do not find an answer to this question in the NMFS proposal, nor in the Draft Legislative Environmental Impact Statement (DLEIS). Instead, we find a DLEIS that has no evaluation of the information collected by the Interim Exemption Program, no quantitative economic analysis of the impacts on the seafood industry, and no quantitative evaluation of the expense to implement the proposed program.

Further, and more perturbing, we find that the proposal is a horrendous bureaucratic nightmare that transfers significant MFCMA and state authority for fisheries management to the MMPA - - authority such as fishing permits, user fees, mandatory observers, allocations and fishery regulations to control gear, seasons, areas, etc. Our concerns with the details of the proposal include:

- **Optimum Stainable Population**
  It is not clear in the proposal what the relationship is between OSP, ABR and quotas and when/how a stock at OPS will lead to takes and when/how a stock outside OSP will lead to takes. It is also unclear why ABR will "work" instead of OSP, when both seem to be a function of carrying capacity and mean net productivity. Further, we question why NMFS has failed to explicitly acknowledge that (1) OSP and ABR are a function of current carrying capacity (and not some historic level) and (2) that OPS is not such a difficult number to arrive at for populations that are unquestionably robust (by any rational wildlife management standards) such as gray whale, California sea lions and West Coast harbor seals?

- **Zero Take Goal**
  The Act's goal of reducing incidental kill or serious injury to insignificant levels approaching a zero mortality and serious injury rate is ill defined and much debated. It is not clear in your proposal how the goal will be interpreted and applied by NMFS. If, for example, ABR is 200 and a fishery has a documented take of 150 will the quota be 200, 150 or will the "zero take goal" force a quota less than 150?

  Is the goal effected by previous efforts of industry to reduce the take? Is it effected by the incremental cost to further reduce the take? Is it effected by the increases in the mammal population level or by behavioral changes in the mammal (i.e., availability or catchability).

  The Council does not interpret this goal to mean that the take must reach zero for all fisheries and mammals.

- **Allowable Biological Removals (ABR)**
  We wholeheartedly support an approach to incidental takes that recognizes there is an acceptable removal from all but the most critically depressed stocks - - a concept universally intuitive to wildlife management. The ABR process, though, troubles us because (a) it is unclear on the definition of stock (geographically) and how this effects the ABR for different fishing zones within a fishery; (b) it is uncertain how stable the ABR will be for industry planning given so many deficiencies in data; (3) there are potentially tremendous negative impacts of "uncontrollable" takes, which in fact could be controlled through statutory changes; (4) it is uncertain what the relationship is between ABR, the goal to reduce takes toward a zero rate, and the actual quota per fishery; (5) the ABR algorithm is unprecedentially conservative and (6) the process for allocation should use existing fishery institutions (i.e., Regional Management Councils and state rulemaking entities).

- **User Fees, Observers, Logbooks**
  The proposal seeks broad federal authority for the assessment of fees, the placement of onboard observer and the use of logbooks. It is unclear on the extent to which NMFS will use this authority and the impact it will have on the seafood industry.

- **Classifying Fisheries**
  We agree that there should be only two categories, so long as category one reflects only those fisheries with a likelihood of a significant impact on a mammal stock. We do not agree with your criterion of simply being "likely to interact with marine mammals". Let us focus instead on the real issue of significant impact on the stocks.

- **ESA**
  We believe the option to amend the ESA to authorize the take of threatened and endangered species under MMPA is superior to your option which requires the bureaucratic exercise of section 10 (ESA) permits.

- **Intentional Take**
  Again, it is impossible for us to evaluate the impact of the proposal on fisheries. For lethal takes, what is a "demonstratable negative impact on the fishery"? Is 80% loss of fish to mammals, as has been documented in some fisheries, sufficient demonstration of a negative impact? For non-lethal takes, the burden to prove that deterrents will not significantly adversely affect stocks is unacceptably burdensome, expensive and in some cases probably impossible.

This proposal has potential for significant negative impact on the seafood industry, may cost tens of millions of dollars to implement, and would disrupt the existing state and council fishery management institutions. All of this to meet the January 1, 1992 deadline and to apparently resolve the issue of clarifying authority under MMPA to legally take mammals incidental to commercial fishing.

We prefer to see a program designed to address whatever real problems arise from information gathered on mammal takes and stock status. It is the Council's experience that very few fisheries significantly impact mammal stocks. Let's not create a sledgehammer to drive a tack.

It is our recommendation that NMFS extend the interim exemption program with a few changes. These changes are intended to provide NMFS with the discretion and flexibility to use its available fiscal resources to (1) collect and analyze data on fishery interaction in those fisheries that are likely to have significant impact on mammal stocks and (2) collect and analyze data on the status of mammal stocks most likely to be impacted by commercial fisheries. Our suggested changes to the Interim Exemption Program include giving NMFS discretion to require logbook reporting only where NMFS believes there is opportunity for collecting reliable data; encouraging NMFS to fix "hot spots" of interaction if any arise, through existing regulatory authorities; requiring mandatory observers in those, and only those, fisheries that NMFS believes require such monitoring to document the take because there is a likelihood of a significant impact on a mammal stock; resolving the conflict between MMPA and ESA to legalize the take of threatened and endangered species under MMPA; and reducing the extent of the entire program through only two categories of fisheries (where category one has those fisheries that are likely of significant impact on a stock).

Once the Nation has acquired and evaluated data on takes, status of stocks,, and methodologies (for monitoring, enforcing, etc), then we can all work together to identify the "problem" and seek a rational and reasonable solution.

Sincerely,

Richard Swartz
Chairman
Pacific Fishery Management Council

DRAFT

September 20, 1991

Dr. Charles Karnella
Office of Protected Resources
National Marine Fisheries Service
1335 East West Highway
Silver Spring, MD 20910

Re: Marine Mammals And
Commercial Fishing

Dear Dr. Karnella:

The undersigned commercial fishing organizations appreciate this opportunity to comment on the Proposed Regime To Govern Interactions Between Marine Mammals And Commercial Fishing Operations published on May 24, 1991 (56 Fed. Reg. 23958) and its Draft Legislative Environmental Impact Statement (DLEIS).

We are encouraged by NOAA's obvious commitment of time and thought to this issue, as is evident in the comprehensive nature of the DLEIS. We are also pleased that NOAA has been forthright in acknowledging the legitimacy of commercial fishermen taking animals from stocks that are threatened, endangered or depleted. NOAA also recognizes the negative economic impact to the nation's important seafood industry, if only a few or no marine mammal takings are allowed.

This "common ground" serves as a starting point for NOAA and the seafood industry to continue working together to develop a future program to rationally and reasonably resolve public concerns over the impact commercial fishing may be having on marine mammals. NOAA's proposal, however, raises numerous scientific and policy questions which are explained in these comments. Until these uncertainties are resolved, we are unable to offer any general comment or views on NOAA's proposal.

What follows is an initial summary of concerns based upon our understanding of your proposal and a preliminary scientific review of the DLEIS. We encourage NOAA to clarify its proposal, better define the expected impacts of its proposal in the DLEIS, and seek additional public comment, before submitting a legislative proposal to congress.

It is particularly important that seafood companies and

consumers have a better understanding of exactly what would be expected of them under NOAA's proposed system in the way of permits, reporting requirements and fees, and what would happen to fisheries where:

(1) projected takings exceed ABR levels (e.g., the Gulf of Maine); and
(2) projected takings approximate ABR levels (e.g., the Gulf of Alaska).

1. Calculating Allowable Biological Removal Levels

Under NOAA's proposal, an Allowable Biological Removal (ABR) level would be established for each marine mammal stock. We have several concerns with the proposed methodology which would be used to calculate these ABR levels.

First, it is unclear: (1) what criteria would be used to identify a "stock" of marine mammals; (2) how ABR "stocks" relate to "populations" under the Marine Mammal Protection Act (MMPA), "species" under the Endangered Species Act (ESA), "fisheries" under the Magnuson Fisheries Conservation and Management Act, and the "management stock units" of the International Whaling Commission; and (3) the process which would be used to determine the number and geographical range of individual "stocks."

The stock structure of most marine mammal species is uncertain and controversial. Some coastal species, for example, include different local, so-called resident, groups in embayments, as well as transient or migratory groups which move into and out of these embayments on a seasonal basis. From a biological standpoint, it is unclear from your proposal what degree of group spatial intermixing, morphometrics, etc. produces a stock.

The extent to which "management" considerations play a role in the definition of stocks also is unclear. For example, for management purposes, marine mammal species are often divided into either domestic or international management areas based on historic regions of capture or harvest. We are uncertain whether these considerations would go into your proposed definition of a "stock" for ABR purposes.

The definition of "stock" is not clarified by the tables of stocks in the DLEIS (Tables 2.2 and 2.3). Indeed, these tables illustrate the need for clearer definition and analysis. Nor is the definition of stock clarified by the descriptions in Part 3 of the DLEIS which refer variously to stocks, groupings, populations, subspecies, breeding colonies, and species in a confusing and apparently inconsistent manner. Repeated references are made to published studies in which stocks and/or populations were identified in different ways. The discussion of this issue at DLEIS page 2-38 only adds to the uncertainty.

Second, we question whether it is appropriate under accepted principles of wildlife conservation to use multiple conservative default assumptions as well as a recovery factor in the calculation of an ABR level. As we understand the proposal, conservative assumptions would be used to estimate minimum population estimates and the annual net productivity factor as well as to classify stocks under the recovery factor.

Using the lower bound of the 95 percent confidence interval as the estimate of stock size, as proposed, differs from the use of mean or median values commonly used in estimating stock conditions in scientific publications, and is extraordinarily conservative in those instances where there is poor data on stock structure and/or wide variation in stock estimates. Given the large magnitude coefficient of variation for many stock surveys, it is not uncommen for the upper bound of the 95 percent confidence interval to be more than five times the lower bound.

The use of an actual count, which is proposed as an alternative method of estimating population size, also is conservative given the difficultion in observing animals and the sightability coefficients typically used for animals surveyed by airoraft.

The default estimates for calculating net productivity also appear conservative. Indeed, your proposed default estimates are at the lower bound of those published in professional journals or used in other conervation programs.

Wildlife management decisions often include some type of safety factor, either explicitly or implicitly, to allow for the limitations of data, and the imperfections of management institutions. Nevertheless, if the population size and net productivity factor are estimated conservatively as they would be in your proposal, and these estimates are multipled together, the result is a potential removal level which will assure either that stocks will remain above the MNP point, or that they will recover to a level above the MNP point. The proposed ABR recovery factor, in short, appears to be a redundant safety factor.

Third, the three so-called recovery factors also are of concern. We do not understand how the different recovery factors were derived. It also is unclear what recovery schedules are assumed when these factors are used.

For example, if a stock is above the MNP level, it would be placed in the highest recovery factor category, but the stock, by definition, would also be in the OSP range. What is the scientific rationale for the proposed recovery factor of 0.9 for these stocks, rather than 1.0, given the conservative default assumptions and calculations used to estimate population size and net reproductivity? Also, if these stocks are within OSP, why wouldn't a removal level be estimated consistent with prior determinations of OSP?

We fail to find any scientific basis set forth in either the proposal or the DLEIS for the recovery factors of 0.1 and 0.5 for stocks in the lower recovery-factor categories. In the absence of any explanation, these numbers appear to be arbitrary. The underlying problem, we believe is the lack of a sound conceptual basis for use of the recovery factor in the proposed ABR analysis. Unless a scientific rationale is given for these particular values, their quantification becomes political.

Fourth, we are concerned that the implementation of the ABR system would place undue emphasis upon theoritical statistics, and not enough emphasis upon specific biological analysis of individual stocks. While the use of default estimates and safety factors is appropriate in wildlife management decisions, these estimates and factors are derived on a stock-by-stock basis in the context of a particular data base for a particular stock, and not as part of an across-the-board regulatory equation applicable to all species. Flexibility is needed to accomodate the unique circumstances which surround each stock assessment. In some situations, the use of indices and trend analysis could provide a sounder basis for regulatory action.

We are very concerned that the implementation of the proposed ABR concept will become mired in data deficiencies and definitional discrepancies to a point that it will be impossible to predict accurately what would happen in the future. Seafood companies need clear guidance so they can plan for the future.

The DLEIS is helpful in providing some insight into how ABR levels might be calculated under the proposal. We understand, however, that the data used to make some of these ABR calculations may not be the best available biological data, particularly in the Gulf of Maine and Gulf of Alaska, and that adjustments should be made. It also would be helpful if the DLEIS illustrated how the elements of the ABR estimates were calculated given the data base for specific stocks as described in Part 3.

In summary, the ABR methodogy appears to be derived from calculations frequently used by researchers to estimate stock size. What is new are the acronyms and the proposed use of "risk averse" concepts. These concepts are not clear and little scientific rationale is offered to explain why certain values were chosen.

Risk analysis in science is very controversial because it involves societal judgements. The proposed ABR system apparantly would leave these societial judgements to be made by the small number of scientists who would chose what level of risk was acceptable to them, and not the members of the public.

Fishermen must rely on the opinions of NOAA scientists. For a variety of reasons, trust in these opinions has eroded. This erosion, in turn, has created an authority vacuum which now is

being filled by self-appointed authorities who are telling the public that marine mammal and fishery stocks are threatened with extinction.

Care should be taken that any risk analysis is conducted in an appropriate forum, and that the results are communicated to the public. We do not see such a process built into the ABR proposal.

2. Optimum Sustainable Populations

As is evident from our earlier comments on the ABR recovery factor, the relationship between OSP and ABR is confusing and should be clarified.

First, for those stocks where OSP has been determined, or could be determined, would an OSP approach be followed to determine an allowable removal level, or would only the proposed ABR system be followed? If some OSP approach would be used, under what circumstances would it be adopted? Also, what method and procedure would be followed for determining acceptable incidental fishing quotas if OSP determinations were made?

The reference in your proposal to depleted stocks suggests that OSP determinations would continue to be made, at least in some circumstances. It is unclear, however, how the proposed system for allocating ABR levels would relate to your proposal that conservation plans govern the taking of stocks found to be below their OSP range. Will ABR quotas be allocated as well as conservation plans be developed? If so, will two different groups (allocation board and plan team) decide on restrictions?

We also wonder what impact an OSP determination would have on the proposed ABR system, if any, in those situations where a stock was found to be in or above its OSP range.

It also is unclear why you are suggesting that the OSP approach will not work and the ABR system will, when it appears that both the ABR and OSP approaches require the same type of information to administer. The OSP level, for example, has been defined by the agency as a range between the ecosystem carrying capacity (K) and the population level resulting in maximum net productivity (MNP). By analogy with other large mammal species, the agency has determined that the population level expected to result in MNP for marine mammals is about 50 to 60% of K. Thus, OSP has been derived from estimates of either K or MNP.

Your proposal explains that an ABR system is proposed because calculating K and MNP is difficult or impossible for many stocks. Yet, your proposed recovery factor calls for classifying stocks in one of three categories which are determined based upon information about where the present population level is located in relation to the levels associated with K and/or MNP. These K and MNP levels are the same estimates needed to calculate OSP. If an ABR recovery factor can be

estimated for a stock as you propose, why not OSP?

SPECIAL NOTE: The DLEIS observes that the eastern Pacific gray whale stock is at or near its pre-exploitation level and that it is well within its OSP range. NMFS has known this since the early 1980s. It is said to be increasing at about 2.5 percent per year. We are baffled that you continue to classify this stock as endangered under the ESA. We also wonder how its "endangered" status impacts your proposed ABR system given the definition of "depleted" populations in the MMPA which cross references the ESA. Reform of agency ESA determinations and practices with respect to marine mammals is long overdue.

3. Allocating ABR Levels

We have several concerns about NOAA's proposal to allocate ABR levels among various user groups and among commercial fishing fleets.

First, you propose that the ABR be allocated "based first on our ability to control the takings." Thus, takings from "subsistence harvests of non-depleted species, collisions with ships, and incidental takes by foreign fishing outside the EEZ " would be deducted from the ABR before quotas were derived for "commercial fishing, public display, and scientific research." The result is that priority is given to certain activities based on NOAA's present legal authority to regulate the activity in question. Noncontrolable activities, therefore, are given first priority in the taking of marine mammals.

NOAA's present legal authority to "control" the taking of marine mammals would be a necessary consideration in determining appropriate levels of takings by commercial fishermen and others if this were a regulatory proceeding. What is proposed, however, is a new legislative system in which regulatory powers would be amended.

We suggest that you review this aspect of your proposal and offer a more appropriate scheme for assigning priorities among users. It appears to be unfair, and counter productive, to propose that present authority is a valid basis for allocating ocean resources, when changes to this authority are being proposed.

Just as there is uncertainty concerning the definition of a marine mammal "stock" in calculating an ABR, there are uncertainties in determining what is a "commercial fishery" for purposes of allocating the ABR. For example, what will be the criteria and process used to distinguish between a "subsistence" fishery, a "recreational" fishery, and a "commercial" fishery under your proposal?

The criteria to be used in distinguishing commerical

fisheries from each other also are uncertain. Fisheries are variously defined by state, federal and international law as well as by the industry and members of the public. The present interim exemption for commercial fishing under the MMPA uses a different list of categories.

The "fisheries" of the west coast as described in the DLEIS differ significantly in level of detail and geographical scope than the "fisheries" in the Gulf of Mexico and Atlantic. Is the DLEIS list of "commercial fisheries" to be used under your proposed ABR system as is suggested by the calculations presented in the DLEIS? Why do the fisheries on different coasts appear to be defined using different criteria?

We also question the need to allocate quotas in all instances as NOAA seems to propose. Because several different stocks might be taken in an individual fishery, and several different fisheries might take mammals from the same stock, the number of allocation decisions could be extensive, depending upon the number of "stocks" and "fisheries." Indeed, hundreds of allocation decisions might have to be made each year.

Numerous fisheries have a negligible impact on stocks, or insignificantly low levels of incidental take, or incidental take levels which are diminishing. We question the benefit achieved in annually allocating quotas to these fisheries when the time and effort required appears to be extensive and the benefit appears to be minimal.

In summary, the ABR quota allocation process needs to be better defined, particularly in relation to the present management systems used to regulate harvests.

4. The Goal Of Reducing Incidental Takings

Under your proposal, the achievement of the goal of reducing incidental takings to insignificant levels in an individual fishery appears to be: (1) independent of the population level of the stocks taken by a fishery; and (2) a factor to be considered in allocating quotas. The relationship between the quota system invisioned by your proposed ABR system, and the goal of reducing mortality to insignificant levels, however, is very uncertain.

If incidential take levels must be reduced irrespective of present population levels, we wonder how the proposed ABR allocation system will operate. For example, if a stock is within OSP, or total mortality is significantly smaller than ABR levels, what role does the goal play in the allocation of ABR levels? Would less than the ABR level be allocated in such cases? If so, what criteria would be used to quantify the size of the reduction?

Conversely, if the the level of incidental takings in a fishery exceeds its ABR quota, does the goal of reducing

mortality have precident over the ABR quota and allow fishing to continue so long as takings in the future are reduced, or does the ABR system operate as an absolute limit on fishing irrespective of the progress being made in a fishery?

Finally, we wonder whether the relative progress towards achieving the goal among fisheries would be a factor in allocating ABR levels among fisheries. For example, would a fishery making progress towards the goal get preference (i.e. a higher allocation) over a fishery not making progress, or would the successful fishery have its quota reduced because of the progress it had made and the unsuccessful fishery get a larger quota because of its failure to reduce takings?

The exact meaning of the goal of reducing incidental takes as used in the MMPA is not clear on its face and has been the subject of much dispute, particularly in the tuna/porpoise controversy. In this controversy the goal has been debated as a technology-driven standard based more on philosphical or political considerations rather than sound principles of wildlife conservation.

We agree with the observation in your proposal that lack of guidance about this goal has frustrated progress, but there is no such guidance in your proposal. Vague mention is made to the need for programs to achieve the goal, but no specific proposals are offered.

Given the limited resources available to the agency for conserving marine mammals, we question the usefulness of proposing an elaborate quota system based on population assessments which is comprehensive to all marine mammal stocks and fisheries. We also question the practicality of a scheme of reducing takings, which would be administered in addition to an ABR quota system, which is based upon a vaguely-worded goal, and which apparantly is unrelated to: (1) maintaining stocks at OSP levels; (2) keeping incidental takes within ABR levels; and (3) sound principles of wildlife conservation.

5. User Fees And Vessel Observers

We have supported various NOAA proposals for user fees in situations where a specific governmental service is provided to an individual company. In this regard your proposal to "supplement monitoring costs for particular fisheries" is unclear. We encourage you to explain what you propose in greater detail so that individual companies can better understand what the expected impacts would be. We have similiar concerns over your proposal for a vessel observor program.

6. Classifying Fisheries

Three categories of fisheries were addressed in the 1988 MMPA amendments to aid in the gathering of information from an industry which is very diverse and complex. These three

categories helped focus the limited resources of NOAA and the industry on high-priority areas, or potential "hot spots," and minimized unnecessary permiting and reporting requirements in fisheries with negligible impact on marine mammal populations.

Based on the available data gathered so far under the interim program, there is little justification to impose added operational costs on the vast majority of fishing vessels. Your proposal to classify fisheries into two categories in the future has merit if its purpose is to concentrate agency and industry efforts on those few fisheries which may significantly impact mammal stocks.

We are very uncertain about what you are proposing and how you would define the key proposed standards of "likely to interact with marine mammals" and "whose direct interactions may adversely affect a marine mammal stock." Does the term "likely" refer to the risk of an encounter, or to the predictability of an encounter. If the former, how likely is "likely?" Also, would this standard apply on a fleet-wide, or individual-vessel basis, and over what period of time (e.g., day-by-day, trip-by-trip, season-by-season, year-by-year)? For example, would the taking of a single gray whale each year by all west coast vessels be "likely" merely because it was predicable? If so, would such taking have an "adverse" impact on the gray whale stock because it is "endangered" (even though the population is at or very near its carrying capacity).

Agency and industry efforts should be aimed at maintaining healthy stocks. Very few fisheries, however, significantly impact stocks. These few fisheries are the high-priority ones we should concentrate on, and place in your proposed category one. For example, even though the data from the interim program suggests that there are interactions between the Columbia River gillnet fishery and harbor seals, this stock of seals is expanding rapidly. It should not be in category one.

Your proposal, however, does not clearly set priorities based on maintaining healthy populations. This uncertainty arises from the word "or" between the two standards in your proposed test for putting fisheries in category one. This word, we believe, should be "and" not "or."

7. Intentional Takings

We agree with your observation that it is necessary to intentionally take mammals in certain fisheries to avoid losses. Your proposal to authorize such takes, however, is very uncertain. For example, what is a "demonstratable negative impact on the fishery?" What type of monitoring or information would be required? Who would initiate such a finding?

Commercial fishermen use a variety of non-lethal methods to protect their personal safety, gear, catch, and mammals from entanglements. Your proposal seems to suggest that fishermen

would no longer be able to defend themselves and protect mammals unless someone undertook the burden of showing that deterring marine mammals did not significantly adversely affect stocks. But who could, or would, undertake such a burden of proof?

Such a proposal could have a devastating impact. Proof of a negative impact is always difficult, and is particularly burdensome (and expensive) when it comes to marine mammal stocks.

8. The Endangered Species Act

We agree with your observation that "in certain cases, limited incidental taking of endangered and threatened marine mammals would not disadvantage the stock and should be allowed" (DLEIS p., 2-48). We also agree that the simplier and less confusing solution is to authorize such takes under the MMPA and not require continued authorization under the ESA. We disagree, however, with your statement that just because an amendment to the ESA is "significant" you should recommend amending Section 10 of the ESA to cover fishing in the EEZ (and on the high seas).

Consider the consequences of your proposal. Obtaining ESA Section 10 authority involves a permit and conservation plan process which requires information and agency funding which are not readily available. How many permits and plans do you propose would be obtained? Would each individual commercial fishermen have to apply for a permit and trudge through the bureacratic pathways of Section 10?

9. Conclusion

Further information is needed regarding the process and criteria to be followed before we can offer a general comment on your proposal. Our general concern is that agency and industry efforts be concentrated where they are needed, and not be dissipated through needless paperwork and activity.

Creating a paperwork and bureaucratic nightmare would not help mammals, fishermen or seafood consumers. Let's develop a proposal which targets real effort on real problems.

AGENDA C-1(d)
SEPTEMBER 1991

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Alaska Fisheries Science Center
7600 Sand Point Way NE
BIN C15700 F/AKC
Seattle, Washington 98115-0070

September 6, 1991 SEP 10

MEMORANDUM FOR: F/AKR - Steven Pennoyer
NPFMC - Clarence Pautzke

FROM: F/AKC - William Aron *WA*

SUBJECT: Fisheries Related Marine Mammal Issues in Alaska

The attached report summarizes and updates ongoing work on marine mammals of concern to the Region and Council. We will, by the time of the September meeting, be able to provide more detailed information regarding our findings for the northern sea lion as well as some update on the harbor seal status. If you have need for further information, please call me or Howard Braham.

Attachment

MARINE MAMMAL CONSIDERATIONS

NORTHERN SEA LIONS

Declines in Alaskan northern sea lion numbers as determined by surveys conducted through 1990 were sufficient to lead to a final listing on 26 November 1990 of the species as threatened throughout its range under the Endangered Species Act (ESA). Regulatory measures instituted as part of this listing included the designation of 3 nm no-entry zones around all major Alaskan sea lion rookeries west of 150°W longitude. Subsequent emergency regulations prohibited trawling within 10 nm of rookeries in the Gulf of Alaska and eastern Aleutian Islands. In addition, the Gulf of Alaska walleye pollock TAC was split in half between the western and central Gulf of Alaska management areas (at 154°W longitude) to minimize potential localized depletion of walleye pollock stocks.

The northern sea lion recovery team submitted a draft recovery plan for public comment in February 1991. Comments were incorporated into a draft final revision by August 1991, with a final draft currently in preparation.

1991 Surveys

Aerial surveys of adult and juvenile northern sea lions were conducted during June 1991 at all rookeries and most haul-outs in southeastern Alaska, the Gulf of Alaska, and the Aleutian Islands. Preliminary results indicate that since 1990, numbers in southeastern Alaska and the eastern Aleutian Islands remain basically unchanged, while numbers appear to have decreased in the Gulf of Alaska, Prince William Sound, and the central and western Aleutian Islands.

Counts of pups were made at 13 rookeries in the same area (except central and western Aleutian Islands) during July 1991. Pup numbers generally followed the trends in adult numbers, except at Seal Rocks (Prince William Sound) where pup numbers were constant but adult numbers appeared to have declined.

Juvenile Survival at Marmot Island

During 1987-88 a total of 800 northern sea lion pups were marked at Marmot Island in a long term study of northern sea lion dispersal, survival, and reproduction. Calkins and Pitcher (1982) found that most of the pups surviving from the cohorts marked in the mid-1970's returned to their island of birth by the time they were four years old. Life tables they had constructed from collections in the mid-1970's indicated that 41% of females and 22% of males survived to age four. Based on that study, around 100 survivors of the 400 pups tagged in 1987, plus some animals from the 1988 cohort were expected to return to Marmot Island in the summer of 1991. A field team was placed on the island during June-July 1991 to count returnees. A maximum of

seven tagged animals were resighted during the month of observations. These low returns point towards either increased dispersal or some change in life history characteristics (e.g., declining juvenile survival or delayed age of first reproduction). Field teams will return to the island in subsequent field seasons to evaluate these hypotheses.

1990-91 Foraging Studies

Satellite-linked radio transmitters were attached to adult female sea lions (with pups) at rookeries and haul-outs in the Gulf of Alaska and Aleutian Islands during 1990-91. In summer, animals studied remained close to the rookeries (< 30 km), made brief trips (<= 2 days), and made shallow dives ($\dot{x}$ < 30 m). The deepest recorded dive was 120 m. This seems to be characteristic of animals at all of the five sites studied (Chirikof, Ugamak, Ulak, Seguam, and Kiska islands).

Results from the fall and winter studies (again using females with pups at Marmot and Chirikof islands) indicated that winter feeding trips are much longer in duration (up to 4 months) and distance (up to 450 km offshore), and animals dive deeper ($\dot{x}$ up to 84 m with deepest dives at least 273 m).

Aside from the areas immediately around rookeries, areas identified where Gulf of Alaska animals appear to forage in winter include:

- Marmot Island (1 animal tagged) - Portlock Bank and Marmot Bay
- Chirikof Island (3 animals tagged) - Albatross Bank/Barnabus Gully (2 animals), Marmot Gully (1 animal) and Gilbert/Patton Seamounts (3 animals).

Physiological Studies

One element of the summer 1991 fieldwork was a continuation of studies began in 1990 to measure the health of 1-2 month old pups. In 1991 blood was drawn from 58 pups at 9 sites in the area from southeastern Alaska through the eastern Aleutian Islands to study pup condition. Pups were also weighed at two sites--Ugamak and Atkins Island. Ugamak Island pups were heavier than pups weighed in 1990. While there were no 1990 data for Atkins Island, pups weighed there in 1991 were similar in size to the 1991 Ugamak Island pups. These weights, and preliminary examination of the blood samples, indicate that pups in all areas generally appeared healthy without signs of anemia or malnourishment.

Genetic Studies

Stock differentiation studies using MtDNA analysis were begun during summer 1991. Blood (white blood cells) was collected from

adults and pups at sites from southeastern Alaska, the Gulf of Alaska, the Aleutian Islands, and the Pribilof Islands. Analysis of these samples, plus previously collected samples from Oregon, is presently underway.

NORTHERN FUR SEALS

A new population estimate of northern fur seals is not available for 1991. In 1990 fur seal numbers on St. Paul Island were stable while those on St. George Island were declining (York 1990, Kajimura and Sinclair in press). The overall Bering Sea population is considered to be depleted but stable.

PACIFIC HARBOR SEALS

NMFS began a comprehensive population assessment of harbor seals in Alaska during 1991. That state will be surveyed during June (Bristol Bay) and August/September (Bristol Bay again and the reminder of the state) over a three-year period with different sections of the state surveyed during different years. Surveys in 1991 include Bristol Bay, Cook Inlet, and Prince William Sound. Preliminary results from June 1991 surveys in the Bristol Bay (NMFS unpubl. data) indicate that numbers there have not changed significantly since 1990; however, numbers there are less than half of those recorded in 1976. The generally low abundance recorded in recent surveys in the Bristol Bay and Kodiak areas had led NMFS to begin a status review of the Alaskan population of harbor seals. Results of the status review should be available in early winter.

KILLER WHALE

Since 1986, NMFS has been conducting investigations of the nature and magnitude of killer whale interactions with sablefish fisheries. Depredation by killer whales on longline catches of sablefish has been documented in the southeastern Bering Sea and Prince William Sound areas (Dahlheim, 1988). Results of dockside interviews conducted in the winter of 1988 with domestic Bering Sea longline fishermen suggested that depredation occurred on 20% of the sets. In Prince William Sound, a 25% predation rate was reported based on interviews conducted with fishermen. Data collected from the Japan/U.S. cooperative longline research surveys operating in the Aleutian Islands and Bering Sea indicate that interactions may be increasing (Yano and Dahlheim, 1991). Probably as a consequence of these interactions, there have been numerous reports of fishermen shooting at whales. Photographs of Alaskan killer whales show evidence of bullet wounds. Reports have also been received of fishermen using high-powered explosives to frighten whales away from their boats during fishing operations.

Various methods have been tried to reduce or eliminate whale depredation on commercially valuable fish. A Saltonstall-Kennedy grant to Hubb's Research Institute has been used to investigate

possible methods to reduce interactions. No consistently effective technique has been developed to date.

Population estimates of killer whales are not available for most Alaskan waters. Prince William Sound is an exception. Based on photo-identification studies that have been ongoing there since 1984, 233 individuals have been identified representing 9 resident pods and 8 transient pods. The pod responsible for most of the fishery interactions in Prince William Sound (AB pod) has experienced a high level of mortality (Matkin et al., 1987). Since 1986, 20 whales (out of a pod of 37 individuals) are missing and considered dead. Prior to being listed as missing, many of these whales showed evidence of bullet wounds.

Photographs collected from fisheries observers working in the Bering Sea have been submitted to NMFS since 1986. These photographs have also documented bullet wounds on killer whales. In 1991, in addition to the numerous sightings and photographs, domestic observers reported at least four separate records of dead killer whales floating in the Bering Sea.

HARBOR PORPOISE

NMFS began a three year assessment of the Alaskan harbor porpoise population during 1991. Vessel surveys were conducted in Southeast Alaska in spring, summer, and fall of 1991, and aerial surveys of Cook Inlet and Bristol Bay during late summer 1991. Initial results indicate high densities of harbor porpoise exist in southeastern Alaska, with low numbers in Bristol Bay and Cook Inlet. Additional surveys will be conducted during 1992-93 in Southeast Alaska, Prince William Sound, Kodiak, and the southside of the Alaska Peninsula.

BOWHEAD WHALES

Aerial Photogrammetric Studies

In the spring of 1991, the NMML conducted a photogrammetric study of bowhead whales near Point Barrow, Alaska, consistent with surveys flown annually since 1984 (except 1988). A total of 358 bowhead whales were seen in 1991. Of these, 299 were photographed, including 16 calves. This compares favorably with other years, ranging from 257 to 738 photographed per year. Although the 1991 sample size was not large, most of the migratory season was sampled. There were extensive periods of fog and very low ceilings which limited flights. However, there were no periods where the whale's migration was constricted, thus the sampled migration should be representative of the bowhead population.

Results from measurements made on whales prior to 1991 indicate that the population is composed of 41.8% sexually mature adults, 53.0% immature, and 5.2% calves (Withrow and Angliss 1991). The high proportion of immatures indicates the population may be

increasing. The NMML photographic collection now contains over 2,500 images of bowhead whales with sufficient markings to allow for reidentification (Rugh 1990). Four cows were reidentified in different years, each time with a different calf (a total of 8 calves), indicating, with other information, a calving interval of approximately 4 years (Rugh et al., In press). Gross Annual Recruitment Rate calculations using 41.8% sexually mature adults, 50% female and 5.2% young also suggests the calving interval is 4 years (Withrow and Angliss 1991).

International Whaling Commission Assessments

The International Whaling Commission at it's 1991 meeting, estimated a current bowhead whale population of between 6,400-9,200 whales, with the most probable point estimate being 7,500. The population appears to be growing at 3.1% per year given the current subsistance harvest rate (44 strikes per year).

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UNITED STATES DEPARTMENT OF
National Oceanic and Atmospheric
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

September 17, 1991

Clarence G. Pautzke
Executive Director
P.O. Box 103136
Anchorage, Alaska 99510

Dear Clarence,

I wanted to update you on the status of sea lion/fishery actions, and Sue Salveson has just told me staff have already discussed merging two agenda items for the Council's September 23-27, 1991, meeting.

We agree that rather than have two agenda items addressing measures for sea lion protection and GOA pollock management, a single agenda item, under C-1(c), would be more appropriate.

As we discussed earlier, the Council must take final action on these items (Amendments 20 and 25) at its September meeting. We intend to provide the Council drafts of an environmental assessment/initial regulatory flexibility analysis, regulations, and amendment text. We plan to provide copies of the environmental documents to the SSC this week.

With advance notice of this agenda item, and opportunity for public comment at the Council meeting, thus meeting the intent of our Operational Guidelines, the following schedule appears possible. (General Council - Alaska Region, has informed us that justification does not exist for separate ER implementation of these amendments).

September 27, 1991	Council adoption of Amendments 20 and 25.
October 18, 1991	Submission to the Secretary
October 23, 1991	Receipt Date (Day 0), the 5th day after the day on which the Council transmits the amendment to the Secretary.
November 7, 1991	Publish proposed regulations in the Federal Register for a 45-day comment period,
December 23, 1991	Comment period ends.
Early January, 1992	Approve the amendments and publish final and regulations in the Federal Register

Approval of the amendments may occur at any time subsequent to the 60th day after the receipt date and before the 95th day from the receipt date. Early January, however, is about the soonest date that we could make regulations effective, and even then the

30-day cooling off period would have to be waived. This scenario depends upon the Council adopting a 1992 season delay.

We also note that agenda item D-2-(~~f~~)d addresses Council consideration of an emergency rule to authorize the Regional Director to require preregistration in certain fisheries if appropriate. Although this agenda item is listed under groundfish management measures for 1992, the Region has been requested to consider similar action to enhance the inseason management of the 1991 fourth quarter pollock fishery in the Gulf of Alaska. We do not believe, however, that an emergency rule to require vessel registration could be implemented before the opening of the fourth quarter fishery because of lengthy review and approval requirements triggered by regulations that authorize new reporting requirements.

The Region is preparing rulemaking to implement changes to the existing recordkeeping and reporting program for 1992 (see agenda item D-2). The proposed changes do not include the implementation of a vessel registration program for 1992, although NMFS staff believes that, conceptually, such a program would enhance our ability to specify preannounced fishery closures based on anticipated levels of fishing effort. At this time, however, staff has been unable to devote the time necessary to analyze the feasibility of such a program, including technological and enforcement requirements necessary to implement an effective program. We recommend, therefore, that the Council delay consideration of an emergency rule to implement a vessel registration program in 1992 until it has been afforded the opportunity to consider problems associated with the development and implementation of such a program. If staff priority is given to the development of a vessel registration program, the program would be implemented under a regulatory amendment, that could be preceded, if necessary, by an emergency rule.

Sincerely,

Dale

Dale R. Evans
Chief, Fishery Management Division

UNITED STATES DEPARTMENT OF COMMERCE
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National Marine Fisheries Service
P.O. Box 21668
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September 20, 1991

Richard B. Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK 99510

Dear Mr. ~~Lauber~~ Rich:

I am transmitting two environmental assessments (EAs) related to Steller sea lion protection measures that will be considered at next week's Council meeting.

The first EA considers measures for the GOA groundfish fishery only. Management measures implemented by emergency rule in June, i.e., establishing new districts east and west of 154° W in the Western/Central Regulatory Areas for pollock, and a limit on rollover of the pollock TAC quarterly allowances, are discussed and recommended for adoption.

The second EA analyzes options for restricting groundfish trawling in areas proximal to Steller sea lion rookeries throughout the BSAI and GOA. Five alternatives are evaluated but no specific alternative is recommended. Rather than recommend a preferred alternative, we considered it prudent for the Council to review and discuss the contents of the EA and select their preferred course of action.

Sincerely,

Steve

Steven Pennoyer, Director
Alaska Region

DRAFT

ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW/ INITIAL REGULATORY FLEXIBILITY ANALYSIS FOR AMENDMENT 25 TO THE FISHERY MANAGEMENT PLAN FOR GROUNDFISH OF THE GULF OF ALASKA

Groundfish Management Measures Proposed to Protect Sea Lions During the 1992 Fishing Year

(1) Establish new districts east and west of 154° W. longitude for purposes of managing pollock; and

(2) Limit on rollover of the pollock TAC quarterly allowances.

INTRODUCTION

This environmental assessment examines groundfish management measures that are proposed to protect sea lions in the 1992 Gulf of Alaska pollock fishery. The groundfish fisheries in the exclusive economic zone (EEZ) of the Gulf of Alaska are managed by the Secretary of Commerce (Secretary) under the Fishery Management Plan (FMP) for Groundfish of the Gulf of Alaska. The FMP was prepared by the North Pacific Fishery Management Council (Council) under the Magnuson Fishery Conservation and Management Act (Magnuson Act) and is implemented by regulations for the foreign fishery at 50 CFR Part 611 and for the U.S. fishery at 50 CFR Part 672. Additional regulations for U.S. fishermen are found at 50 CFR Part 620.

Acceptable biological catches (ABCs) and total allowable catches (TACs) for pollock (Theragra chalcogramma) are determined each year. The process for determining ABCs and TACs for groundfish species in the Gulf of Alaska is established by the FMP and is implemented in regulations at 50 CFR 672.20(a). The Council will meet during December 1991, for purposes of recommending 1992 TAC specifications for pollock, as well as other groundfish. It will review the best available scientific information about pollock stocks, and will recommend ABCs and TACs for Gulf of Alaska pollock that will govern pollock harvests during 1992.

On November 26, 1990, sea lions were listed as threatened under the Endangered Species Act (55 FR 49204). The listing included measures that accomplished the following: (1) establishment of a 3-nautical mile (nm) buffer zone around major Steller sea lion rookeries in the Gulf of Alaska and Aleutian Islands, (2) prohibition against shooting at or near Steller sea lions, and (3) reduction of the allowable level of take incidental to commercial fisheries in Alaskan waters.

During the course of the 1991 Gulf of Alaska pollock fishery, an emergency rule was implemented containing three measures designed To protect sea lions (56 FR 28112, June 19, 1991). These measures included:

(1) Allocation of the pollock TAC specification in the combined Western/Central Regulatory Areas equally east and west of 154° W. longitude;

(2) Stipulation that any unharvested amount of any quarterly allowance of TACs will be added in equal proportions to the quarterly allowances of the following quarters, resulting in a sum for each quarter not to exceed 150 percent of the initial quarterly allowance; and

(3) Prohibition of fishing with trawl gear in the EEZ within ten nm of the fourteen Gulf of Alaska Steller sea lions rookeries.

Reasons justifying the above management measures still exist. Consequently, the Council has proposed these measures that would amend the FMP and/or its implementing regulations. Measure (1) and (3), above, require amendments to the FMP. They are proposed, therefore as Amendment 25 to the FMP. Measure (2) requires an amendment to existing regulations. This EA/RIR/IRFA examines the potential impacts of implementing measures (1) and (2), above. An analysis for measure (3), which would establish sea lion buffer zones, is contained in a separate document. A description of, and reasons for, these actions follow:

Establish new districts east and west of 154° W. longitude for purposes of managing pollock.

New management districts in the combined W/C Regulatory Area east and west of 154° W. longitude would be established for purposes of managing pollock. They are proposed to be named as the West Pollock District between 170° and 154° W. longitudes; and the Central Pollock District between 154° and 147° W. longitudes. This is a change from an existing measure, which heretofore required that a single pollock TAC be specified for the W/C Regulatory Area. This change would now require that the pollock TAC established for the W/C Regulatory Area be further apportioned equally between the two pollock districts.

The purpose of these new districts is to prevent an entire quarterly allowance of pollock from being harvested in local areas within the W/C Regulatory Area. Otherwise, such harvests could result in local depletion of pollock, albeit temporarily, which may adversely affect the feeding success of Steller sea lions. This measure provides protection to the four major Steller sea lion rookeries (on Sugarloaf, Marmot, and the Chowiet

and Chirikof Islands) in the Gulf of Alaska where Steller sea lion populations have shown the steepest recent declines. The limited data available suggest that Steller sea lions from these four rookeries feed in or around important commercial fishing areas on the east side of Kodiak Island (Barnabus Gully, Chiniak Gully, Marmot Gully, and Marmot Bay). These areas have accounted for a high proportion of pollock catch since 1987. Spatial as well as quarterly allocations of pollock TAC could reduce the potential impacts on Steller sea lions from localized high levels of fish removal.

Limit on rollover of the pollock TAC quarterly allowances.

Existing regulations at 50 CFR 672.20(a)(2)(iv) require the pollock TAC for the W/C Regulatory Areas to be divided equally into four quarterly allowances. Existing regulations also require that any unharvested amount of a quarterly allowance, or excessive harvests of a quarterly allowance, in equal proportions will be added to (rolled over), or subtracted from, the subsequent quarters' allowances.

To prevent excessive accumulation of any quarterly allowance, an amendment to these regulations is proposed to limit the maximum amount of any subsequent quarterly allowance to 150 percent of the initial quarterly allowance. As an example, if each initial quarterly allowance of each pollock TAC is 12,500 mt in each of the pollock management districts, the maximum amount of any subsequent quarterly allowance resulting from rollovers is 18,750 mt in each of the two districts. The purpose of this measure is to prevent excessive harvests of pollock in any quarter, which could reduce amounts of food available for sea lions, or which could limit their feeding efficiency.

Other measures

To implement the measure that establishes two pollock management districts in the W/C Regulatory Area, certain amendments to other regulations are necessary. First, the definition of a fishing trip in regulations at 50 CFR 672.20(h)(2) must be amended for purposes of managing prohibitions to directed fishing for pollock in each of the two districts. Should NMFS prohibit directed fishing for pollock in either district, amounts of pollock retained on board a vessel must be less than 20 percent of the amount of all other fish species retained on board that vessel at any time until any offload or transfer of any fish or fish product from that vessel or until the vessel leaves reporting areas 61 and 62 combined, or reporting area 63, or the Eastern Regulatory Area, where fishing activities commenced, whichever occurs first.

The above area division also requires that the existing statistical area 621 (Shelikof Strait District), defined at 50 CFR 672.2, be divided into two statistical areas - 621 and 631. This action is necessary, because the longitude of 154° bisects statistical area 621, and determining which part of the pollock catch was east and west of 154° W. longitude would not be possible with existing reporting requirements under 50 CFR 672.5. Fish that might have been reported from the Shelikof Strait District must now be reported by either Reporting Area 621 or 631, as appropriate.

ALTERNATIVES

Establish new districts east and west of 154° W. longitude for purposes of managing pollock.

Alternatives include:

Alternative 1. Do nothing. Pollock would continue to be managed in the W/C Regulatory Area as a single TAC. Fishing effort could be directed anywhere in the regulatory area until the quarterly allowance for pollock was reached.

Alternative 2. Divide the combined W/C Regulatory Areas into two districts by dividing it at 154° W. longitude, and then allocate the TAC specified for the W/C Regulatory Area into equal parts. For example, if a TAC of 100,000 mt were specified for the W/C Regulatory Area, it would be further divided into equal parts of 50,000 mt for each of the two pollock districts. Under this alternative, the Central Pollock District would be Federal reporting area 63 (Kodiak) and 631 (Eastern Shelikof District), bounded by 147° and 154° W. longitudes. The West Pollock District would be Federal reporting area 62 and 61 (Chirikof and Shumagins), and 621 (western Shelikof District) bounded by 154° and 170°.

Limitation on carryovers on the pollock TAC quarterly allowances.

Alternatives include:

Alternative 1. Do nothing. Do not implement limits on carryovers.

Alternative 2. Limit the amount of a quarterly TAC allowance that may be carried over to subsequent quarters resulting in a sum that does not exceed 150 percent of the initial quarterly TAC allowance.

ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Analyses of environmental impacts associated with these measures are those related to marine mammal interactions as well as impacts of the physical and other aspects of biological environment. The primary purpose of these measures is provide protection to marine mammals, especially sea lions.

Status of Certain Marine Mammals

Steller sea lions, Pacific harbor seals, and northern fur seals have all experienced significant numerical declines in Alaskan waters in the past 30 years. Index counts of Steller sea lions at standardized dates and times indicate a significant decline in the size of the population over the past 30 years (Merrick, et al., 1987). The number of adult animals in the Gulf of Alaska formerly represented about 38 percent of the world's population. However, the proportion in the Gulf of Alaska has changed as the Alaskan portion of the population declines (Braham et al., 1980; Merrick et al., 1987). Reports of Steller sea lion declines off Alaska are summarized in a Technical Draft Recovery Plan that was prepared by a recovery team appointed by NMFS, February 15, 1991, which is available from Alaska Region, NMFS, P.O. Box 2-1668 Juneau, AK 99802. Preliminary results from 1991 Steller sea lion surveys indicate that the index counts were lower in 1991 than in 1990. The greatest declines in both adult and pup counts in 1991 were in the Gulf of Alaska.

Less is known about areawide changes in harbor seal numbers. However, recent surveys in Bristol Bay, Tugidak Island, and Prince William Sound (NMFS unpubl. data, Pitcher 1990) have documented declines of similar magnitudes to those observed for Steller sea lions. At present, harbor seals are not listed under the Endangered Species Act or Marine Mammal Protection Act; however, NMFS has begun a comprehensive assessment of Alaskan harbor seals with the goal of determining the current status of the population. NMFS is proceeding under the assumption that due to the similarity in timing and locations of harbor seal and Steller sea lion declines that the declines of the two species may have the same causative agent. Thus the discussion which follows may apply equally well to both species. NMFS has initiated and will continue Steller sea lion and harbor seal research efforts to assess the status of the population and the factors involved in the population decline. In addition the Alaska Department of Fish and Game is conducting a state-wide review of subsistence use of Steller sea lions.

Northern fur seals are currently listed as depleted under the Marine Mammal Protection Act, but recent surveys indicate population numbers have been stable since the early 1980's. Cause(s) of the decline do not appear related to direct effects of the Gulf of Alaska groundfish fishery.

Causes of Steller Sea Lion and Harbor Seal Population Declines

The causes of Steller sea lion and harbor seal population declines are presently unknown. Natural environmental factors (e.g., predation, ecosystem changes, disease), as well as human activities (e.g., commercial and subsistence harvest, disturbance, fisheries), are considered to be possible factors in the population decline. In 1986, a NMFS-organized working group listed 12 factors (Appendix 1) that may have caused the Steller sea lion decline off Alaska. Much of the recent discussion of the causes of the Steller sea lion decline has centered on food availability, including both quantity and quality of food (Loughlin 1987, Merrick et al 1987, Calkins and Goodwin 1988; Alverson 1991). Changes in the Steller sea lion prey base could be due to natural environmental variability, resulting in changes in fish community structure, and/or commercial fishery harvests.

Natural Environmental Variability -- Shifts in species dominance resulting in altered community structure may have a profound influence on the dynamics of the food web and on the carrying capacity for higher level predators such as sea lions. Recruitment of marine fish stocks may be favored by environmental conditions leading to shifts in species dominance. Shifts in dominance among fish stocks, which coincide with environmental change, have been reported in several large marine ecosystems around the globe (Skud, 1982; Southward, 1983: Sherman, 1990).

Since 1932, environmental variability in the Northeast Pacific has been characterized by alternating warm and cool eras of 6 to 12 years duration (Hollowed and Wooster, 1991). The recent shift from a cool period in the early 1970's to a warm period after 1977 coincides with apparent changes in the recruitment success of several groundfish stocks, including pollock, in the North Pacific (Hollowed and Wooster, unpub. report). The apparent shift in the recruitment of marine fish beginning in 1977 coincides with the beginning of the sharp declines in sea lion abundance (Merrick et al. 1987).

The potential adverse effects to Steller sea lions and harbor seals of the Gulf of Alaska groundfish fishery could include: 1) reduction of food availability (quantity and/or quality) due to harvest, 2) unintentional entanglement of Steller sea lions in fishing gear, 3) intentional harassment (including killing and wounding) of animals by fishermen, and 4) disturbance by vessels and fishing operations.

Commercial Fishing -- Large fishery harvests from areas proximal to Steller sea lion rookeries/haulouts could decrease the amount of food available to Steller sea lions. Deterioration in the Steller sea lion's prey base could decrease their survival, reduce their reproductive success, and increase their

susceptibility to disease and other stress. However, to date, the Steller sea lion decline has not been demonstrated to be related to commercial fishery-induced changes in prey availability.

Steller Sea Lion Food Requirements and Fishery Harvests

Pollock is currently a dominant component of the Steller sea lion's diet within waters off Alaska (Pitcher 1981, Calkins and Pitcher 1982, Lowry et al. 1982, Calkins and Goodwin 1988, Merrick et al 1988). However, comparison of historical trends in Gulf-wide pollock biomass and counts of Steller sea lions on rookeries shows that the pollock biomass was at the highest levels on record in the early 1980's after the decline in Steller sea lions began. This suggests that Steller sea lion declines can not be attributed solely to declines in gulf-wide pollock abundance.

Steller sea lion populations in the Gulf of Alaska in 1990 required an estimated 96,000 mt of pollock for the entire year (Appendix 2). This figure represents about 10 percent of the pollock biomass available to commercial fisheries in 1991 (age 3+ years; Appendix 3) However, some of the pollock consumed by Steller sea lions are aged 0-2 years, which are not exploited by fisheries. Biomass estimates for pollock 0-2 years, which are not exploited by fisheries, would be in addition to the 1,000,000 mt of exploitable pollock biomass estimated for 1991.

The key issue lies in whether pollock fishing will deplete local concentrations of pollock in areas where Steller sea lions forage. During the 1970's, foreign pollock fisheries harvested large quantities of pollock annually from offshore areas throughout the Gulf of Alaska. Catches by foreign vessels were also relatively evenly distributed throughout the year.

In the early 1980's the fishery shifted from a bottom trawl to a midwater fishery and tended to be more concentrated in space (primarily Shelikof Strait) and time (primarily in late fall and early spring) than in the 1970's. Localized depletions of pollock and other Steller sea lion prey may have occurred due to this spatial and temporal concentration of fishing effort which could have contributed to the decline of the Steller sea lion. For this reason, spatial and temporal restrictions the Gulf of Alaska pollock fishery were imposed by emergency rule in June 1991. Apportioning the W/C Regulatory Area pollock TAC to the proposed pollock management districts would decrease the likelihood that large amounts of pollock would be taken in any one area. Under Alternative 1, no spatial restrictions would be placed on the commercial harvest of the pollock TAC in the W/C areas.

Unintentional direct take of Steller sea lions by fishing vessels is believed to be relatively rare. During the 1980s, the number of Steller sea lions annually taken incidental to Gulf of Alaska groundfish fisheries has been declining. NMFS observers reported no Steller sea lions taken incidentally in the groundfish fisheries during 1989 and 1990. No data are available on incidence of collisions between fishing vessels and Steller sea lions in Alaskan waters. The probability of collisions is believed to be small. Predicting behavioral reactions or assessing the significance of disturbances to Steller sea lion populations is not currently possible.

Intentional killing of Steller sea lions by fishermen and others is considered a possible contributing factor in the decline of Steller sea lions. An increased enforcement effort may be necessary to ensure that Steller sea lion killing is curtailed.

Entanglement of Steller sea lions in debris from fishing vessels is believed to be a rare event. Loughlin et al. (1986) reported a 0.07 percent adult entanglement rate for Aleutian Islands rookeries; Merrick et al. (1988) reported 0.09-0.17 percent for Ugamak Island, and 0.12 percent for Marmot Island.

The cumulative effects of unrelated, non-federal actions that occur within the fishery management area may contribute to the decline in Steller sea lions. Commercial fisheries in state and international waters may exacerbate the adverse effects of Gulf of Alaska EEZ fisheries on Steller sea lions. The State of Alaska Pacific herring and Pacific salmon fisheries and the international doughnut hole pollock fisheries may, individually or cumulatively, further reduce the availability of suitable food for Steller sea lions. Unintentional takes associated with these fisheries will not likely exceed the Marine Mammal Protection Act established quota. Improved data are needed on the biology, distribution, and habitat requirements of Steller sea lions. Additional information is also needed on the nature and extent of impacts from all commercial fisheries.

Establish new districts east and west of 154° W. longitude for purposes of managing pollock.

Alternative 1. Quarterly allowances of pollock could be harvested in their entirety anywhere in the W/C Regulatory Area. Local overharvesting of pollock could occur, which could be more extensive than under Alternative 2.

Alternative 2. The pollock TAC for the W/C Regulatory Area would be apportioned equally between the two districts. Quarterly allowances of each TAC apportionment would established.

Physical and biological impacts on the environment

Physical impacts under either Alternative 1 (status quo) or Alternative 2 are those that would be caused by (1) trawling activity on the sea bed and associated benthos, i.e., attached animals and plants, and (2) deposition of fish wastes resulting from processing activities. Some disturbance to the benthic environment would occur as would be expected by all trawl fisheries. Substantial amounts of pollock may be harvested with pelagic trawl gear, however, which is expected to impact the benthic environment less compared to harvests with bottom trawl gear.

Physical impacts

Under Alternative 1, the W/C pollock TAC could be taken in its entirety in either of the West or Central districts. Physical impacts could be concentrated in either area. Impacts on the sea bed and attached benthos and subsequent deposition of processing wastes could be more localized.

Under Alternative 2, the physical impacts would be ameliorated, because (1) the area divisions east and west of 154° W. longitude force fishing effort to spread across wider areas, allowing some recovery from any physical impacts that might have occurred. These impacts are believed largely unmeasurable, given the size of the Gulf of Alaska fishing grounds, and the fact that much of the pollock harvest would be taken with pelagic trawls fished off the bottom.

Biological impacts

Biological effects on the environment are those caused by changes in predator/prey relationships among the pollock stocks, other groundfish species, as well as marine mammals and birds. Each of these species is either a predator, i.e., feed on other organisms, or a prey, i.e. is consumed by other organisms.

Under Alternative 1, biological effects could be concentrated over smaller areas if the pollock harvest occurred entirely east or west of 154° W. longitude. Actual effects would depend on the size of the pollock TAC being harvested. A number of pollock would be removed from the ecosystem where they would no longer serve as predators and prey. Such local overharvests could impact certain marine mammal population more so than under Alternative 2.

Under Alternative 2, the same type of impacts would occur as under Alternative 1, but they could not occur over a single subarea. Because the total amount of fishery removals is not a sufficient portion of the prey base, insuring that localized depletions of prey do not occur is critical. The intent of

Alternative 2 is to divide the pollock fishing harvest in the W/C combined area between two subareas to reduce the likelihood of severe localized depletions of prey. This alternative provides protection to the four major Steller sea lion rookeries as stated above. The limited data available suggest that Steller sea lions from these four rookeries feed in or around important commercial fishing areas on the south and east sides of Kodiak Island. Alternative 2 will also prevent the entire pollock TAC from being harvested in the gullies on the south and east side of Kodiak Island, which are both important fishing grounds and feeding areas for Steller sea lions at four major rookeries in the Gulf of Alaska.

Estimates of exvessel value of pollock production

Under Alternative 1, a pollock TAC for the combined W/C Regulatory Areas would not be further divided between two management districts east and west of 154° W. longitude. No changes in operating costs would occur that would have an impact on the exvessel value of pollock production.

Under Alternative 2, apportioning equal amounts of the pollock TAC to these new districts might increase operating costs. Catcher vessels that fish pollock for delivery to shorebased processing facilities must travel farther to have access to pollock that otherwise might have been available anywhere in the W/C Regulatory Areas. In 1990, about 78 percent of the pollock harvest in the W/C Regulatory Areas occurred in Federal reporting area 63, i.e., the subarea east of 154° W. longitude. If this percent represents an optimum level, then catcher vessels that must travel to the west side of 154° W. longitude, thus potentially incurring higher costs. Catcher vessels landed about 89 percent of the catch during the first three quarters. Likewise, catcher/processor vessels would have to depart one subarea and move to another subarea to continue fishing when one subarea closes. Potential costs on catcher/processor vessels could be minimal to the extent they were fishing close to either area.

Limitation on carryovers on the pollock TAC quarterly allowances.

Alternative 1.

Under this alternative, the permissible amount of harvest shortfalls that could be carried over to a subsequent quarter would not be limited. Any amounts up to the proportional share for the number of fishing quarters remaining would be carried over. These shortfalls could be harvested in their entirety. Somewhat more trawl activity would occur than under Alternative 2, impacting the sea bed and attached animals and plants. More processing wastes would be deposited at sea. Less pollock would

be remain in the system, serving as predators and prey, including prey for marine mammals and birds.

Alternative 2. Limiting the amount of the harvest shortfall that could be carried over could reduce the overall pollock harvest. Relative to Alternative 1, fewer numbers of pollock might be removed from the ecosystem. Larger numbers of pollock, therefore, would remain to serve as predators and prey. Overall disruption to the sea bed and attached animals and plants would be less. Smaller amounts of processing wastes would be deposited in the ocean. Alternative 2 also insures that if the entire annual pollock TAC is harvested, that effort to achieve this total is spread out throughout each of the four quarters of the year.

None of these impacts under Alternatives 1 or 2 are expected to be measurable, given the size of the ecosystem.

FINDINGS OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

For the reasons discussed above, neither implementation of the proposed action nor any of the alternatives to that action would significantly affect the quality of the human environment, and the preparation of an environmental impact statement on the preferred action is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

_____

DATE

COORDINATION WITH OTHERS

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Appendix 1. Potential causes of recent northern sea lion population declines in Alaska. Source: Loughlin (1987)

Cause	Potential Impacts	Comment
Disease mortality	High	Diseases cause reproductive failures, sterility, and adult or juvenile
Combined impact of all fishery effects	High	Combined effect of following three causes
Changes in prey abundance or composition	Moderate	Prey (pollock) biomass decreased somewhat: abundance of target size prey low in some years
Incidental take	Moderate	Annual take probably <1000 animals
Intentional take	Moderate	Unknown amount of mortality
Commercial pup harvest	Low	May have depressed and redistributed population in 1970s; should have little effect now
Entanglement in marine debris	Low-Adult ?-Juvenile	Low incidence of observed adult mortality: juvenile mortality unknown
Increased predation	Low	No apparent increase in predator (killer whale) populations
Climate and ocean changes	Low	Little direct impact, but may affect prey
Subsistence harvest	Low	Small annual take (<200) should affect local groups only
Pollution	Low	No apparent effect on other Bering Sea pinniped populations
Harassment	Low	May have redistributed populations, but no major effect on numbers overall

Appendix 1 - food needs in metric tons (irrespective of prey type) for sea lion populations observed at Gulf of Alaska rookeries. Includes adults and juveniles from appropriate year's June surveys. Modelled after approach of Perez and McAllister (in press). Does not include animals on haul-outs or at-sea.

Site	Daily food need by survey year (mt) 1976-79	1985	1990
Outer	61.2	-	11.6
Sugarloaf	83.1	47.6	24.1
Marmot	156.8	79.2	28.1
Chirikof	82.3	37.3	16.9
Chowiet	70.6	32.7	14.3
Chernabura	43.9	7.7	7.3
Atkins	79.5	24.8	11.6
Pinnacle	58.7	25.2	20.7
Clubbing	42.3	19.9	16.2
Ugamak	75.7	23.9	15.0
Akun	16.7	6.9	1.9
Akutan	63.9	27.2	12.2
Ogchul	17.6	8.7	3.8
Daily Sum	852.3	341.1	183.7

Adjustments:

1. Adjust rookery total for animals on haulouts by a factor of 1.24:

Adjust = $\frac{\text{Sum of all animals counted in GOA and EAI}}{\text{Animals on rookeries only in the area}}$

1.24 = 14766 / 11956

Therefore, for animals counted, food needs = 183.7 x 1.24 = 227.8

2. Adjust for animals at-sea, double the estimate,
Therefore, daily food needs = 2 x 227.8 = 455.6 mt/day

3. Annualize by multiplying by 365 to determine annual food needs = 365 X 455.6 = 166,300 mt/yr
Note this is for all prey items.

4. Pollock comprises 58.1% of the sea lion diet based on frequency of occurrence. Therefore, annual sea lion needs for pollock = 166,300 X .581 = 96,600 mt/yr

Appendix 3. Acceptable Biological Catches (ABC) Exploitable Biomass and Exploitation Rate for Walleye pollock in the Gulf of Alaska for 1981 through 1991.

YEAR	ABC mt	EXPLOITABLE BIOMASS mt	EXPLOITATION RATE percent
1981	168,800	1,831,000	9.22
1982	168,800	2,587,000	6.52
1983	216,600	2,400,000	9.03
1984	416,600	1,800,000	23.14
1985	321,600	1,800,000	17.87
1986	116,600	420,000	27.76
1987	112,000	595,000	18.82
1988	93,000	935,000	9.95
1989a	63,400	650,000	9.75
1989b	75,375	721,000	10.45
1990	73,400	685,000	10.72
1991	103,400	1,000,000	10.34

-- General Notes and Explanations for Table 1:

1. Biomass estimates were not made available to the Council for its ABC decisions prior to 1985. ABC's were set based on trends in abundance indicators. Hence, exploitation rates were not known when ABC was established.

2. The two estimates for 1989 are: a) one originally projected for 1989 in fall 1988; and b) a mid-year correction based on hydroacoustic survey data obtained in the spring of 1989.

3. Biomass estimates from 1981-86 (not including 1982) were from acoustic surveys of Shelikof Strait; from 1987-1991, from population dynamics models using data from several sources (surveys and fishery).

DRAFT
ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW/
INITIAL REGULATORY FLEXIBILITY ANALYSIS
FOR
AMENDMENT 25 TO THE FISHERY MANAGEMENT PLAN FOR
GROUNDFISH OF THE GULF OF ALASKA
AND
AMENDMENT 20 TO THE FISHERY MANAGEMENT PLAN FOR
GROUNDFISH OF THE BERING SEA AND ALEUTIAN ISLANDS

Proposed Prohibition to Groundfish Trawling in the Vicinity of Gulf of Alaska and Bering Sea and Aleutian Islands Steller Sea Lion Rookeries

SUMMARY

This environmental assessment was prepared to examine the need for, and environmental consequences of, imposing additional constraints on commercial fisheries managed under the Bering Sea/Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Groundfish Fishery Management Plans (FMP). The purpose of additional restrictions is to minimize the potential adverse effects of the BSAI and GOA groundfish fisheries on Steller sea lions, a threatened species, and to foster the species's recovery. This assessment considers five alternatives: (1) No action; (2) Prohibiting groundfish trawling within 10 nautical miles (nm) of GOA and BSAI Steller sea lion rookeries year round; (3) Prohibiting groundfish trawling within 20 nm of GOA and BSAI Steller sea lion rookeries year round; (4) Prohibiting groundfish trawling within 10 nm of GOA and BSAI Steller sea lion rookeries from May 1-September 30 and within 20 nm from October 1 - April 30; and (5) Prohibiting groundfish trawling within 20 nm of GOA and BSAI Steller sea lion rookeries from May 1 - September 30 summer and within 60 nm from October 1 - April 30.

PURPOSE AND NEED

Because of a precipitous population decline, NMFS listed the Steller sea lion as a threatened species under the Endangered Species Act (November 26, 1990; 55 FR 49204). To date, extensive declines have been noted in the Soviet Union, Aleutian Islands, Bering Sea, and Gulf of Alaska portions of the Steller sea lion's range. The causes of the observed decline are not known. Hypothesized causal factors include natural or anthropogenic changes in the sea lion's food base, intentional killing, incidental take in fishing gear, and disease.

The BSAI and GOA groundfish fisheries have developed in the geographic area that has historically supported the majority of the Steller sea lion breeding population. This same geographic

region has also experienced substantial declines (about 78 percent decrease from 1956-1990) in the number of Steller sea lions counted on breeding sites over the last 30 years (Merrick et al. 1991). Although the relationship between the Steller sea lion population and BSAI and GOA groundfish fisheries is unclear, Steller sea lions and commercial fisheries are known to interact in ways that may be detrimental to both fishermen and sea lions.

Steller sea lions frequently interact with fishing vessels and gear. These interactions can result in damaged gear and lost catch for fishermen, and in unintentional capture and mortality for sea lions. Perez and Loughlin (1990) estimate that about 21,000 Steller sea lions were killed incidental to BSAI and GOA trawl fisheries between 1973 and 1988. They conclude that incidental take was a contributing cause in the observed Steller sea lion decline in Alaska accounting for about 16 percent of the decline in the BSAI and 6 percent of the decline in the GOA. Available data indicate that the number of Steller sea lions killed incidental to BSAI and GOA groundfish fisheries has declined significantly in recent years. Based on fishery observer data, NMFS estimates that 23 Steller sea lions were taken incidental to BSAI and GOA groundfish trawl fisheries during 1990; available data indicate that incidental take levels for the 1991 fishing year will be of a similar magnitude.

Deliberate killing of Steller sea lions by fishermen and others is also considered to be a possible contributing factor in the observed population decline. Fishermen have been seen killing sea lions on rookeries, haulouts, and in the water, but the magnitude of the take and its role in the population decline are unknown. In 1990, NMFS prohibited intentional killing or wounding of Steller sea lions. This prohibition, as well as the rookery buffer zones, have probably significantly reduced, but not entirely eliminated, this source of mortality.

Reduction in food availability is considered to be a possible factor in the Steller sea lion population decline. The BSAI and GOA groundfish fisheries harvest fish stocks that are major components of the Steller sea lion's diet. Large fishery harvests from areas proximal to Steller sea lion rookeries/haulouts could decrease the amount of food available to sea lions. Deterioration in their prey base could force sea lions to expend additional energy, or be unable, to meet their nutritional needs, and could result in reduced reproductive success and increased mortality. Calkins and Goodwin (1988) found that Steller sea lions collected in the GOA in 1985-1986 were significantly smaller (girth, weight, and standard length) than same aged animals collected in the GOA in the 1970s. Reduced body size at age was interpreted as an indicator of nutritional stress. Presently, the effect of the BSAI and GOA fisheries on the Steller sea lion's ability to obtain adequate food is not known.

To date, NMFS has taken several steps to reduce the adverse effects of human activities, including commercial fisheries, on Steller sea lions. NMFS implemented the following conservation measures coincident with the 1990 species listing: (1) Prohibited vessel entry within 3 nm of Steller sea lion rookeries in the GOA and BSAI; (2) Prohibited shooting at or near Steller sea lions; and (3) Reduced the allowable level of take incidental to commercial fisheries in Alaskan waters. NMFS has specified total allowable fish harvest levels in the BSAI and GOA groundfish fisheries that are conservative. On June 19, 1991, NMFS prohibited groundfish trawling within 10 nm of GOA Steller sea lion rookeries, and placed further time and area constraints on GOA walleye pollock harvest (56 FR 28112). These additional restrictions were implemented on an interim basis and will expire on December 18, 1991.

The purpose of this environmental assessment (EA) is to examine the need for, and environmental consequences of, permanently prohibiting groundfish trawling within additional areas in the BSAI and GOA to protect Steller sea lions. Steller sea lions use specific terrestrial locations, typically on remote islands, to breed, give birth, nurture pups, and rest. Rookeries are sites where the primary activity during the breeding season is related to reproduction; sea lions also use rookery sites during the non-reproductive season for rest and refuge. These habitats are essential to the continued survival and recovery of the Steller sea lion; waters adjacent to rookeries are likely to be important feeding areas, particularly for postpartum nursing females and juvenile animals. This EA will consider alternative plans for prohibiting groundfish trawling in waters adjacent to 35 Steller sea lion rookery sites within the GOA and BSAI (Table 1).

The selection of the closed area sizes considered in each alternative is based on the very limited available data on Steller sea lion foraging habits and habitats, primarily from NMFS recent satellite telemetry studies. To date, most of the animals tracked have been female Steller sea lions with nursing pups. In the summer of 1990, NMFS tracked 6 female Steller sea lions; in general, these animals stayed close to rookeries during foraging trips (Table 2). On-land observations and 1991 summer satellite telemetry data from females without pups indicate that their summer feeding trips are much longer. Results from females with pups tracked in winter 1990 indicate that winter trips are considerably longer than postpartum summer feeding trips (Table 3). Aside from the areas immediately around rookeries, GOA sea lions tagged in 1990-91 winters appeared to be foraging at Portlock Bank, Marmot Bay, Albatross Bank, Marmot Gully, Shelikof Strait, and Gilbert/Patton seamounts.

The goal of prohibiting trawling in waters adjacent to rookeries is to reduce incidental and intentional takes, and the potential

adverse effects of the BSAI and GOA groundfish removals on Steller sea lion's foraging success. Under all additional closure alternatives (Alternatives 2-5), groundfish harvest with hook and line, jig, troll, and pot gear within the new closed areas would be permitted. The primary reasons for only excluding trawl gear is: (1) the trawl fishery harvests the majority of the catch (Table 4), (2) the risk of lethal incidental take of Steller sea lions in non-trawl gear is low, and (3) groundfish harvest with trawl gear results in the bycatch of other non-target species, e.g., juvenile pollock, squid, octopus, herring, capelin, eulachon, and sand lance, that are also important prey items for Steller sea lions. Vessels that use non-trawl gear types would not be affected by new closures, and would not incur the additional costs borne by trawl fisheries.

Although this EA focuses only on additional management measures for the BSAI and GOA groundfish trawl fisheries, NMFS's research and management program to aid the recovery of Steller sea lions is more broadly focused. A Recovery Plan for Steller sea lions has been drafted, circulated for public comment, and will soon be published in final form and implemented. A draft proposed rule to designate critical habitat for Steller sea lions is presently being reviewed and will be published in the near future. Via a separate NEPA process, NMFS is developing a system for authorizing and determining biologically-acceptable incidental take levels for marine mammal species, including Steller sea lions. Steller sea lion research programs have expanded and are focusing on population census, animal physiology, pathology, population genetic structure, defining the level of subsistence harvest, refining survey techniques, and defining foraging habitats and habits.

DESCRIPTION OF ALTERNATIVES

Alternative 1 - Status Quo: Under this alternative, no additional closed areas would be created. Only the existing prohibition against approaching within 3 nm of the BSAI and GOA Steller sea lion rookeries would remain in effect.

Alternative 2 - Year round, 10 nm Trawl Closures: Under this alternative, groundfish trawling would be prohibited within 10 nm of BSAI and GOA Steller sea lion rookeries year round. The 3 nm no entry buffer zone would remain in effect, and an additional 7 nm mile zone would be closed to trawling to create closed areas with radii of 10 nm.

The 10 nm rookery closure zones represent an approximation, based on available data, of the average summer foraging range of female Steller sea lions with pups. NMFS tagged and tracked 6 female sea lions during the summer of 1990; in general, these animals stayed close to the rookeries during foraging trips - the average

trip distance observed was about 8 miles, the maximum for any single trip was 21 miles (Table 2).

Alternative 3 - Year round, 20 nm Trawl Closures: Under this alternative, groundfish trawling would be prohibited within 20 nm of BSAI and GOA Steller sea lion rookeries year round. The 3 nm no entry buffer zone would remain in effect, and an additional 17 nm mile zone would be closed to trawling to create closed areas with radii of 20 nm.

The 20 nm rookery closure zones represent an approximation, based on available data, of the maximum summer foraging range of female Steller sea lions with pups (Table 2).

Alternative 4 - Seasonal Trawl Closures - 10 nm in summer, 20 nm in winter: Under this alternative, groundfish trawling would be prohibited within 10 nm of BSAI and GOA Steller sea lion rookeries during the Steller sea lion's summer breeding season, and within 20 nm during the non-reproductive season. The 3 nm no entry buffer zone would remain in effect year round. An additional 7 nm mile zone would be closed to trawling from May 1 through September 30 to create 10 nm closures, and an additional 17 mile zone would be closed to trawling from October 1 through April 30 to create 20 nm closures.

The expanded trawl closure zone during the non-breeding season is based on (1) available data that indicate foraging Steller sea lions range more extensively during the non-breeding season than postpartum females in summer (Table 3), and (2) the need to provide extended protection during the winter-early spring season when Steller sea lion's nutritional needs and stresses are likely to be greatest.

Alternative 5 - Seasonal Trawl Closures - 20 nm in summer, 60 nm in winter: Under this alternative, groundfish trawling would be prohibited within 20 nm of BSAI and GOA Steller sea lion rookeries during the Steller sea lion's summer breeding season, and within 60 nm during the non-reproductive season. The 3 nm no entry buffer zone would remain in effect year round. An additional 17 nm mile zone would be closed to trawling from May 1 through September 30 to create 20 nm closures, and an additional 57 mile zone would be closed to trawling from October 1 through April 30 to create 60 nm closures.

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.

ENVIRONMENTAL CONSEQUENCES

Because the effect of the BSAI/GOA groundfish fishery on food availability to Steller sea lions is not known, it is not possible to actually compare the benefits to Steller sea lions of the following alternatives. The simplistic approach taken here is that larger zones, because they better encompass the sea lion's foraging range and redistribute a greater proportion of the catch away from sea lion habitats, decrease the risk that groundfish fishing will diminish local fish abundance and reduce food availability to Steller sea lions.

Because many of the principal groundfish species are widely distributed and, in some instances, highly migratory, it is unlikely that the proposed closures in Alternatives 2 - 5 would actually result in foregone catches of the sizes predicted under socioeconomic effects and in Table 8. Trawl fishing effort is expected to be redistributed to the remaining open areas. The fishery's ability to completely compensate for lost fishing opportunities, and the additional cost of that compensation, varies under the various alternatives.

Alternative 1 - Status Quo

Under this alternative, the fishery would operate under the existing management regime. No change in environmental or socioeconomic effects of the fishery would occur. No additional benefits or protection for Steller sea lions would be provided.

This alternative has the least potential for an immediate increase in socioeconomic costs. However, if, as a result of retention of the status quo alternative, Steller sea lion populations continue to decline throughout the BSAI and GOA areas to the point that they are listed as an endangered species, the economic and socioeconomic costs are likely to be very great. At such time, much more severe restrictions than are contained in this EA would be required in order to protect the remaining sea lion population. The size, extent, and duration of such impacts would be dependent upon the precise regulatory actions imposed and cannot be quantitatively evaluated at this time. It is clear, however, that regulatory actions that restricted fishing access to larger areas, extended controls to greater numbers of fisheries and gear-types, and/or are applied to increased periods of the fishing year would impose significantly greater costs on the fishing industry than those associated with the present set of management alternatives.

Alternative 2 - Year round, 10 nm Trawl Closures

The primary effect of Alternative 2 would be to shift groundfish trawl fishing effort away from waters within 10 nm of BSAI/GOA Steller sea lion rookery sites. The total area that would be

closed to trawl fishing, exclusive of the existing 3 nm buffer areas, is about 10,000 nm^2. Based on 1990 observer data, NMFS estimates that approximately 6 percent (94,000 mt) of the BSAI total groundfish catch and 4 percent (6,700 mt) of the GOA groundfish catch was taken within 10 nm of Steller sea lion rookery sites (Table 5).

Physical and Biological Effects

Benthic environment: Physical disturbance of the benthos by bottom trawls will cease within the closed area. A reduction in the amount of fish waste and gear debris disposed within these zones is also expected. Since the biological significance of these actions is not known, it is not possible to predict whether 10 nm closures will have any beneficial effects on the environment. No adverse effects to the physical environment are expected.

Fish stocks: The amount and composition of the bycatch (non-target fish species and juvenile size classes of target species) can be affected by fishing location. Since only a relatively small percentage of the total catch occurs within the 10 nm zones, only a small redistribution of trawl fishing effort would be necessary to compensate for the closed areas. There are no data available to predict the likelihood that bycatch rates of non-target species and juvenile fish would be altered. Considering the relatively small percentage of catch that would be deflected to other areas, any changes in bycatch patterns are expected to be minor. Effects to fish stocks are not expected.

Marine mammals: Steller sea lions, Pacific harbor seals, and northern fur seals have all experienced significant numerical declines in Alaskan waters over the last 30 years. The causes of these declines, and the effect of the BSAI and GOA groundfish fisheries on North Pacific pinniped populations are not known.

The potential adverse effects to marine mammals of the BSAI and GOA fisheries include: (1) reduction in food availability (quantity and/or quality) due to harvest, (2) unintentional entanglement in fishing gear, (3) intentional harassment (including killing and wounding) of animals by fishermen, and (4) disturbance by vessels and fishing operations. Pinnipeds, particularly Steller sea lions, are more likely to be affected by BSAI and GOA fisheries than cetaceans. Of the pinnipeds, Steller sea lions are the mostly likely to be affected by the closures. Further discussion is this EA will focus on Steller sea lions.

The 10 nm closures around rookery sites, where Steller sea lion abundance is expected to be high, will reduce the opportunity for incidental and intentional takes of Steller sea lions by the trawl fishery. The frequency of incidental takes in a geographic area is likely to be a function of Steller sea lion abundance and

the fishing effort in the area. The abundance of Steller sea lions is comparatively high in the 10 nm closed areas but the overall fishing effort is comparatively low. Considering the small proportion of trawl fishing effort, it appears likely that the closures will have only a small effect on the occurrence of incidental and intentional take of Steller sea lions in the BSAI/GOA fisheries.

The 10 nm closures will reduce the amount of fish, including bycatch, harvested proximal to rookery sites but it is not clear what effect this will have on food availability to Steller sea lions and harbor seals. 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. Since trawl fishery removals within the 10 nm zones are estimated to be only about 6 percent of the BSAI and 4 percent of the GOA total groundfish catch, any effect of the 10 nm closures on food availability to Steller sea lions is expected to be comparatively small.

Seabirds: Unexplained declines in numbers of some species of Bering Sea piscivorous seabirds have also been noted since the 1970s (Springer In Press). The relationship, if any, between seabird populations and BSAI/GOA groundfish fisheries is unknown. However, these fisheries are not likely to have direct adverse effects on the area's abundant seabird populations. In general, piscivorous seabirds prey primarily on juvenile fish or fish species not the target of BSAI/GOA fisheries, and thus are not expected to compete with fisheries for food. The incidental take of seabirds in BSAI/GOA groundfish trawl fisheries is expected to be low.

Many seabird colonies are located within the 10 nm closures; no adverse effects on seabirds are expected.

Socioeconomic Effects

Table 7 estimates the 1990 catch and wholesale value for each fish species within various closure areas. The first wholesale value, which includes the value added by primary processing, is based on preliminary data from a joint NMFS and State of Alaska survey of groundfish processors for 1990. The estimated wholesale value of the 1990 total catch within 10 nm of Steller sea lion rookeries is $74.3 million. These estimates represent a "worst case" estimate of the catch and value that could be foregone because of closed areas. For the 10 nm zones, the foregone catch is expected to be compensated for as fishing effort is redistributed to the areas that remain open. The 10 nm closures are not expected to have any effect on the overall ability of the fleet to harvest the yearly BSAI and GOA groundfish TACs.

Atka mackerel harvest may be an exception. NMFS 1990 observer data indicate that 89.4 percent of the Atka mackerel catch was taken within 10 nm of Steller sea lion rookery sites, and 100 percent of the harvest was with trawl gear (Tables 4, 5). NMFS fish surveys have identified major concentrations of Atka mackerel occurring between Buldir Island and Seguam Pass (Figure 1). Closures will affect a significant portion of the defined concentration areas (Figure 2).

Because of the 10 nm closed areas, travel costs may increase for the trawl fishing fleet, with a higher relative cost borne by the inshore component of the fishery. Based on 1990 fishery observer data, catch within 10 nm was less than 10 percent of the total catch for all processor types (Table 6); the increased operating costs associated with the redistribution of catch cannot be estimated but are expected to be small. This is particularly true since most of the closed areas are remote from fishing ports; exceptions to this are closures at Marmot, Akun, Akutan, and Ugamak Islands (Figure 3).

Alternative 3 - Year round, 20 nm Trawl Closures

The primary effect of Alternative 3 would be to shift trawl fishing effort away from waters within 20 nm of BSAI/GOA Steller sea lion rookery sites. The total area that would be closed to trawl fishing, exclusive of the existing 3 nm buffer areas, is about 42,970 nm^2. Based on 1990 observer data, NMFS estimates that about 18.3 percent (280,000 mt) of the BSAI and 28.3 percent (48,000 mt) of the GOA groundfish trawl catch was taken within 20 nm of Steller sea lion rookery sites (Table 5).

Physical and Biological Effects

Benthic Environment: Under this alternative, an area approximately 4 times larger than under alternative 2 would be closed to trawl fishing and its associated physical effects, i.e, benthic disturbance, fish and gear waste disposal. The overall likely effects on the physical environment are not known; however, no adverse effects are expected.

Fish Stocks: Under this alternative, a larger proportion of the fishing effort would have to be redistributed to other areas to compensate for lost catch within the 20 nm closures. The potential effect on bycatch amounts and composition is greater under this alternative than alternative 2. However, it is not possible to predict the likely positive or negative effects of closures on bycatch. Since bycatch of prohibited species, e.g., halibut, crab, salmon, is managed and overall BSAI/GOA groundfish harvest levels are not expected to be significantly affected under this alternative, no effect on fish stocks is anticipated.

Marine Mammals: Under this alternative, a significantly larger no trawling zone would be created around Steller sea lion rookeries, and a higher proportion of the catch would be affected. Based on 1990 observer data, about 357,000 metric tons[1] of the 1990 groundfish catch was harvested within 20 nm of Steller sea lion rookeries. This region accounted for more than 30 percent of the 1990 trawl fishery harvest of BSAI rockfish/Pacific Ocean Perch complex, sablefish, Arrowtooth flounder, Atka mackerel, and Greenland turbot and GOA Pacific cod and deepwater flatfishes (Table 5).

Because of the uncertainty regarding Steller sea lion foraging habitats and the mobility of fish stocks, it is not clear what effect 20 nm closures will have on food availability to Steller sea lions. Available data indicate that 20 nm zones would not be sufficient to completely encompass the observed feeding range of animals during the winter or females without pups throughout the year, but would cover most feeding trips of postpartum females during the breeding season. In that a much greater proportion of the catch would be harvested away from Steller sea lion rookery habitats, the potential to reduce any fishery effects on food availability to Steller sea lions is greater under alternative 3 than alternatives 1 and 2.

Since this alternative encompasses a greater amount of fishing effort and a larger area of potential Steller sea lion habitat, a larger reduction in incidental take is expected for this alternative than under alternatives 1 or 2. Opportunities for intentional take of Steller sea lions and harbor seals should also be reduced over alternatives 1 and 2.

Seabirds: A greater area of seabird habitat would be closed to trawling under this alternative. No adverse effects to seabirds are anticipated.

Socioeconomic Effects

The socioeconomic impacts of this alternative are likely to be greater than under alternatives 1 and 2. Adverse effects of this alternative are expected to be more severe for the GOA fishery than the BSAI groundfish trawl fishery because a larger percentage of the GOA trawl yield occurs within 20 nm and a greater proportion of the GOA fleet is inshore based.

The 20 nm closures are not expected to have a large effect on the overall ability of the fleet to harvest the yearly BSAI and GOA groundfish TACs, with the exception of Atka mackerel. Fishermen are expected to compensate for lost opportunities in closed areas

[1]Estimate includes an 8.8% discard rate not included in Table 7.

by increasing fishing effort in areas beyond 20 nm. However, a higher proportion of the overall TAC and individual species' TACs would be affected by this alternative. Also, if the larger redistribution of fishing effort required under this alternative results in higher bycatch rates of prohibited species, some groundfish catch and value may be foregone.

Based on 1990 observer data, fisheries for some species could be greatly altered. Currently, over 93 and 97 percent, respectively, of the BSAI Atka mackerel and GOA deepwater flatfishes fishery occurs within 20 nm of Steller sea lion rookeries. Figure 2 shows that 20 nm closed areas would preclude fishing in most of the NMFS survey-defined Atka mackerel major concentration areas. Fishermen are expected to be able to compensate for at least some of this lost fishing opportunity but may not be able to achieve current harvest levels. The estimated value of the 1990 Atka mackerel catch within 20 nm of Steller sea lion rookeries is $24 million.

The 1990 GOA deepwater flatfishes catch was about 7848 mt. NPFMC (1990b) estimates a GOA flatfish exploitable biomass of over 2 million mt, and recommended an acceptable biological catch of 228,000 mt in 1991. Because of the high available flatfish biomass, 20 nm closures should not affect the fishery's ability to harvest the flatfish TAC. The 1990 estimated value of the deep water flatfish fishery within 20 nm of Steller sea lion rookeries is $7.8 million.

A greater increase in fuel costs and lost fishing time is expected under this alternative than Alternative 2. Many of the closed areas are in remote locations and will have no effect on travel costs; however, a 20-nm closure around Marmot Island, Akun, Akutan, and Ugamak is likely to significantly increase transportation costs and lost fishing time for the Kodiak and Dutch Harbor based component of the trawl fishery.

Table 6 shows the proportion of 1990 catch, based on fishery observer data, by processor type in the alternative trawl restriction areas. Trawlers would be more affected by 20 nm closures (45% of their catch taken within 20 nm), than motherships (7.1%), catcher/processors (11.3%), or floating processors (8.6%).

The estimated wholesale value of the 1990 catch within 20 nm of Steller sea lion rookeries is $206.7 million.

Alternative 4 - 10 nm summer and 20 nm winter closures

Alternative 4 provides larger closed areas during winter months when (1) Steller sea lions are likely to forage over wide areas and (2) nutritional stress for juveniles and adult pregnant females is expected to be higher due to recently-weaned

juveniles' foraging inexperience, pregnant animals' increased metabolic needs, and adverse weather conditions (Loughlin and Merrick 1989). This alternative decreases costs to the fishery over alternative 3 by reducing the closed areas during the Steller sea lion's summer reproductive period. The total area that would be closed to trawl fishing, exclusive of the existing 3 nm buffer areas, is about 10,000 nm^2 for 5 months of the year and about 42,970 nm^2 for 7 months of the year. Based on 1990 observer data, we estimate that about 13 percent (200,000 mt) of the BSAI and 22.4 (38,000 mt) percent of the GOA trawl catch would have been harvested within these seasonally closed areas.[2]

Physical and Biological Effects

Adverse effects to the physical environment, fish stocks, and seabirds are not expected under this, or any of the alternatives. Effects on bycatch composition and amounts due to redistribution of fishing effort cannot be predicted, but are expected to be greater than alternative 1 and 2, and less than alternative 3.

Marine Mammals: Potential benefits to Steller sea lions, i.e., reduced incidental and intentional take, decreased effects to food availability, are expected to be greater than alternatives 1 and 2, but less than alternative 3.

Socioeconomic Effects

Socioeconomic effects, i.e., increased costs and lost fishing time/opportunities, would be greater than alternatives 1 and 2, but less than alternative 3. Fishermen would be expected to compensate for lost opportunities in closed areas by increasing fishing effort in open areas and during summer season. However, since season of harvest affects recovery rates, product form, catch value, and consumer acceptance significantly, winter closures may not be compensated for by summer "openings." The estimated wholesale value of the 1990 catch that was caught within the seasonally closed areas is $158.8 million.[3]

Alternative 5 - 20 nm summer and 60 nm winter closures

Alternative 5 approximates the maximum observed Steller sea lion summer foraging range, and provides extensive closed areas during winter months to better approximate the observed winter foraging range and compensate for the expected increased nutritional stress of Steller sea lions during this season. The total area that would be closed to trawl fishing, exclusive of the existing

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[2]Calculation of catch and value estimates for this alternative is explained in Appendix A.

[3]Calculation of this estimate explained in Appendix A.

3 nm buffer areas, is about 42,970 nm^2 for 5 months of the year and about 250,000 nm^2 for 7 months of the year. Based on 1990 observer data, we estimate that about 34.3 (524,000 mt) percent of the BSAI and 57.0 (97,000 mt) percent of the GOA trawl catch would have been harvested within these seasonally closed areas.[4]

Physical and Biological Effects

No adverse effects on the physical environment, fish stocks, or seabirds are expected. A potential for effects to bycatch amounts and composition is greatest under this alternative. However, it is not possible to predict the likely positive or negative effects of closures.

Marine Mammals: This alternative would close the largest area to trawling, and a much larger proportion of the catch would be affected. Based on 1990 observer data, we estimate that about 620,000 metric tons[5] of the 1990 groundfish catch was harvested within closed areas defined under Alternative 5. Because of the uncertainty regarding Steller sea lion foraging habitats and the mobility of fish stocks, it is not clear what effect the proposed closed areas will have on food availability to Steller sea lions. In that a much greater proportion of the catch would be harvested away from Steller sea lion rookery habitats, the potential to reduce the risk that groundfish removals will decrease food availability to Steller sea lions is greater under alternative 5 than alternatives 1-4. This alternative best encompasses the known foraging range of Steller sea lions.

Since this alternative encompasses a greater amount of fishing effort and a larger area of Steller sea lion habitat, a larger reduction in incidental take is expected for this alternative than under other alternatives. Fishing-related opportunities for intentional take of Steller sea lions and harbor seals should also be reduced over other alternatives. However, because of the severe economic hardship placed on the fishery under this alternative, antagonism toward sea lions and intentional takes could increase.

Socioeconomic Effects

The closures defined under this alternative would have the greatest adverse socioeconomic effects on the fishery. Because of hazardous winter weather conditions in the BSAI and GOA and

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[4]Calculation of catch and value estimates for this Alternative is explained in Appendix A.

[5]Estimate includes an 8.8% discard rate not included in Table 7 or Appendix A.

the fact that 60 nm closures will close substantial portions of walleye pollock spawning grounds, the overall ability of the fleet to harvest the yearly BSAI and GOA TACs may be compromised. This effect may be ameliorated by the excess fishing capacity available in the fleet. However, since season of harvest affects recovery rates, product form, value, and consumer acceptance significantly, large winter closures are likely to be more serious economically, and may not be compensated for by summer "openings." Also, the large redistribution of effort expected under this alternative may result in higher bycatch rates of prohibited species, and thus, fishery closures, that would increase economic losses.

Increased costs and lost fishing opportunities are expected to be greater for the GOA than the BSAI trawl groundfish fishery because a larger percentage of the GOA trawl yield occurs within the seasonal closures and a greater proportion of the GOA fleet is inshore based. Costs and lost profits will be greatest for small inshore trawlers that are more likely to be weather limited and must regularly return to port. Ninety percent of the observed 1990 BSAI trawler catch was taken within 60 nm (Table 6).

The estimated wholesale value of the 1990 catch taken within closed areas defined under this alternative is about $519 million[6].

CONCLUSIONS

Table 8 compares relevant features of the five alternatives considered here. Because the effect of the BSAI/GOA groundfish fishery on food availability to Steller sea lions is not known, it is not possible to actually compare the benefits to Steller sea lions of the alternatives. The simplistic approach of this EA is that larger zones, because they encompass a greater portion of the sea lion's foraging range and affect a larger percentage of the catch, will provide better protection for Steller sea lions.

Fishermen are expected to be able to redistribute fishing effort and compensate for the lost fishing opportunities associated with alternatives 1-4. Increased travel costs are expected, but the worst case foregone catch and value estimates projected for Alternative 2-4 are not likely. Since alternative 5 restricts fishing in such a large area during the season of harshest weather conditions and highest catch value, it is unlikely that the fishery could fully compensate for lost fishing opportunities. The worst case foregone catch and value estimates for this alternative are expected to overestimate losses.

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[6]Calculation of this estimate explained in Appendix A.

However, alternative 5 is likely to significantly affect the fishery, particularly the inshore component.

For increased likelihood of benefits to Steller sea lions, a comparison of alternatives indicates that 5>3>4>2>1; for reduced costs to the fishery, 1>2>4>3>5.

FINDINGS OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

Prohibiting groundfish trawling as defined under Alternatives 1 through 4 is not likely to significantly affect the quality of the human environment, and the preparation of an environmental impact statement for selection of any of these four alternatives as the preferred action is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations. Alternative 5 is likely to have a significant impact on the human environment. Its selection as the preferred alternative would require the preparation of an environmental impact statement.

_____

DATE

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Table 1. BSAI/GOA Steller Sea Lion Rookery Sites

Island	From Lat.	From Long.	To Lat.	To Long.
1. Outer I.	59°20.5 N	150°23.0 W	59°21.0 N	150°24.5 W
2. Sugarloaf I.	58°53.0 N	152°02.0 W		
3. Marmot I.	58°14.5 N	151°47.5 W	58°10.0 N	151°51.0 W
4. Chirikof I.	55°46.5 N	155°39.5 W	55°46.5 W	155°43.0 W
5. Chowiet I.	56°00.5 N	156°41.5 W	56°00.5 N	156°42.0 W
6. Atkins I.	55°03.5 N	159°18.5 W		
7. Chernabura I.	54°47.5 N	159°31.0 W	54°45.5 N	159°33.5 W
8. Pinnacle Rock	54°46.0 N	161°46.0 W		
9. Clubbing Rks-N	54°43.0 N	162°26.5 W		
Clubbing Rks-S	54°42.0 N	162°26.5 W		
10. Sea Lion Rks	55°28.0 N	163°12.0 W		
11. Ugamak I.	54°14.0 N	164°48.0 W	54°13.0 N	164°48.0 W
12. Akun I.	54°17.5 N	165°34.0 W	54°18.0 N	165°31.0 W
13. Akutan I.	54°03.5 N	166°00.0 W	54°05.5 N	166°05.0 W
14. Bogoslof I.	53°56.0 N	168°02.0 W		
15. Ogchul I.	53°00.0 N	168°24.0 W		
16. Adugak I.	52°55.0 N	169°10.5 W		
17. Yunaska I.	52°42.0 N	170°38.5 W	52°41.0 N	170°34.5 W
18. Seguam I.	52°21.0 N	172°35.0 W	52°21.0 N	172°33.0 W
19. Agligadak I.	52°06.25N	172°54.0 W		
20. Kasatochi I.	52°10.0 N	175°31.0 W	52°10.5 N	175°29.0 W
21. Adak I.	51°36.5 N	176°58.5 W	51°38.0 N	176°59.5 W
22. Gramp Rock	51°29.0 N	178°20.5 W		
23. Tag I.	51°33.5 N	178°34.5 W		
24. Ulak I.	51°20.0 N	178°57.0 W	51°18.5 N	178°59.5 W
25. Semisopochnoi	51°58.5 N	179°45.5 E	51°57.0 N	179°46.0 E
Semisopochnoi	52°01.5 N	179°37.5 E	52°01.5 N	179°39.0 E
26. Amchitka I.	51°22.5 N	179°28.0 E	51°22.0 N	179°25.0 E
27. Amchitka I.	51°32.5 N	178°50.0 E		
28. Ayugadak Pt.	51°45.5 N	178°24.5 E		
29. Kiska I.	51°57.5 N	177°21.0 E	51°56.5 N	177°20.0 E
30. Kiska I.	51°52.5 N	177°13.0 E	51°53.5 N	177°12.0 E
31. Walrus I.	57°11.0 N	169°56.0 W		
32. Buldir I.	52°20.5 N	175°57.0 E	52°23.5 N	175°51.0 E
33. Agattu I.	52°24.0 N	173°21.5 E		
34. Agattu I.	52°23.5 N	173°43.5 E	52°22.0 N	173°41.0 E
35. Attu I.	52°57.5 N	172°31.5 E	52°54.5 N	172°28.5 E

Each site extends in a clockwise direction from the first set of geographic coordinates along the shoreline at mean lower low water to the second set of coordinates; if only one set of geographic coordinates is listed, the site extends around the entire shoreline of the island at mean lower low water.

Table 2. Minimal estimate of maximum distance from shore travelled by tagged female Steller sea lions during summer 1990. (Data from 1991 studies not included)

Animal	Tag Location	Distances to farthest point offshore (nm)
9950	Chirikof	8, 2, 4, 6, 1: x = 4 nm
9953	Ulak	2
9955	Kiska	2, 3, 4: x = 3 nm
9961	Seguam	21, 20, 20, 2: x = 16 nm
9962	Ugamak	18, 7, 3, 3, 9: x = 8 nm
9963	Chirikof	14

Mean Maximum Distance Travelled = 7.8 nm

Table 3. Estimate of maximum distance from shore travelled by tagged female Steller sea lions during winter 1990. (Data from 1991 studies not included)

Animal	Tag Location	Distances to farthest point offshore (nm)
9900	Marmot	22, 4, 6, 21, 125, 51, 15, 41, 9, 26: x = 32
9955	Chirikof	53
9956	Chirikof	> 252[7]
9957	Chirikof	11
9958	Chirikof	> 279, 281: 280 nm

Mean Maximum Distance Travelled = 79.7 nm

[7]Excludes one position at Dixon Entrance, 528 nm away from Chirikof Island.

Table 4. Total catch, including discards, and percent of catch by gear type for each species in the BSAI and GOA for 1990.

BSAI

Species	Catch (mt)	Trawl	Hook/Line	Pot
Pollock	1,391,117	99.8%	0.2%	0
Rockfish/POP	23,473	98.8%	1.2%	0
Sablefish	4,450	27.1%	72.9%	0
Arrowtooth	10,194	95.3%	4.7%	0
Atka Mackerel	23,318	100%	0	0
Greenland Turbot	8,906	89.3%	10.7%	0
Pacific Cod	167,577	70.7%	28.4%	0.8%
Rock Sole	23,324	99.9%	<0.1%	0
Yellowfin Sole	16,003	99.9%	<0.1%	0
Other Flatfishes	16,360	99.4%	0.6%	0
Squid	626	99.5%	0.5%	0
Other Species	20,809	87.0%	13.0%	0
Total Catch	1,706,173	96.5%	3.4%	<0.1%

GOA

Pollock	80,586	98.8%	1.2%	0
Pelagic Rockfish	1,647	97.4%	2.6%	0
Other Rockfish	21,113	97.0%	3.0%	0
Sablefish	25,766	13.5%	86.5%	0
Pacific Cod	70,823	83.6%	8.4%	8.0%
Arrowtooth	18,913	99.2%	0.6%	0.2%
Deep Flatfishes	7,848	98.0%	1.5%	0.5%
Shallow Flatfishes	7,929	95.7%	0.3%	4.0
Demersal Rockfish	357	0	100%	0
Thornyheads	1,575	80.7%	19.3%	0
Other Species	7,784	88.5%	11.1%	0.4%
Total Catch	244,341	84.5%	12.6%	2.9%

Table 5. Estimated percent of trawl fishery catch within 3, 10, 20, and 60 nm closure zones by species based on 1990 observer data and PACFIN landings data[8].

Species	Percentage of Catch within rookery closures of 3 nm	10 nm	20 nm	60 nm[9]
		BSAI		
Pollock	0.05	4.0	16.3	42.3
Rockfish/POP	2.6	24.6	49.4	91.1
Sablefish	0.5	31.8	58.5	82.6
Arrowtooth	0.2	11.5	30.8	50.6
Atka Mackerel	13.5	89.4	93.8	99.9
Greenland Turbot	0.02	14.1	50.5	81.8
Pacific Cod	1.0	9.8	18.2	35.4
Rock Sole	0.2	2.1	10.7	59.8
Yellowfin Sole	0.0	0.2	2.1	16.3
>>>>>>>>Total	0.4	6.1	18.3	43.8
		GOA		
Pollock	0.1	2.7	13.7	46.5
Pelagic Rockfish	0.0	0.0	0.3	2.7
Other Rockfish	0.0	0.2	12.7	27.4
Sablefish	0.0	1.2	13.5	33.4
Pacific Cod	0.4	6.1	50.2	79.3
Arrowtooth	0.04	6.1	26.8	65.6
Deep Flatfishes	0.0	18.6	97.2	99.7
Shallow Flatfishes	0.3	5.0	30.0	65.1
Demersal Rockfish	0.0	0.0	0.0	2.7
Thornyheads	0.0	0.2	3.2	40.3
Other Flatfish	0.1	4.0	14.8	54.6
>>>>>>>>Total	0.2	4.0	28.3	53.3
>>Total BSAI & GOA	0.3	5.9	19.3	44.7

[8]Haul by haul data from the Domestic Observer Program were used to estimate the proportion of the 1990 BSAI and GOA trawl catch that occurred within the 3, 10, 20, and 60 nm closures being considered. This was done by species or species group. To the extent that smaller vessels that have lower observer coverage are more likely to fish in near shore areas, these estimates understate the actual catch from each closure area.

[9]60 nm estimate based on observer data for all gear types.

Table 6. Percent catch by processor type within 10, 20, and 60 nm of Steller sea lion rookeries based on 1990 fishery observer data for the BSAI.

Processor type	Percentage of Catch within rookery distances of 10 nm	20 nm	60 nm
Catcher/processor	4.2	11.3	34.4
Mothership	3.1	7.1	26.4
Trawler	8.9	45.4	90.0
Floating Processor	7.7	8.6	18.8

Table 7. Estimates of the worst case catch and value that would have been foregone in 1990 for each of the three closures if no redistribution of effort occurred.

Species	Catch within closures of 3 nm	10 nm	20 nm	60nm	Wholesale value ($ 1,000) within closures of 3 nm	10 nm	20 nm	60 nm
BSAI								
Pollock	664.7	53,704.4	216,678.7	562,301.1	284.9	23,019.9	92,877.4	241,025.4
Pacific Cod	1,079.9	11,117.5	20,734.5	40,241.3	1,159.0	11,931.6	22,252.8	43,188.6
Atka Mackerel	2,995.3	19,850.4	20,825.1	22,181.8	3,493.9	23,154.6	24,291.6	25,874.4
Sablefish	6.5	406.8	747.0	1,055.6	17.9	1,114.1	2,045.8	2,908.1
Rockfish/POP	762.9	7,284.8	14,658.6	27,023.1	746.0	7,122.7	14,332.0	26,424.3
Greenland Turbot	1.8	1,242.2	4,434.7	7,186.1	2.2	1,583.7	5,653.8	8,872.9
Rock Sole	21.7	286.5	1,456.8	8,119.1	32.8	432.6	2,199.7	12,272.2
Yellowfin Sole	0.0	25.1	230.1	1,777.8	0.0	31.3	287.0	2,217.1
Arrowtooth	1.3	82.7	221.0	362.8	2.3	149.9	400.7	642.2
>>>>>>>>>>>>>>>Total	5,534.1	94,000.3	279,986.5	670,248.8	5,739.0	68,540.3	164,341.0	363,425.2
GOA								
Pollock	69.8	2,070.3	10,592.1	36,056.6	34.3	1,017.3	5,204.5	17,718.4
Pacific Cod	269.5	3,748.1	30,732.2	48,566.5	204.6	2,845.8	23,333.7	36,870.1
Sablefish	0.0	33.6	373.8	926.2	0.0	82.3	916.6	2,268.6
Arrowtooth	1.6	241.9	1,067.3	2,610.0	0.6	91.2	402.5	984.0
Deep Flatfish	0.0	398.6	2,083.1	2,137.6	0.0	1,487.2	7,772.8	7,982.8
Shallow Flatfish	9.5	168.6	1,019.0	2,213.4	10.6	188.5	1,138.9	2,469.7
Thornyheads	0.0	2.5	40.3	508.6	0.0	4.2	67.0	853.4
Dem. Shelf Rockfish	0.0	0.0	0.0	2.3	0.0	0.0	0.0	2.0
Pel. Shelf Rockfish	0.0	0.0	3.2	34.2	0.0	0.0	2.5	26.7
Slope Rockfish	0.0	35.3	1,945.9	4,201.5	0.0	57.7	3,185.2	6,867.6
>>>>>>>>>>>>>>>Total	350.4	6,698.9	47,856.8	97,256.9	250.1	5,774.2	42,023.6	76,043.3

Table 8. Comparison of Alternatives

Alternative	Size of Closed Area (nm^2)	Catch mt & % Total Catch in Closed Area	Wholesale Value closed Area Catch (millions)	Effect on SSL Take	Effect on SSL Food	Effect on TAC harvest
1	0	0	0	None	None	None
2	10,000	94,000 - 6.1% BSAI 6,700 - 4.0% GOA	$ 74.3	>1	?	None
3	42,970	280,000 - 18.3% BSAI 48,000 - 28.3% GOA	$206.7	>1,2,4	?	Minor
4	10,000 & 42,970	200,000 - 13.0% BSAI 38,000 - 22.4% GOA	$158.8	>1,2	?	Minor
5	42,970 & 250,000	524,000 - 34.3% BSAI 97,000 - 57.5% GOA	$519.0	>1-4	?	Moderate (BSAI) Severe (GOA)

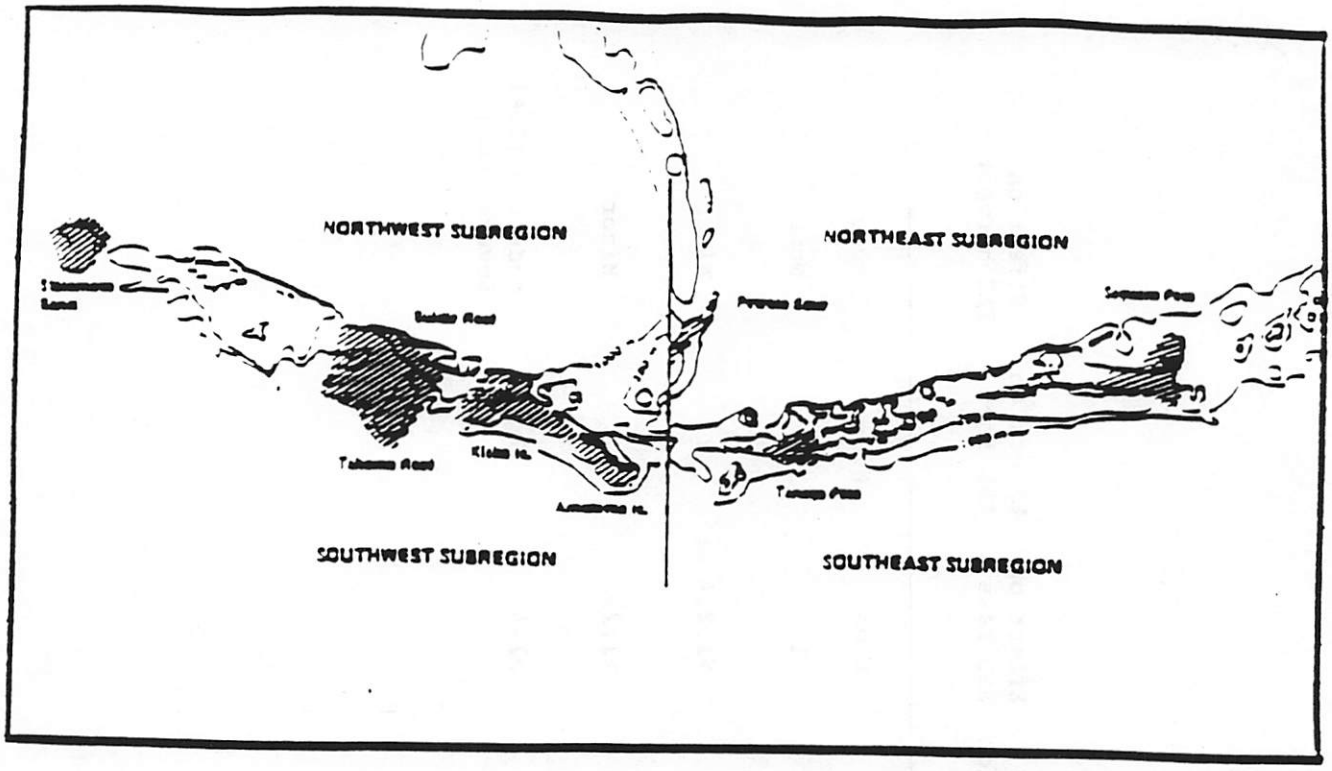


Figure 1. Map of the Aleutian Islands region that shows the major concentrations of Atka mackerel found in NMFS surveys (NPFMC 1990a).

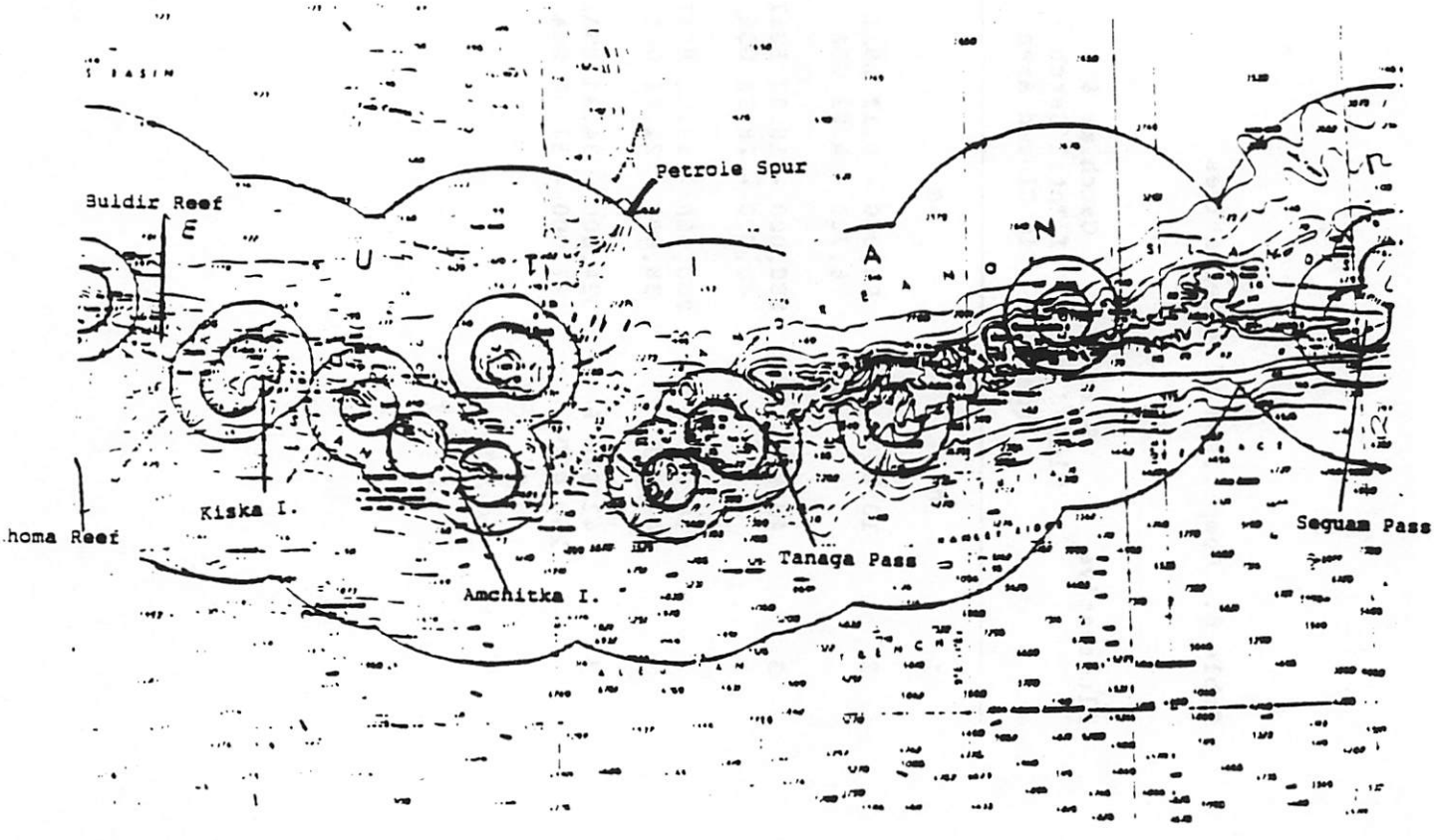


Figure 2. Map of the Aleutian Islands region that shows 10, 20, and 60 nm closures in the vicinity of Atka mackerel concentrations.

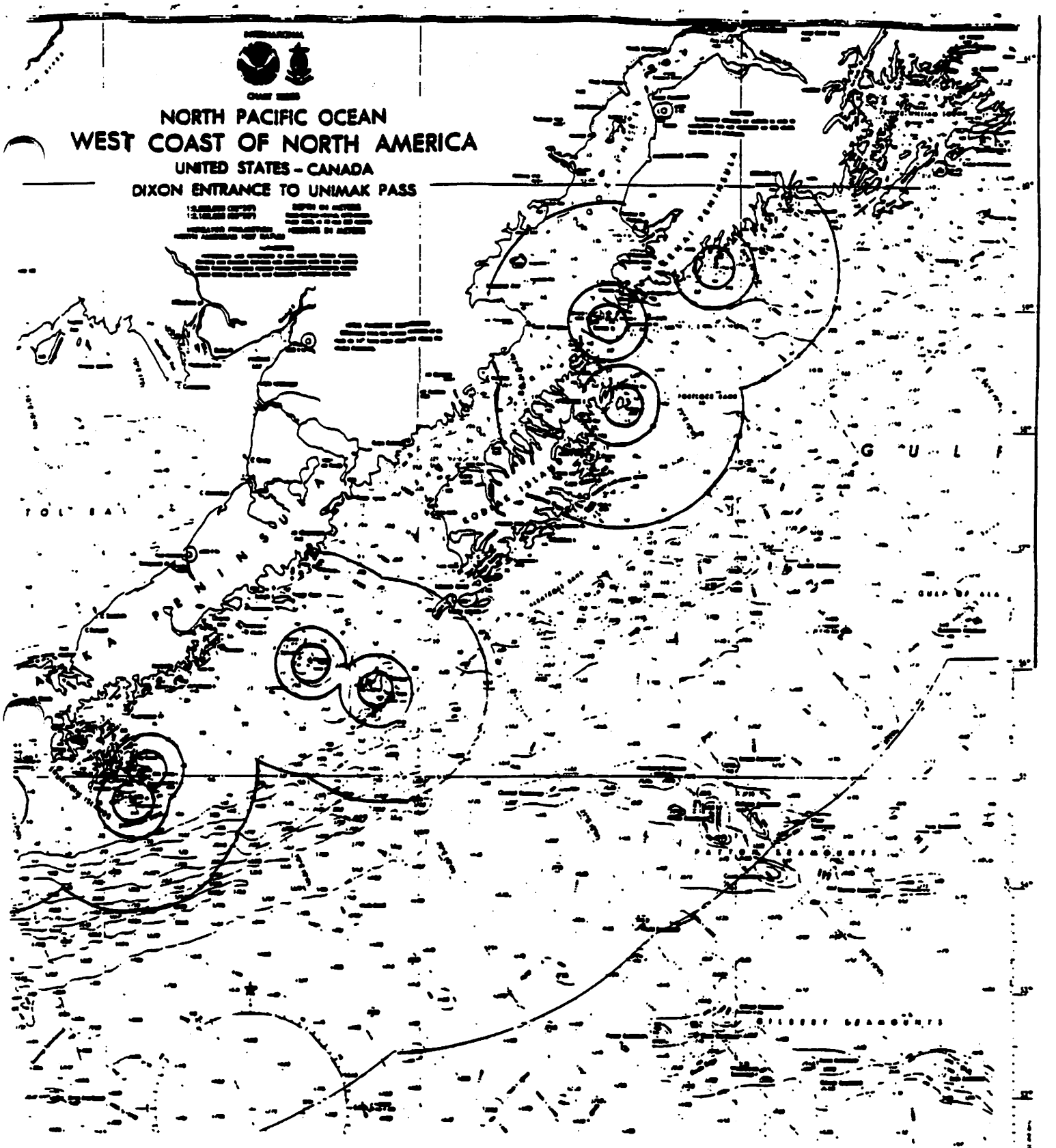
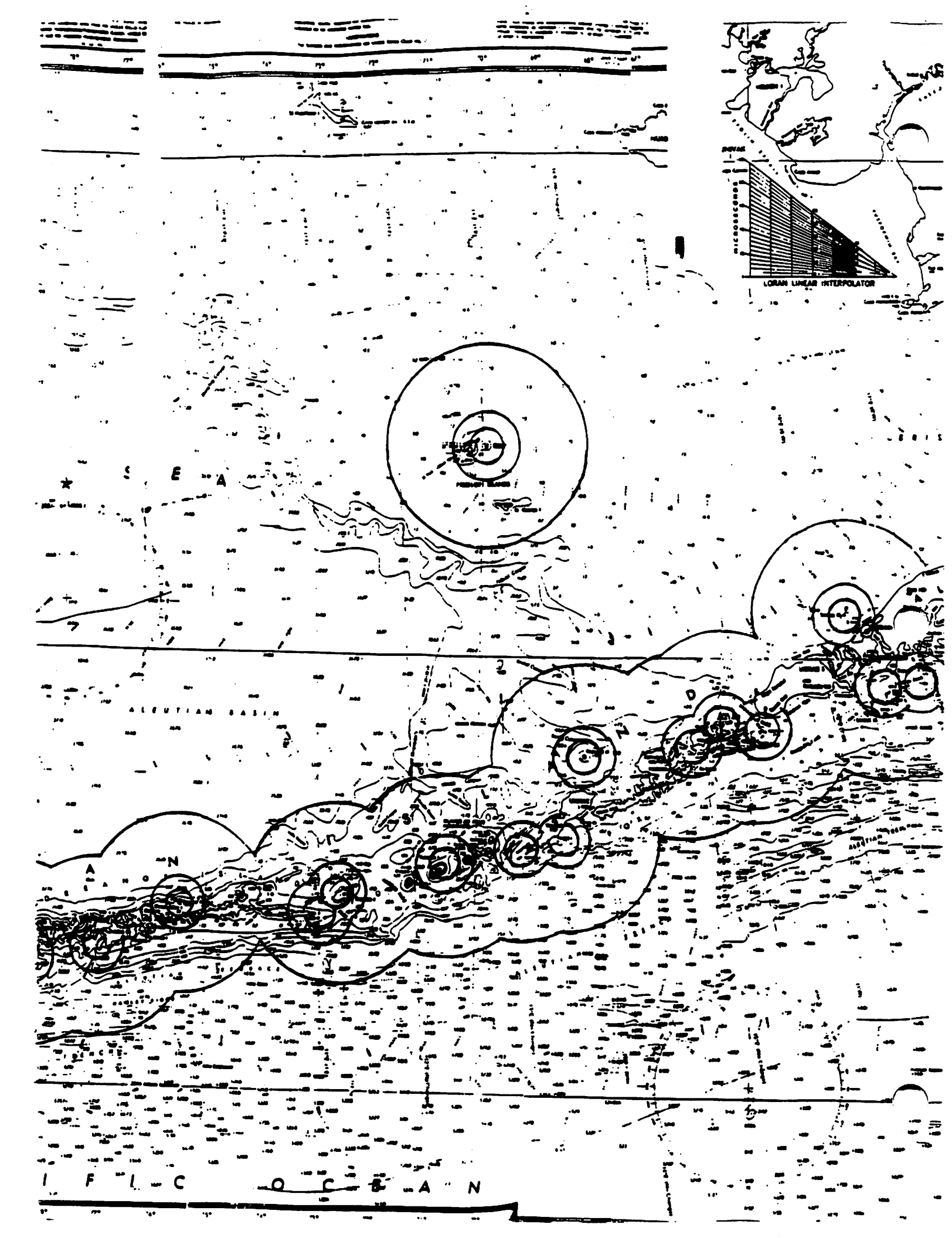


Figure 3. Approximate boundaries of 10, 20, and 60 nm closures around Steller sea lion rookeries in the Gulf of Alaska and Bering Sea. Rookery locations are listed in Table 1. Refer to NOAA International Charts INT 800 and INT 513. Figure continues on the next two pages.


LORAN LINEAR INTERPOLATOR
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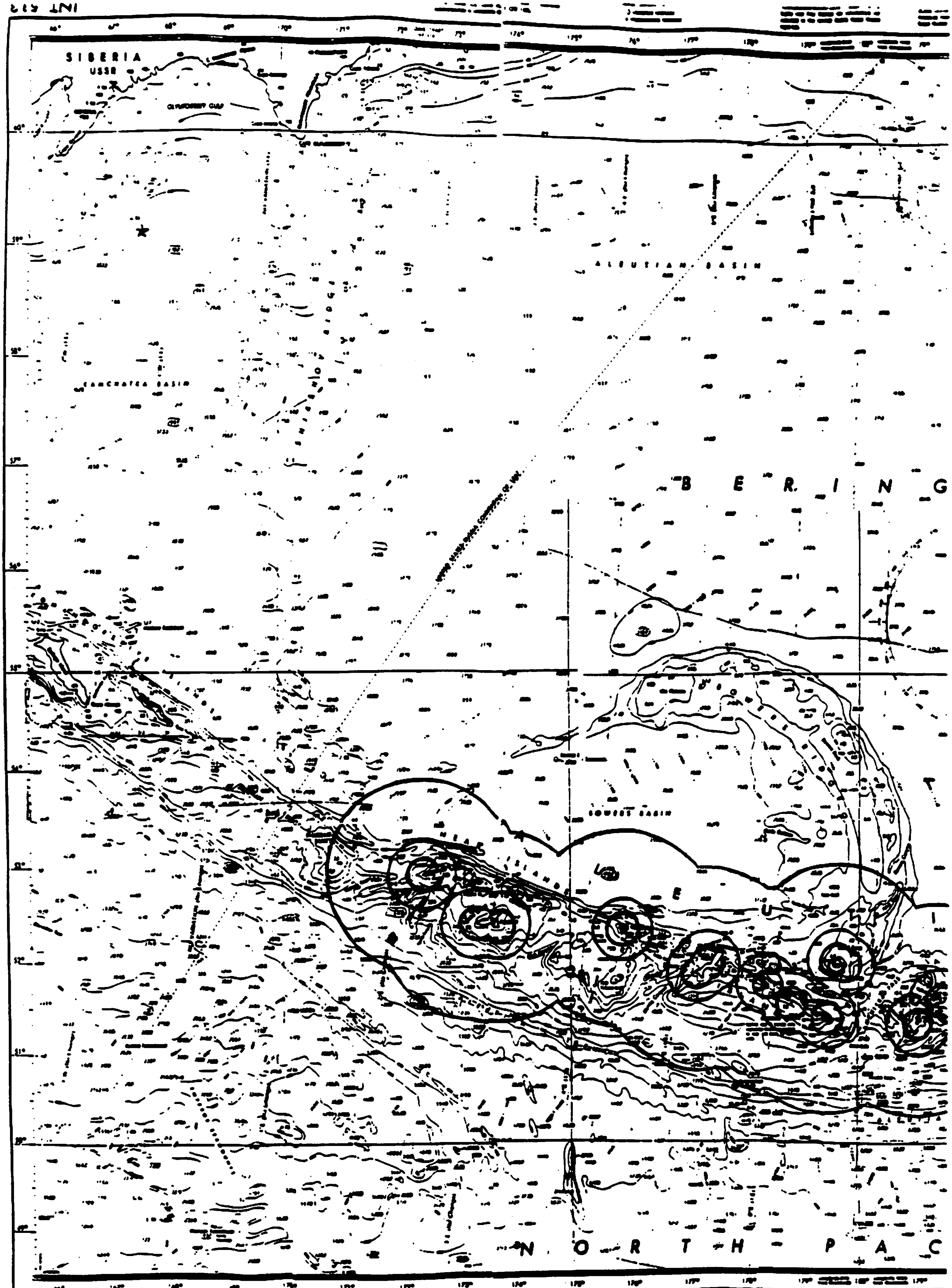
SIBERIA
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Appendix A

I. Calculation of Catch and Value under Alternatives 4 and 5

For the BSAI and GOA, 1990 quarterly Domestic Observer Program catch data for each species was used to estimate the percent quarterly catch of each species. Quarters 1 and 4 were lumped to form a winter (Oct - March) estimate, and quarters 2 and 3 (April - Sept) were lumped to form a summer estimate for each species. Percent catch for each species and quarter pair used in these calculations is given below.

Species	Qtr 1 & 4	Qtr 2 & 3
BSAI		
Pollock	33.4	66.6
Pacific Cod	46.2	53.8
Atka mackerel	5.0	95.0
Sablefish	49.7	50.3
Greenland Turbot	43.7	56.3
Yellowfin Sole	7.1	92.9
Rockfish/POP	20.3	79.7
Rock Sole	71.2	28.8
Arrowtooth	28.4	71.6
GOA		
Pollock	59.1	40.9
Pacific Cod	49.2	50.8
Sablefish	7.4	92.6
Arrowtooth	31.5	68.5
Deepwater Flatfish	55.5	44.5
Shallow Flatfish	52.5	47.5
Dem. Shelf Rockfish	0.2	95.8
Pel. Shelf Rockfish	2.5	97.5
Slope Rockfish	9.4	90.6
Thornyheads	18.0	82.0

The following calculation was made to estimate the maximum foregone catch and value under Alternative 4, which would close 10 nm from May 1 - Sept 30 and 20 nm from Oct 1 - April 30. To estimate the May - Sept catch, for each species the 10 nm catch from Table 7 was multiplied by the percent catch during qtr 2 & 3 (April - Sept) for that species. This value was by multiplied by 0.83 to reduce the 6 month estimate by one-sixth. To estimate the Oct - April catch, for each species the 20 nm catch estimate from Table 7 was multiplied by the percent catch during qtrs 1 & 4 for that species. This value was multiplied by 1.17 to increase the 6 month estimate by one-sixth. These results were added to estimate the "worst case" foregone catch for each species for Alternative 4. The value of each species catch was derived using the average wholesale values for each species shown in Table 7. Individual species results were added to achieve a total foregone catch and value for each region.

A similar calculation using the 20 and 60 nm catch estimates was made to estimate foregone catch for Alternative 5.

As explained below, the total catch and value estimates derived by the above approach were increased by 25% to compensate for underestimation due to seasonal variability in wholesale value and lumping of quarters.

II. Comparison of foregone value for pollock under Alternatives 4 and 5 using average and quarterly wholesale values.

Using the method outlined above and the average wholesale value for pollock used in Table 7, the worst case foregone walleye pollock catch under Alternatives 4 and 5 was calculated for the BSAI and GOA, as follows:

	Alternative 4		Alternative 5	
	Catch	Value	Catch	Value
BSAI	113969.9	$48.9 mill	339366.7	$145.6 mill
GOA	8008.9	3.9 mill	28472.2	14.0 mill
Total	121978.8	$52.8 mill	367838.9	159.6 mill

A second calculation was made based on the following estimates of the quarterly pollock catch from the 1990 Domestic Observer Program and quarterly estimates of wholesale value, and the estimates of BSAI/GOA pollock catch within 10, 20, and 60 zones (Table 5).

Qtr	BSAI Catch	GOA Catch	Estimated Wholesale Value
1	404112.4	13182.0	$531/mt
2	392148.5	8064.3	$396/mt
3	210032.1	23572.5	$413/mt
4	323024.0	32722.3	$403/mt

For alternative 4:

Qtr 1 = 20nm percentage * quarter 1 catch
Qtr 2 = (0.67*10nm percentage*qtr 2 catch)+(0.33*20nm percentage*qtr 2)
Qtr 3 = 10nm percentage*qtr 3 catch
Qtr 4 = 20nm percentage*qtr 4 catch

For alternative 6, 20 nm percentage was substituted for 10 nm, and 60 nm for 20 nm.

Based on this approach, the following foregone values for pollock were calculated:

	Alternative 4		Alternative 5	
	Catch	Value	Catch	Value
BSAI	158527.8	$72,2 mill	439380.4	$198.6 mill
GOA	7435.9	3.2 mill	26552.6	11.5 mill
Total	165963.7	75.4 mill	465933.0	200.1 mill

From this comparison, it is apparent that the approach (explained in item I) used to calculate "worst case" catch and value that could be foregone probably underestimates potential losses by between 20 and 30%. Therefore, the total foregone catch and value figures presented for Alternatives 4 and 5 in the EA were the values calculated via the method explained in item I increased by 25% to compensate for the underestimation.