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PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

FISHERY MANAGEMENT PLAN
and
FINAL ENVIRONMENTAL IMPACT STATEMENT
for the
GROUNDFISH FISHERY
in the
BERING SEA/ALEUTIAN ISLAND AREA

March 23, 1979

FINAL

NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
P.O. Box 3136 DT
Anchorage, Alaska 99510

North Pacific Fishery Management Council

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FISHERY MANAGEMENT PLAN
and
FINAL ENVIRONMENTAL IMPACT STATEMENT
for the
BERING SEA/ALEUTIAN ISLAND AREA

March 23, 1979

The North Pacific Fishery Management Council has prepared a Fishery Management Plan and Final Environmental Impact Statement for the Groundfish Fishery in the Bering Sea/Aleutian Island Area as directed by the Fishery Conservation and Management Act of 1976 (P.L. 94-265).

The NPFMC approved this combined DEIS/DFMP on July 27, 1979, as a draft for distribution during the public comment period. It was offered for public review and comment as follows:

Seattle	Oct. 7, 1978
Kodiak	Oct. 10, 1978
Unalaska	Oct. 12, 1978
Anchorage	Oct. 31, 1978

Additional opportunity for public comment was offered in

Anchorage	Nov. 31, 1978

during the regular monthly meeting of the Council. At the close of the public comment period on Jan. 10, 1979, the draft was revised with respect to comments received during the review period.

Final Council review and acceptance was conducted March 23, 1979, in Juneau, Alaska, during the regular monthly meeting of the Council.

This Fishery Management Plan is herewith forwarded to the Secretary of Commerce as the official recommendation for the conduct of the groundfish fishery in the Bering Sea/Aleutian Island area.

Jim H Branson

Jim H. Branson
Executive Director
North Pacific Fishery Management Council

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NOTE

Certain portions of the Management Regime section (14.0) have been reserved for final decision and are indicated in the FMP on page 161 and following.

All changes indicated are a matter of degree rather than substance and will not alter the management concept of the plan. They are included as marked for purposes of review in general.

SUMMARY SHEET

FISHERY MANAGEMENT PLAN FOR THE GROUNDFISH FISHERY IN THE BERING SEA/ALEUTIAN ISLAND AREA

(X) Final () Draft Environmental Impact Statement

Responsible Agencies: North Pacific Fishery Management Council
Contact: Jim H. Branson
Executive Director
P.O. Box 3136 DT
Anchorage, Alaska 99510

National Marine Fisheries Service
Contact: Harry L. Rietze
Regional Director
P. O. Box 1668
Juneau, Alaska 99802

1. Name of Action: (X) Administrative () Legislative

2. Description of Action: The proposed action is to adopt and implement a fishery management plan for the groundfish fishery in the Bering Sea/Aleutian Island area under the provisions of Title III of the Fishery Conservation and Management Act of 1976 (P.L. 94-265). This act extends jurisdiction over fishery resources and establishes a program for their management. The purpose of the plan is to manage the groundfish fishery in the Bering Sea/Aleutian Island area for the optimum yield and to allocate harvest between domestic and foreign fishermen.

3. Summary:

   (a) Environmental Impacts: Implementation of this fishery management plan within the limit of its constraints is presumed not to cause adverse impacts on the environment. Conservation measures are provided for species for which they are deemed necessary. Those measures and the conduct of the fishery as outlined will be beneficial to the ocean environment affected, to demersal and pelagic fishes and to the human environment.

4. Alternatives: The following alternatives are considered:

   a. No action
   b. Regulation of foreign fishery only
   c. Continuation of present management regime

5. Comments Requested: Comments have been requested and received from the following: (See Section 20.3.8.2).

6. Hearings: (See Section 20.3.8.2.)

7. Draft Statement to CEQ: Sept. 6, 1978

8. Final Statement to CEQ: ______________

2.0 EXECUTIVE SUMMARY

MANAGEMENT OBJECTIVES TO BE ATTAINED

1. **Promote conservation while providing for the optimum yield from the region's groundfish resources in terms of:**

a. **Providing the greatest overall benefit to the nation with particular reference to food production and recreational opportunities;**

b. **Avoiding long-term or irreversible adverse effects on fishery resources and the marine environment;**

c. **Insuring availability of a multiplicity of options with respect to future uses of these resources.**

2. Promote, where possible, efficient use of the fishery resources but not solely for economic purposes.

3. Promote fair and equitable allocation of identified available resources in a manner that no particular group acquires an excessive share of the privileges.

4. Base the plan on the best scientific information available.

DOMESTIC ANNUAL HARVESTING CAPACITY AND INTENT

Pollock	10,000 mt	
Pacific cod	7,000 mt	
Rockfishes	1,100 mt	(Eastern Bering Sea)
	1,100 mt	(Aleutian)
Yellowfin sole	1,000 mt	
Turbots	1,000 mt	
Other flounders	1,000 mt	
Sablefish	500 mt	(Eastern Bering Sea)
	500 mt	(Aleutian)
Others	1,400 mt	
TOTAL	24,600 mt	

MAXIMUM SUSTAINABLE YIELD, EQUILIBRIUM YIELD, ALLOWABLE BIOLOGICAL CATCH & OY

MSY, EY, and ABC Values for Groundfish in the Bering Sea/Aleutian Region during 1979 (1000's mt)

Species	Sub-area 1/	MSY	EY	ABC=OY	(1978 OY)	(1978-79 change)
Pollock	BS	1,100-1,600	1,000	1,000	(950)	(+50)
	AL	?	?	100		
Yellowfin sole	--	169-260	117	117	(106)	(+11)
Turbots	--	100	90-95	90	(139)	(+12)
Other flatfishes	--	44.3-76.8	=MSY	61		
Cod	--	58.7	=MSY	58.7	(58)	(+0.7)
Pacific Ocean perch	BS	32	6.5	3.25	(6.5)	
	AL	75	15	7.5	(15)	
Other rockfish	--	?	?	7.7		4/
Sablefish	BS	11.35	3.5	3.5	(5)	(-1.5)
	AL	1.85	1.5	1.5	(1.5)	(0)
Atka mackerel	--	33	Unknown	24.8	(24.8)	(0)
Squid	--	≥ 10	≥ 10	10	(10)	(0)
Pacific halibut	--	5	0.3	2/	--	--
Other included species	--	67	67	55.5	(93.6)	(-38.1)
Total 3/	--	1,702.2-2,325.7	1,446.5-1,484.0	1,540.45	(1,409.4)	(+131.05)

1/ BS = Eastern Bering Sea Area (Statistical Areas I, II, III combined).
AL = Aleutian Area (Statistical Area IV).

2/ Under management by the International Pacific Halibut Commission.

3/ Excluding Pacific halibut.

4/ Included under "others" in 1978.

TOTAL ALLOWABLE LEVEL OF FOREIGN FISHING

(TALFF) (metric tons)

Reference: Species group	sub-area 1/	Annex I ABC =OY	Section 13.1 Reserve	Annex II Initial DAH 3/	Initial TALFF
Pollock	BSea	1,000,000	50,000	10,000	940,000
Pollock	Aleutian	100,000	-	-	100,000
Yellowfin sole		117,000	5,850	1,000	110,150
Turbots		90,000	4,500	1,000	84,500
Other flatfishes 2/		61,000	3,050	1,000	56,950
Pacific cod		58,700	2,935	7,000	48,765
Pacific ocean perch	BSea	3,250	162	550	2,538
Pacific ocean perch	Aleutian	7,500	375	550	6,575
Other rockfish		7,727	500	1,100	6,127
Sablefish	BSea	3,500	350	500	2,650
Sablefish	Aleutian	1,500	150	500	850
Atka mackerel		24,800	1,240	0	23,560
Squid		10,000	500	0	9,500
Others		55,500	2,775	1,400	51,325
Total		1,540,477	72,327	24,600	1,443,490

1/ BS = Bering Sea (Statistical Areas I,II,III combined)

AI = Aleutian Island Area (Statistical Area IV)

2/ Excluding Pacific halibut

3/ Equals DAP, see Annex II

ECOLOGICAL, ECONOMIC AND SOCIAL IMPACTS

Ecological Impacts

In the context of long-term relationships, fishery managers are just now beginning to find out, understand and quantify the complex relations among species and between the biota and the environment of the ecosystem in the Bering Sea/Aleutian Island area. Until that understanding is more fully developed, it is not possible to predict the long-term effect on the ecosystem of the current, single species management strategies (as opposed to the integrated ecosystem method) or of subtle environmental changes.

The quantitative processes in the marine ecosystem are beginning to be simulated and studied with numerical, dynamic, deterministic marine ecosystem reproduction models.

It is generally recognized by fisheries scientists that the existing theories and models pertaining to fishery resources management suffer some fundamental inadequacies; concepts and theories must be developed to answer present and future management decisions. Until such new concepts supercede the old, the latter can still serve as a useful basis for deriving management decisions, providing their limited and underlying assumptions are recognized and evaluated with the best available information. This is the philosophy and approach used throughout this plan.

Economic Impacts

The number of vessels operating in this fishery management area has been so small that specific information cannot be disclosed without violating the confidentiality of individual reports. There is a slightly larger groundfish fishery for bait used by crabbers operating in the fishery.

In all, the total domestic commercial groundfish catch in the Bering Sea/Aleutian region (excluding halibut) is thought to be no more than 1,500 mt in any recent year.

Although substantial freezing and transshipping facilities are located at Ducth Harbor (Unalaska), with the exception of very small amounts of groundfish frozen for crab bait, no groundfish processing (except halibut) has occured in this region in recent years.

The viability of a domestic Bering Sea groundfish fishery will ultimately depend on the ability of U.S. industry to market products at prices which cover their production costs.

The impact of this FMP on the domestic socio-economic climate will be in direct proportion to the participation of Americans in the fishery. It is presumed that any financially sound participation in the future will result in increased employment opportunities and the benefits associated with development above the present low level.

Social Impacts

The relatively undeveloped nature of this fishery makes obvious the fact that any development will immediately impact the social climate. Employment is in direct proportion to plant development and processing capabilities. Certainly, initial efforts will be at least tentative and exploratory in nature. The single vessel now (spring, 1979) participating in a joint-venture is being used by prospective fishermen as a bellwether. The reader is referred to a fact sheet contained in the comment section of this plan for a precis' of conditions in the fishery.

ALTERNATIVES

The only alternative to this fishery management plan that would be consistent with P.L. 94-265 would be to continue to manage the fishery by preliminary fishery management plan. Inasmuch as a PFMP can apply only to foreign fishermen, and there is a potential for the domestic groundfish fishery to cause adverse impacts on halibut, the alternative of operating under a PFMP has been rejected.

CONSERVATION AND MANAGEMENT MEASURES

Specific management objectives are:

A. Continue rebuilding the halibut resource so that a viable halibut setline fishery is again available to American fishermen.

B. Rebuild depleted groundfish stocks to, and maintain healthy groundfish stocks at levels of abundance that will produce MSY.

C. Provide an opportunity for U.S. involvement in the Bering Sea/Aleutian groundfish fishery, limited only by the OY of individual species and objectives (A) and (B) above.

D. Allow foreign participation in the fishery, consistent with objectives (A), (B) and (C) above.

Objective (A) will be accomplished by winter restrictions on fishing in areas where juvenile halibut are known to concentrate.

Objective (B), as it pertains to Pacific ocean perch and sablefish, will be accomplished by setting OY below current EY (see Sec. 9.8.2. and Annex I) so that abundance can rebuild to the necessary level to produce MSY. Objectives (C) and (D) will be accomplished as provided for under Sections 12.2, 13.1 and 13.2.

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4.0 INTRODUCTION TO THE PLAN

This Fishery Management Plan (FMP) has been developed by the North Pacific Fishery Management Council and is for the groundfish fishery, excluding halibut and herring, of the Bering Sea/Aleutian Island area. It is intended to replace all of the current Preliminary Fishery Management Plan (PFMP) for the Trawl and Herring Gillnet Fisheries of the Bering Sea and Aleutians except that portion dealing with herring, and that portion of the PFMP for the Sablefish Fishery of the Bering Sea and Northeastern Pacific Ocean which covers the Bering Sea/Aleutian Region. Both of those PFMP's were developed by the National Marine Fisheries Service and implemented by the Secretary of Commerce in early 1977.

One feature of the format of this FMP is that such items as Allowable Biological Catch, Expected Domestic Annual Harvest, Total Allowable Level of Foreign Fishing, and annual catch statistics which are likely to change from time to time have been arranged in Annexes. This should facilitate both the drafting and review process when such changes are made in the future.

4.1 Description of the Management Unit

The geographical extent of this Management Unit is the entire Fishery Conservation Zone (FCZ) of the Bering Sea, including Bristol Bay and Norton Sound, and that portion of the FCZ of the North Pacific Ocean which is adjacent to the Aleutian Islands west of 170°W.

In terms of both the fishery and the groundfish resource, the Bering Sea/Aleutian groundfish fishery (excluding halibut) forms a distinct management unit. The history of fishery development, target species and species composition of the commercial catch, bathemetry, and oceanography are all much different in that Region than in the adjacent Gulf of Alaska. Although many species occur over a broader range than the Bering Sea/Aleutian Region, with only a few exceptions (e.g. halibut and perhaps sablefish) stocks of common species in this Region are believed different from those in the adjacent Gulf of Alaska.

Even though the International Pacific Halibut Commission is responsible for management of the North American halibut fishery, the potential adverse impact on halibut of a fishery for other groundfish species is so great that it must be taken into account in the management of the groundfish fishery. Therefore, certain pertinent aspects of the halibut resource and the directed fishery it supports are described in this Fishery Management Plan. Throughout this document, the terms "groundfish" and "bottomfish" exclude Pacific halibut unless otherwise noted.

This Fishery Management Plan follows almost exactly the "Outline for Fishery Management Plans" adopted by the North Pacific Council and forms the major component of an Environmental Impact Statement which assesses the effect that implementation of this Plan is expected to have on the environment of the region which encompasses the eastern Bering Sea and Aleutian Island archipelago.

4.2 Goals for Management Plan

The North Pacific Fishery Management Council has determined that all its fishery management plans should, in order to meet the requirements of its constituency, the resources and FCMA, achieve the following goals:

1. Promote conservation while providing for the optimum yield from the Region's groundfish resource in terms of: providing the greatest overall benefit to the nation with particular reference to food production and recreational opportunities; avoiding irreversible or long-term adverse effects on fishery resources and the marine environment; and insuring availability of a multiplicity of options with respect to the future uses of these resources.

2. Promote, where possible, efficient use of the fishery resources but not solely for economic purposes.

3. Promote fair and equitable allocation of identified available resources in a manner such that no particular group acquires an excessive share of the privileges.

4. **Base the plan on the best scientific information available.**

In accomplishing these broad objectives a number of secondary objectives have been considered:

a. Conservation and management measures have taken into account the unpredictable characteristics of future resource availability and socio-economic factors influencing the viability of the industry.

b. Where possible, individual stocks of fish are managed as a unit throughout their range, but such management is in due consideration of other impacted resources.

c. In such instances when stocks have declined to a level below that capable of producing MSY, management measures promote rebuilding the stocks. In considering the rate of rebuilding, factors other than biological considerations have been taken into account.

d. Management measures, while promoting efficiency where practiable, are designed to avoid disruption of existing social and economic structures where fisheries appear to be operating in reasonable conformance with the Act and have evolved over a period of years as reflected in community characteristics, processing capability, fleet size and distribution. These systems and the resources upon which they are based are not static, but change in the existing regulatory regime should be the result of considerated action based on data and public input.

e. Management measures should contain a margin of safety in recommending allowable biological catches when the quality of information concerning the resource and ecosystem is questionable. Management plans should provide for accessing biological and socio-economic data in such instances where the information base is inadequate to effectively establish the biological parameters of the resource or to reasonably establish optimum yield. This plan has identified information and research required for further plan development.

f. Fishing strategy has been designed in such a manner as to have minimal impact on other fisheries and the environment.

4.3 Operational Definitions of Terms

1. Determinants of catch levels

a. Maximum sustainable yield (MSY) is an average over a reasonable length of time of the largest catch which can be taken continuously from a stock under current environmental conditions. It should normally be presented with a range of values around its point estimate.
Where sufficient scientific data as to the biological characteristics of the stock do not exist or the period of exploitation or investigation has not been long enough for adequate understanding of stock dynamics, the MSY will be estimated from the best information available.

b. Equilibrium yield (EY) is the annual or seasonal harvest which allows the stock to be maintained at approximately the same level of abundance (apart from the effects of environmental variation) in successive seasons or years.

c. Acceptable biological catch (ABC) is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. It may be set lower than MSY in order to rebuild overfished stocks.

d. Optimum yield (OY) may be obtained by a plus or minus deviation from ABC for purposes of promoting economic, social of ecological objectives as established by law and public participation processes. Ecological objectives, where they primarily relate to biological purposes and factors, are included in the determination of ABC. Where biological objectives relate to resolving conflicts and accommodating competing uses and values, they are included as appropriate with economic and/or social objectives. OY may be set higher than ABC in order to produce higher yields from other more desirable species in a multispecies fishery. It might be set lower than ABC in order to provide larger sized individuals or a higher average catch per unit effort.

4. Determination of domestic annual fishing capacity, expected harvest, and fishing capacity.

a. Domestic annual fishing capacity (DAC) is the total potential physical capacity of the fleets, modified by logistic factors. The components of the concept are:

(1) An inventory of total potential physical capacity, defined in terms of appropriate vessel and gear characteristics (e.g. size, horsepower, hold capacity, gear design, etc.).

(2) Logistic factors determining total annual fishing capacity (e.g., variations in vessel and gear performance, trip length between fishing locations and landing points, weather constraints, etc.).

b. Expected domestic annual fisheries harvest (DAH) is the domestic annual fishing capacity modified by other factors which will determine estimates of what the fleets will harvest (e.g., how fishermen will respond to price changes in the subject species and other species, etc.).

b. Expected domestic annual processing capacity (DAP) includes an estimation of the processors as well as the amount of harvest they intend to process in any given plan year. In this management plan, DAH is equal to DAP.

These concepts should be placed in a dynamic context of past trends and future projections. For example, physical fleet capacity should not simply be last season's inventory of vessels and hold measurements (although this is appropriate for present interim planning), but also next year's projected movement into and out of the fishery. Vessels under construction should be included and attrition should be estimated.

The determination of domestic annual fishing capacity, expected harvest and processing capacity and intent should be made on the best available information.

3. Determination of total allowable level of foreign fishing (TALFF). The foreign allowable catch is determined by deducting the expected domestic annual expected harvest from the optimum yield.

5.0 DESCRIPTION OF FISHERY

5.1 Areas and Stocks Involved

5.1.1 Description of areas

The Bering Sea/Aleutian Island region with respect to U.S. extended jurisdiction is defined as those waters lying south of the Bering Strait, east of the U.S.-U.S.S.R. convention line of 1867, and extending south of the Aleutian Islands for 200 miles between the convention line and 170°W (Figures 1 and 2). Waters lying south of lines joining headlands in the eastern Aleutian Islands, east of 170°W, are considered a part of the Gulf of Alaska management area. The most prominent and unique feature of the Bering Sea is the extensive continental shelf in the eastern and northern portion of the sea. It constitutes approximately 80% of the total shelf area in the Bering Sea (Hood and Kelly 1974) and is one of the world's largest. For the Bering Sea as a whole, 44% of its 2.3 million km2 area is continental shelf, 13% continental slope, and 43% deepwater basin. A number of large bays, including Bristol and

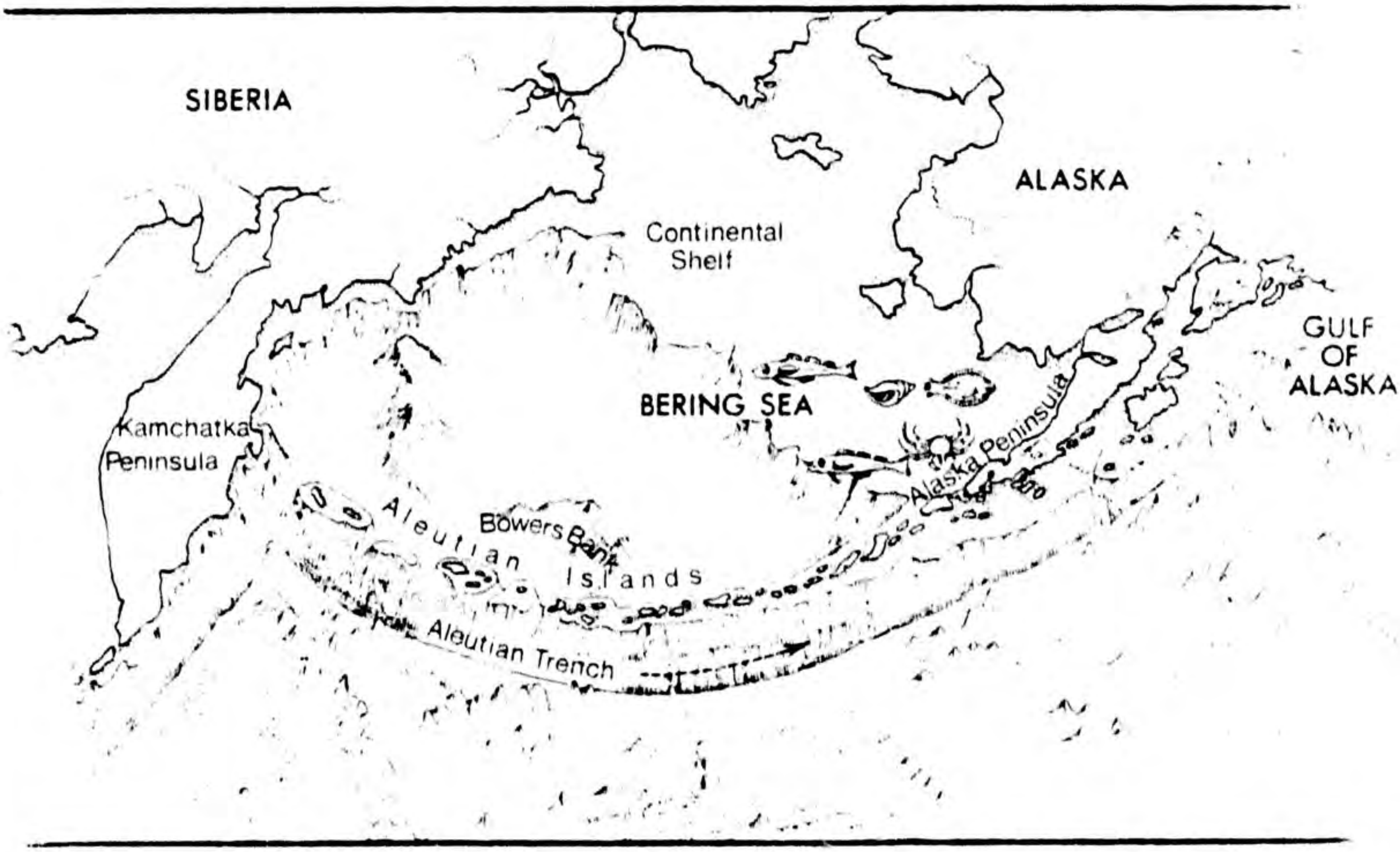


Figure 1.--Bottom features of Bering Sea and Aleutian Islands regions

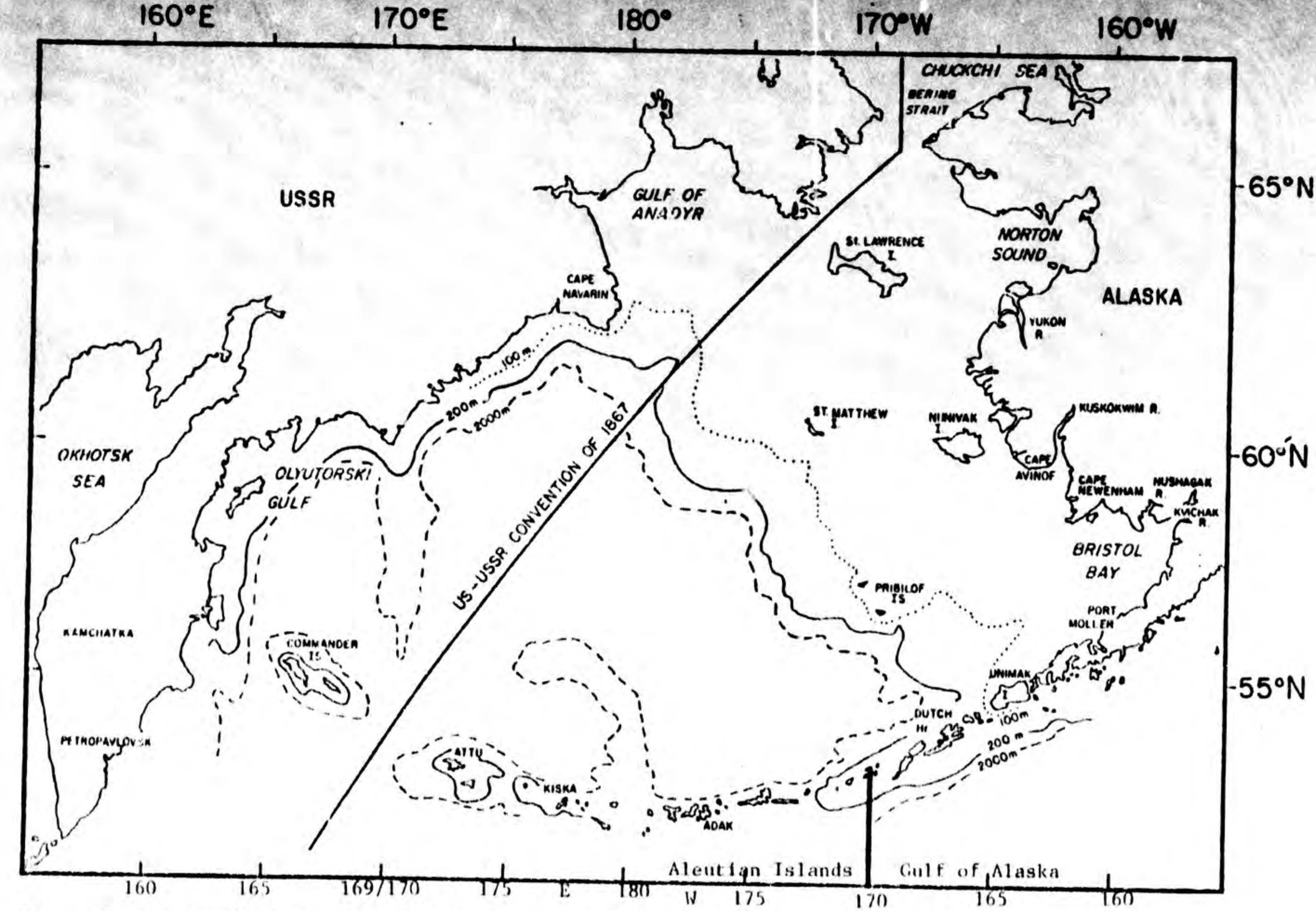


Figure 2.--Geographical locations in the eastern Bering Sea and Aleutian Islands.

Kuskokwim Bays and Norton Sound on the Alaska coast, makes the coast line of the Bering Sea highly irregular. The area of all bays in the Bering Sea makes up 11.1% of the total area of the sea (Gershanovich 1963).

The broad eastern Bering Sea shelf is extremely smooth and has a gentle uniform gradient resulting from sediment deposits (Sharma 1974). The sediments, originating along the coast and transported offshore in graded suspension by storm waves, are predominantly sands over the inner shelf and silt and clay sediments on the other shelf and slope.

The continental slope bordering the eastern Bering Sea shelf is abrupt and very steep and is scoured with valleys and large submarine canyons (Sharma 1974).

Forming a partial barrier to the exchange of Bering Sea and Pacific Ocean water is the Aleutian-Commander Islands arc. This chain is made up of more than 150 islands and has a total length of approximately 2260 km (Gershanovich 1963). Shelf areas throughout most of the Aleutians portion of the chain are narrow (and frequently discontinuous between islands) ranging in width on the north and south sides of the island from about 4 km or less to 42-46 km. The shelf broadens in the eastern Aleutians.

An additional geographical feature of the Aleutian Island region of fishery interest is Bowers Ridge. The submerged ridge, forming an arc off the west-central Aleutian Islands, is about 550 km long and 75-110 km wide, becoming even wider in the vicinity of the Rat Islands (Gershanovich 1963). The southern portion of the ridge summit is 150-200 m deep, the central portion is 600-700 m deep, and the northern portion 800-1000 m deep.

Exchange of water between the Bering Sea and the Pacific Ocean occurs through the various Aleutian Island passes with an estimated 14% of the Pacific water remaining in the Bering Sea (Sharma 1974). The net gain from Pacific water and surface runoff from rivers is lost to the Arctic Ocean through the Bering Strait, creating a net movement of water northward.

The dominant water movement on the eastern Bering Sea continental shelf originates from Pacific waters entering the Bering Sea in the vicinity of Unimak Island. These waters move northward toward St. Matthews Islands and eastward toward Bristol Bay. The northward stream divides near St. Matthews Island before joining again and passing through the Bering Strait.

The eastward flowing current along the Alaska Peninsula upon reaching the head of Bristol Bay is deflected westward by waters from the Kvichak and Nushagak Rivers (Sharma 1974). These westward flowing waters are mixed with Kuskokwim River water near the mouth of Kuskokwim Bay and directed southward, forming a cyclonic gyre in the southeastern Bering Sea.

The Bering Sea is influenced mainly by subarctic climate, except for the southernmost part, which can be included in the temperate zone (Sharma 1974). It lies in a region of moderate to strong atmospheric pressure gradients and is subject to numerous storms. A major environmental feature of the Bering Sea is the pack ice which covers most of the continental shelf in the eastern and northern sections of the sea in winter and spring. The ice edge begins to intrude into the northern Bering Sea in November, and normally reaches it maximum in late March (Potocsky 1975). At its maximum the ice pack may cover the continental shelf south to the Pribilof Islands and extend from the Pribilof Islands eastward to the vicinty of Port Moller. The areas of the outer shelf between the Pribilof Islands and Unimak Island and deeper waters of the Bering Sea are generally ice free throughout the year because of the intrusion of warmer Pacific Ocean water. In April and May the ice edge begins to retreat and by early summer the Bering Sea is normally free of ice.

The physical, climatic, and oceanographic features in the eastern Bering Sea combine to create conditions highly favorable for primary biological productivity. These conditions are only surpassed by some of the upwelling regions in the eastern Pacific and Atlantic Oceans (Hood and Kelly 1974). This productivity supports some of the largest fish, marine mammal, and bird populations in the world. Although the processes for this high productivity are not fully understood, they probably originate from the upwelling of nutrient-rich water along the Aleutian Island chain (Sharma 1974), the mixing of Pacific Ocean and Bering Sea waters, the seasonable extremes in climate with a buildup of nutrients during the winter months (Gershanovich, et al 1974) and the expansive nature of the continental shelf.

5.1.2 Description of stocks

The Bering Sea supports about 300 species of fishes, the majority of which are found near or on the bottom (Wilimovsky 1974). Among the pelagic species are the commercially important, or potentially important groups such as the salmon (Oncorhynchus), herring (Clupea), smelts (Osmerus), and capelin (Mallotus). The fish groups of primary concern in this plan are the bottom or near-bottom dwelling forms--the flounders, rockfish, sabelfish, cod, pollock, and Atka mackerel. Although not bottom-dwelling, squids (Cephalopoda) are also included in the plan.

There is a general simplification in the diversity of bottomfish species in the Bering Sea compared to the more southern regions of the Gulf of Alaska and Washington to California. As a result, certain species inhabiting the Bering Sea are some of the largest bottomfish resources found anywhere in the world. In terms of biomass, the bottomfish community in the Bering Sea is much larger than its counterparts in other areas of the northeastern Pacific. The commercial production by all nations from the eastern Bering Sea/Aleutians has ranged from 1.6 to 2.3 million mt during the five year period of 1971-1975, representing 69 to 86 percent of the groundfish catch for the entire region from the Bering Sea to California.

Relatively few roundfishes form aggregations in the eastern Bering Sea and Aleutian Islands areas large enough to attract target, or occasional target fisheries: Pacific cod, Pacific ocean perch, sablefish, Atka mackerel, and rattails (Table 1). A number of other rockfishes are taken while fishing for Pacific ocean perch, the most common of which are listed in Table 1.

In contrast to the relatively few species of commercially explited roundfishes, the flatfish community of the Bering Sea is very diverse. Yellowfin sole dominates this group and has the longest history of intense exploitation by foreign fisheries. Other flounder species that are known to occur in aggregations large enough to form target species or occasional target species are Greenland turbot, Pacific halibut, rock sole, flathead sole, and arrowtooth flounder. Alaska plaice is also relatively abundant, but has not been intensively fished, apparently because of their low market value. A number of other flounders having commercial importance in regions to the south, also occur in the eastern Bering Sea (Table 1), but their abundance is low.

Elasmobranches (sharks and rays) which commonly occur off Washington to California, are relatively scarce in the eastern Bering Sea. Only skates (Rajidae) occur in significant quantities, but less so than in waters south of the Bering Sea.

Commercial catches illustrate the much greater magnitude of groundfish stocks in the eastern Bering Sea compared to the Aleutian Island region (Figure 3). For the five-year period of 1971 to 1975, the all-nation commercial catch in the eastern Bering Sea averaged 2.0 million mt compared to only 59,000 mt in the Aleutian Islands. The major share of the catch in the eastern Bering Sea from 1971 to 1975 (1.6 million mt or 81%) was made up of pollock. Other roundfish contributed 8% to the average catch and flounders 11%. Roundfish also contributed the major share of the catch in the Aleutian Island area (84%), but the principal roundfish species in the Aleutian region was Pacific ocean perch rather than pollock. Pollock catches in the Aleutians averaged only about 10,000 mt annually in 1971-1975.

Table 1.--Commercially utilized demersal fishes in the ecstern Bering Sea and Aleutian Island region.

Common name	Scientific name
TARGET SPECIES	
Pollock	*Theragra chalcogramma*
Pacific ocean perch	*Sebastes alutus*
Atka mackerel	*Pleurogrammus monopterygius*
Blackcod	*Anoplopoma fimbria*
Yellowfin sole	*Limanda aspera*
Greenland turbot	*Reinhardtius hippoglossoides*
Pacific halibut	*Hippoglossus stenolepis*
OCCASIONAL TARGET SPECIES	
Pacific cod	*Gadus morhua macrocephalus*
Rock sole	*Lepidopsetta bilineata*
Flathead sole	*Hippoglossoides elassodon*
Arrowtooth flounder	*Atheresthes stomias*
Rattails	*Coryphaenoides* sp.
MINOR COMMERCIAL SPECIES 1/	
Rougheye rockfish	*Sebastes aleutianus*
Dusky rockfish	*Sebastes ciliatus*
Northern rockfish	*Sebastes polyspinis*
Shortspine thornyhead	*Sebastolobus alascanus*
Shortraker rockfish	*Sebastes borealis*
Dark botched rockfish	*Sebastes crameri*
Yelloweye rockfish	*Sebastes ruberrimus*
Blue rockfish	*Sebastes mystinus*
Alaska plaice	*Pleuronectes quadrituberculatus*
Rex sole	*Glytocephalus zachirus*
Butter sole	*Isopsetta isolepis*
Longhead dab	*Limanda proboscidea*
Dover sole	*Microstomus pacificus*
Starry flounder	*Platichthys stellatus*
Skates	Rajidae

1/ Includes species that may be marketable, but have low abundance.

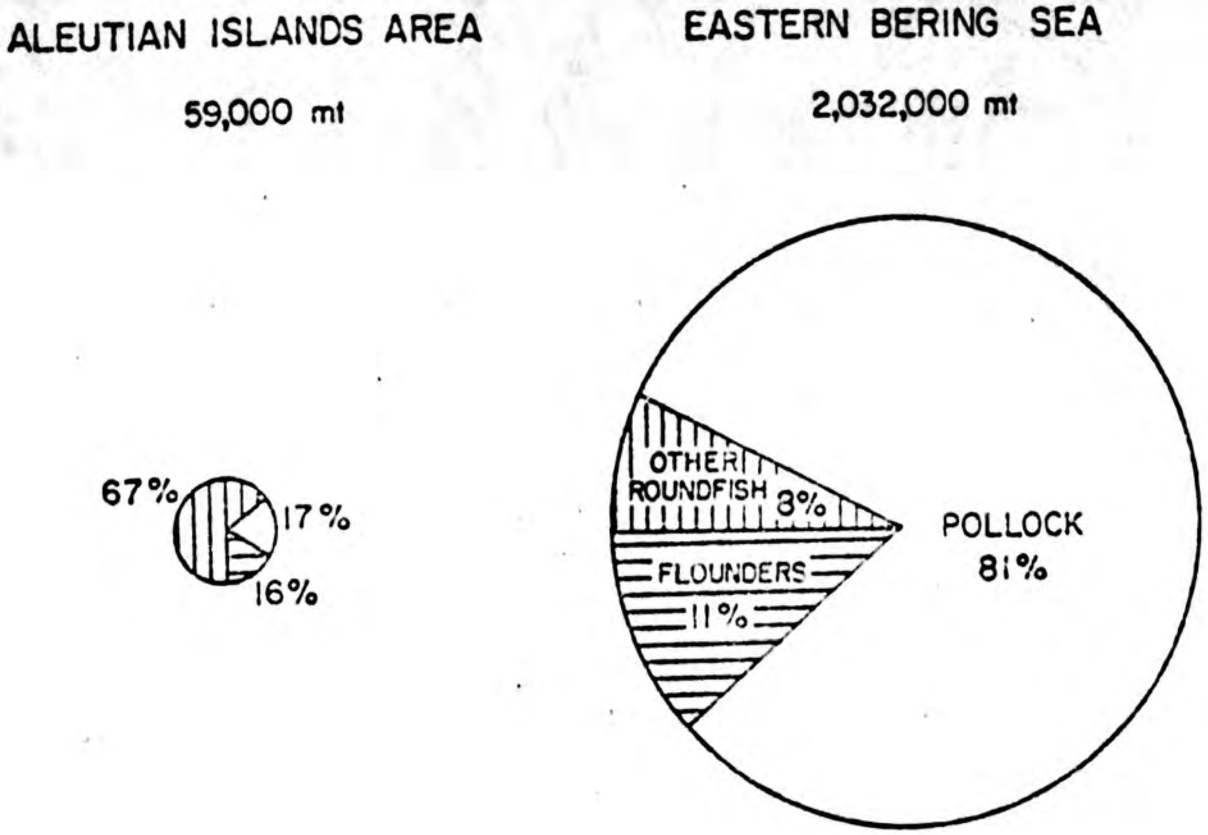


Figure 3.--Average annual catches of groundfish in the Aleutian Island area and the eastern Bering Sea, 1971-75.

The species make-up of catches in the two regions exclusive of pollock are illustrated in Figure 4. The data demonstrate that catches of both roundfish (other than pollock) and flounders were much greater in the eastern Bering Sea than in the Aleutians. Catches of flounders in the eastern Bering Sea were predominated by yellowfin sole (79,000 mt), but catches of Greenland turbot (71,000 mt) in this recent period has approached those of yellowfin sole. Rock sole, flathead sole, and arrowtooth flounders were other principal species of flounders taken in the eastern Bering Sea. Flounders form only an incidental part of the catch in the Aleutian Islands area with Greenland turbot the principal species in that area.

The principal roundfish in eastern Bering Sea catches after pollock was Pacific cod with an annual average catch in 1971-75 of 55,000 mt. The next most abundant species were Pacific ocean perch (17,000 mt) and sablefish (9,000 mt). The catch of "other groundfish" was also relatively high, averaging 69,000 mt annually, and forming 5.6% of the overall catch in the eastern Bering Sea. Although the species in this category were not identified, they most likely consist primarily of sculpins (Cottidae), eelpouts (Zoarcidae), skates (Rajidae), poachers (Agonidae) and rattails.

Pacific ocean perch have been the principal species of roundfish in Aleutian Island catches and in 1971-75 annual catches have averaged 22,000 mt. Other than pollock (10,000 mt), the next most abundant species in catches were Atka mackerel (4,000 mt), sablefish (2,700 mt), and cod (1,500 mt).

Little is known about the extent of the squid resource in the eastern Bering Sea and Aleutian Islands area. The Japanese apparently target on squid to a limited degree. They took 4,300 mt and 5,900 mt in 1975 and 1976. Fishing was mainly in the Aleutian Islands area in 1975 and mainly in the eastern Bering Sea in 1976.

The depth distribution of principal commercial species varies by species and by season. Species of flounders that occupy the shallowest depths on the continental shelf (generally shallower than 100 m during

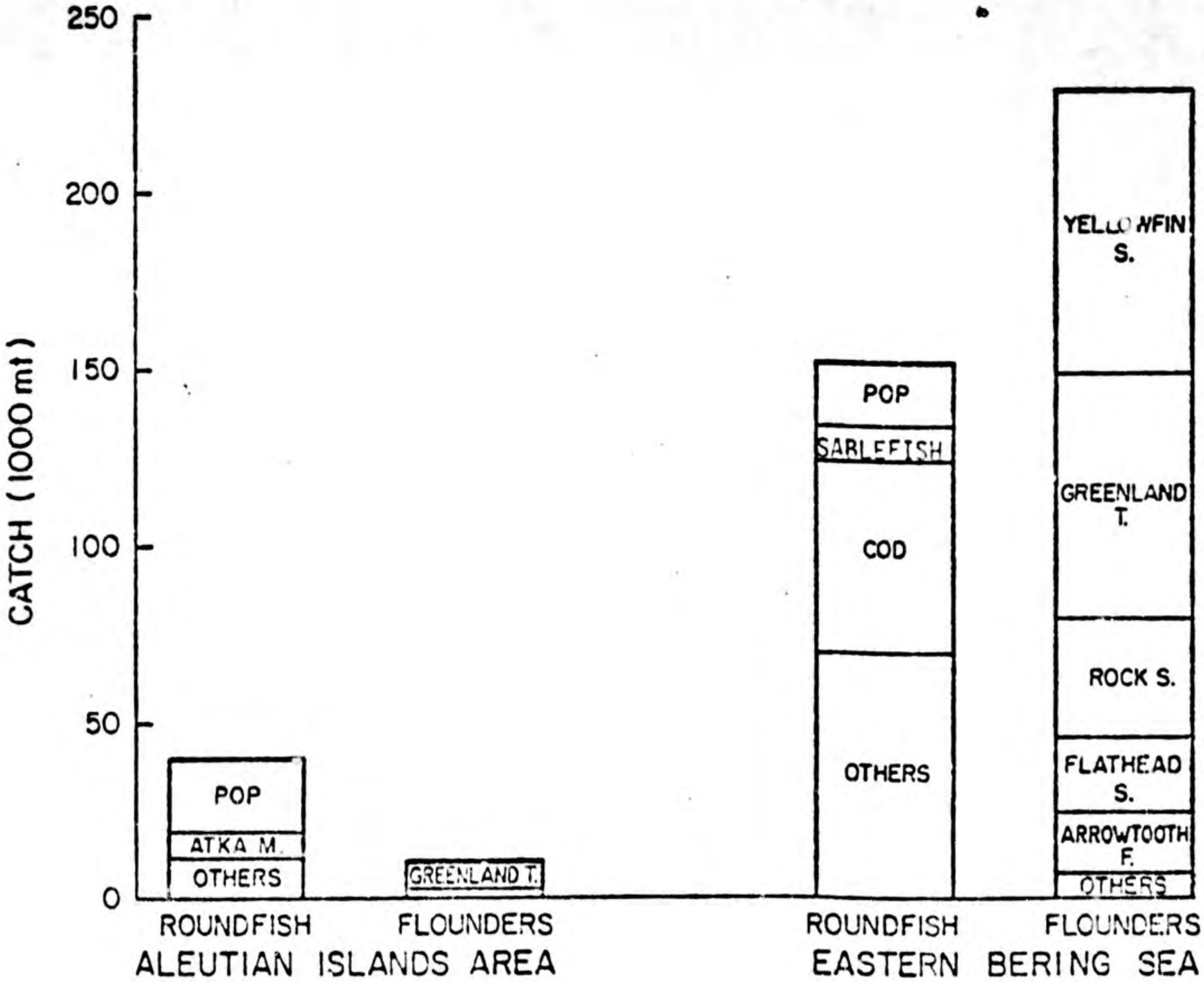


Figure 4.--Average annual catches of groundfish (excluding pollock) in the Aleutian Island area and eastern Bering Sea, 1971-75.

summer) are yellowfin sole, Pacific halibut, rock sole, and Alaska plaice. The distribution of flathead sole is centered in deeper water than the above species, mainly occupying waters on the outer shelf (100-200 m), but also ranging onto the continental slope. The large flounders (Greenland turbot and arrowtooth flounder) occupy the deepest water with adults mainly located on the continental slope; they also occupy shelf waters, but mainly only the juvenile portion of the population.

In winter most of the flounders retreat to waters of the outer shelf and upper slope to avoid the sub-zero temperatures that extend over much of the eastern Bering Sea shelf in winter and early spring. These bathymetric migrations are most extensive for those flounders occupying the inter shelf in summer such as yellowfin sole, rock sole, Alaska plaice, and Pacific halibut. The migrations of Pacific halibut result in their occupying the greatest depth range of all flounders, extending from shallow bays to slope waters of over 500 m in depth.

Major commercial species of roundfish are mainly found on the outer shelf and slope. The distributions of pollock and Pacific cod are centered on the outer shelf in summer with some shifting to upper slope water in winter. Pacific ocean perch and other rockfishes are residents of the relatively deep water of the outer shelf and upper continental slope. Sablefish inhabit the deepest waters occurring to depths of perhaps over 1000 m.

5.2 History of Exploitation

5.2.1 Domestic fishery

5.2.1.1 General description of fishery

The earliest fisheries for groundfish in the eastern Bering Sea and Aleutian Islands were the Native subsistence fisheries. There were an important part of the life of Native people, and dependence on demersal species of fish may have been critical to their survival in periods of the year when other sources of food were scarce or lacking. Fishing was in near-shore waters utilizing such species as cod, halibut, rockfish, and other species. These small-scale subsistence fisheries have continued to the present time.

The first commercial venture for bottomfish occurred in 1864 when a single schooner fished for Pacific cod in the Bering Sea (Cobb 1927). The cod fishery did not commence on a regular annual basis until 1882. This domestic fishery continued until 1950 when demand for cod declined and economic conditions caused the fishery to be discontinued (Alverson et al. 1964). Fishing areas in the eastern Bering Sea were from north of Unimak Island and the Alaska Peninsula to Bristol Bay (Cobb 1927). Vessels operated from home ports in Washington and California and from shore stations in the eastern Aleutian Islands. Canadian vessels also participated in the cod fishery to a limited extent.

The cod fishery reached its peak during WWI when the demand for cod was high. Numbers of schooners operating in the fishery ranged from 1-16 up to 1914 and increased to 13-24 in the period 1915-20. Estimated catches during the peak of the fishery ranged annually from 12,000-14,000 mt (Pereyra et al. 1976). Numbers of vessels in the fishery declined following 1920 until the fishery was terminated in 1950.

Halibut were reported as being present in the Bering Sea by United States cod vessels as early as the 1800's. However, halibut from the Bering Sea did not reach North American markets until 1928 (Thompson and Freeman 1930). Small and infrequent landings of halibut were made by United States and Canadian vessels between 1928 and 1950, but catches were not landed every year until 1952 (Dunlop et al. 1964). The catch by North American setline vessels increased sharply between 1958 and 1963 and then declined steadily until 1972. Since 1972, the catch has remained stable at a relatively low level. The decline in the catch was a result of reduced abundance which led to severe restriction on the fleet. The reduction in abundance was caused by a combination of factors: the North American setline fishery, the Japanese setline fishery, incidental catches of juvenile halibut in foreign trawl fisheries, and adverse environmental conditions. The relative importance of each of these factors is not clear at this time.

In the Aleutians, exploitation by the North American setline fishery is relatively low. There was no fishing before 1960 and since then catches have been less than 200 mt. However, stocks in this area are relatively small, and tagging studies indicate that they are an intermingling component of stocks in the Gulf of Alaska. Consequently, fish from this area should not be considered unexploited.

The number of Canadian and U.S. vessels is shown in Table 2, and the units of fishing effort have been summarized by Myhre et al. (1977) and IPHC (1977). In general, fishing effort in the Bering Sea was meager before 1958, increased sharply during the late 1950's and early 1960's, and then declined steadily until the early 1970's. Effort during the 1970's has been relatively low although a modest increase did occur in 1976 and 1977. The low effort during the 1970's is the result of reduced abundance and restrictions on the North American fleet.

Fishing effort in the Aleutians is very low because halibut stocks are relatively small and the distance to major ports is long.

Present participation by North American nationals in commercial fisheries for bottomfish in the Bering Sea and Aleutian Islands is confined mainly to the relatively small longline fishery for halibut by United States and Canadian fishermen. Some crab vessels may also fish bottomfish occasionally for use as crab bait. A brief, one-vessel exploratory effort occurred for sablefish in the southeastern Bering Sea in 1977. The native subsistence fishery mainly utilizes non-demersal species such as herring and salmon.

5.2.1.2 Description of vessels and gear

The domestic cod fishery was carried out mainly to sailing schooners ranging in length from 30-46 m and equipped for dory fishing (Alverson et al. 1964). The dories were approximately 4 m in length and operated by a single fisherman using handlines to take cod.

Most of the halibut fishing vessels are schooners or seine-type vessels that are over 30 net tons and land their catch in major ports. Smaller vessels out of Unalaska and Adak also fish halibut but these vessels account for less than 10% of the total landings. There is also a small subsistence fishery in the Pribilof Islands and a few other locations, but little is known about the vessels or catch involved.

Table 2. Number of U.S. and Canadian vessels over 5 net tons that fished halibut in the Bering Sea, 1930-1977.

Year	United States	Canada
1930	3	-
1931	8	-
-	-	-
1933	1	-
-	-	-
1945	1	-
-	-	-
1950	1	-
-	-	-
1952	9	-
1953	6	-
1954	2	-
1955	1	-
1956	3	2
1957	1	-
1958	7	14
1959	19	20
1960	35	31
1961	34	27
1962	43	33
1963	51	53
1964	36	32
1965	19	15
1966	4	11
1967	17	19
1968	11	17
1969	7	16
1970	6	13
1971	4	13
1972	6	9
1973	7	3
1974	6	1
1975	8	3
1976	10	1
1977	19	1

The halibut vessels use setline gear which consists of a longline on which branchlines (gangions), each with a hook, are attached at regular intervals, usually about every 6-8 meters. A unit of setline gear is called a "skate" and is about 550 m in length. The gear is left on the bottom for periods from 4 to 30 hours (soaking time). Fishing usually is conducted at depths between 90 and 275 m, but may take place as shallow as 27 m or as deep as 550 m.

The vessels and gear used in the Aleutians are similar to those in the Bering Sea although the amount of effort is much less.

5.2.1.3 Catch trends

The numbers of vessels used and estimated catches in the eastern Bering Sea during the history of the domestic cod fishery are given in Table 3. The catches shown in Table 3 are estimates for the Bering Sea in metric tons roundweight as given by Pereyra et al. (1976). The estimates are based on weights of processed products from Cobb (1927) and Bower (1927-53). As indicated by Pereyra et al. (1974) the catches should be considered as approximations because of some uncertainty about the conversion factors used and some portion of the catches may have originated from the Gulf of Alaska.

Numbers of vessels in the cod fishery and estimated catches reached their peak during World War I when the demand for cod was high. During the period of 1915-19, estimated catches ranged from about 12,000 to 14,000 mt. Following this period, catches declined until termination of the fishery in 1950.

Estimated peak catches of cod in the domestic fishery are relatively small when contrasted with those from the recent foreign fisheries in the eastern Bering Sea which have ranged over 50,000 mt in some years.

Table 4 shows the annual catch of halibut in the Bering Sea and Aleutian areas by Canadian and U.S. fishermen from 1930 to 1977. In the Bering Sea, the annual catch was less than 200 mt before 1958, but then rose sharply to about 4,900 mt in 1963. The catch then declined steadily to a low of 173 mt in 1973. Since then, the catch has increased slightly and was about 450 mt in 1977. The decline in catch since 1963 was the

Table 3.--Estimated catches of Pacific cod in the eastern Bering Sea, 1864, 1882-1950[1] (from Pereyra et al. 1976).

Year	Number Vessels	Estimated[2] Catch (mt)	Year	Number Vessels	Estimated[2] Catch (mt)
1864	1	23	1915	13	12,016
			1916	13	13,947
1882	2	673	1917	16	13,946
1883	5	1,944	1918	17	12,719
1884	3	1,867	1919	17	12,140
1885	3	1,510	1920	24	8,576
1886	2	1,219	1921	6	3,102
1887	1	944	1922	10	5,923
1888	2	1,500	1923	17	8,951
1889	0	0	1924	15	9,889
1890	1	245	1925	14	10,489
1891	6	2,102	1926	7	9,924
1892	6	3,316	1927	7	6,887
1893	4	1,658	1928	8	7,083
1894	5	2,699	1929	9	7,851
1895	5	2,638	1930	8	7,674
1896	7	3,633	1931	4	4,314
1897	8	4,337	1932	5	4,692
1898	4	1,745	1933	5	5,779
1899	7	3,995	1934	7	6,361
1900	8	4,168	1935	5	5,713
1901	7	4,015	1936	5	5,008
1902	12	6,270	1937	4	4,885
1903	10	6,116	1938	3	3,963
1904	11	6,400	1939	3	3,960
1905	16	8,654	1940	4	4,129
1906	11	7,758	1941	3	2,940
1907	9	6,216	1942	1	814
1908	11	7,643	1943	0	0
1909	12	8,511	1944	1	656
1910	9	6,589	1945	1	639
1911	10	7,867	1946	2	997
1912	9	5,485	1947	2	1,041
1913	9	6,180	1948	1	1,006
1914	13	9,817	1949	1	850
			1950	1	668

1/ Original catch data in numbers of fish for 1864, 1882-1925 from Cobb (1927) and weight of cured products for 1926-1950 from Bower (1927 1953) are converted to round weight in metric tons from conversion factors provided by Cobb (1927).

2/ Catches for 1916 to 1925 also include offshore catches from the North Pacific Ocean.

Table 4. Catch of halibut by Canadian and U.S. vessels in the Bering Sea and Aleutian areas, 1930-1977. Catch in metric tons, round weight.

Year	Bering Sea			Aleutian		
	Canada	U.S.	Total	Canada	U.S.	Total
1930	-	62	62	-	-	-
1931	-	62	62	-	-	-
-	-	-	-	-	-	-
1933	-	11	11	-	-	-
-	-	-	-	-	-	-
1945	-	3	3	-	-	-
-	-	-	-	-	-	-
1952	-	152	152	-	-	-
1953	-	137	137	-	-	-
1954	-	24	24	-	-	-
1955	-	27	27	-	-	-
1956	51	107	158	-	-	-
1957	-	24	24	-	-	--
1958	731	582	1,313	-	-	-
1959	1,442	1,065	2,507	-	-	-
1960	2,016	1,392	3,408	10	-	10
1961	1,163	1,231	2,394	-	-	-
1962	2,113	2,304	4,417	-	12	12
1963	2,886	2,022	4,908	38	-	38
1964	758	647	1,605	-	1	1
1965	356	449	805	-	-	-
1966	385	336	721	45	-	45
1967	668	776	1,444	-	9	9
1968	402	395	797	5	-	5
1969	404	340	744	-	53	53
1970	536	148	684	33	32	65
1971	440	83	523	-	1	1
1972	149	293	442	7	12	19
1973	58	115	173	28	-	28
1974	101	162	263	60	3	63
1975	102	215	317	3	-	3
1976	37	278	315	56	11	67
1977*	84	366	450	162	16	178

*preliminary

result of reduced abundance and restrictions on the fishery. In years of high production, the catch was split about evenly between Canadian and U.S. vessels although since 1972 the U.S. share has been larger.

There was no catch reported in the Aleutian area before 1960. Until 1976, annual catches fluctuated between 1 and 67 mt; in 1977 preliminary data indicate a catch of 178 mt.

5.2.2 Foreign Fishery

5.2.2.1 General description of fisheries

Nationals from six foreign countries have conducted groundfish fisheries in the eastern Bering Sea and Aleutian Islands. One of these, the Canadian halibut fishery, was previously described under the domestic fishery because of its small size and similarity to the U.S. fishery for halibut. Of the other foreign fisheries, Japan has had the longest history of exploitation in the region and has mounted the greatest effort over the years. The first documented fishery for demersal species by the Japanese in the eastern Bering Sea dates back to an exploratory effort in 1930. This was followed by a relatively small-scale fishery which had its origin in 1954. Excluding Canada, the second foreign nation to send demersal fishing fleets to the eastern Bering Sea and the nation having the second largest removals of groundfish in the region has been the USSR. Their fisheries commenced in 1958.

In 1966 a trawler from the Republic of Korean (ROK) explored fishing grounds in the eastern Bering Sea and Aleutian Islands. A commercial operation followed in 1967 but the number of vessels and magnitude of the catch by ROK fishermen has remained much smaller than that by Japan and the USSR. The Republic of China (Taiwan) has also had a fishery in the eastern Bering Sea since late 1974, but involving only one or two trawlers.

Polish vessels fished briefly in the eastern Bering Sea in 1973 (Law Enforcement Division 1975). Since then, Poland has agreed to abstain from further fishing in the eastern Bering Sea. Although allowed to fish in certain waters of the Aleutian Islands, Polish vessels have not operated there.

5.2.2.1.1 Japanese fishery

Following the inital exploratory effort by two trawlers in 1930, the Japanese returned to the eastern Bering Sea with a mothership-catcher boat operation in 1933 (Forrester, et al. 1974). The fleet was composed of an 8,000 ton mothership and several catcher boats including 400 gross ton side-trawlers and 88 gross ton pair trawlers. Fishing was off Bristol Bay with the emphasis on pollock for the production of fish meal. The catch was processed aboard the mothership and transported back to Japan aboard transport vessels. This fishery continued to operate until 1937 when prices of fish meal declined causing the fisheries to terminate. Catches in this period ranged up to 43,000 mt with pollock the major species taken.

A second mothership-type operation was conducted in the eastern Bering Sea by Japan in 1940-41 (Forrester, et al. 1974). Target species was yellowfin sole that were frozen for human consumption. Catches in the two-year period ranged from 9,600 to 12,200 mt (Table 5).

With the signing of the peace treaty between the United States and Japan in 1952, restrictions on Japanese distant-water fisheries were removed, and in 1954, fishing in the eastern Bering Sea was resumed. The Japanese post-war fishery for groundfish developed into several components, the four principal ones being the mothership fishery, North Pacific trawl fishery, North Pacific longline-gillnet fishery, and the landbased trawl fishery.

The number of mothership fleets and number of vessels in the other fisheries are given in Table 6 along with a descripton of each type of fishery in the accompanying footnotes. As shown in Table 6, the mothership fishery can be divided into four additional types depending on the target species and processing methods. These are the freezing fleets which targeted on flounders in the period 1954-60; the freezing fleets operating since 1960 that continued to target on flounders, but also targeted on other spcies, the meal and minced fish fleets which originally took flounders for fish meal, but since 1964 have targeted on pollock for the production of minced fish, as well as fish meal and the longline-gillnet fleet which took halibut, cod, sablefish and herring for freezing.

Table 5.—Number of Japanese vessels operating in the eastern Bering Sea and their catches, 1933–37 and 1940–41 (from Forrester et al., 1974).

Year	Number of fleets	No. of catcher boats: Total	Trawl	Pair trawl	Catch (metric tons): Total	Flat-fishes	Pacific pollock	Other fishes
1933	?	5	5	—	3,300	?	?	?
1934	1	5	5	—	14,953	1,385	11,645	1,923
1935	1	11	3	8	28,629	2,869	23,553	2,207
1936	1	8	4	4	26,622	1,003	23,000	2,610
1937	1	13	3	10	43,383	9,310	31,316	2,757
1940	1	8	—	8	9,577	6,941	24	2,612
1941	1	12	4	8	12,226	9,839	1,287	1,100

[illegible] Japanese North Pacific trawl and longline-gillnet fisheries and landbased trawl fishery (data from Forrester et al. 1976; Yamaguchi 1974, 1975; Sasaki 1977).

	Number of mothership fleets					Number of independent vessels		
Year	Freezing fleet1/ for flounders only)	Freezing fleet2/ (including other than flounder)	Meal and mince-fleet3/	Long-line-gill-net fleet4/	Total	North Pacific trawl fishery5/	North Pacific longline-gillnet fishery6/	Land-based trawl fishery7/
1954	2	—	—	—	2	2	—	—
1955	2	—	—	—	2	3	—	—
1956	4	—	—	—	4	1	—	—
1957	4	—	—	—	4	—	—	—
1958	2	—	1	1	4	—	—	—
1959	4	—	1	1	6	2	—	—
1960	3	1	5	4	13	—	—	—
1961	—	13	5	14	32	3	—	54
1962	—	11	5	5	21	2	—	70
1963	—	10	2	5	17	2	—	93
1964	—	6	4	2	12	2	—	103
1965	—	6	4	2	12	2	—	126
1966	—	8	4	1	13	2	—	172
1967	—	7	5	2	14	42	22	173
1968	—	6	5	1	12	42	22	184
1969	—	5	5	1	11	42	21	182
1970	—	3	6	1	10	42	22	182
1971	—	5	6	1	12	42	22	182
1972	—	4	6	8/	10	42	22	182
1973	—	4	6	—	10	42	26	182
1974	—	4	6	—	10	42	30	182
1975	—	3	5	—	8	35	27	182
1976	—	3	5	—	8	54	32	182

1/ Flounder fleet: The fleets, each composed of a mothership of 7,000-9,000 tons, equipped with freezing facilities and having several 300-ton class trawlers attached to it, caught mainly yellowfin sole for freezing off Bristol Bay.

2/ Freezing fleet: The fleets, each composed of a mothership of 5,000-10,000 tons with freezing equipment, accompanied by trawlers as well as Danish seiners, which also fished longlines and gillnets, caught halibut, blackcod, herring, Pacific ocean perch, etc. These fleets operated along the continental slope between Unimak Pass and Cape Navarin, in the Gulf of Olyutorskii, and in Aleutian waters.

Table 6.--(continued)

3/ Fish meal (minced fish) fleet: The fleets, each composed of a mothership of 9,000-14,000 tons, equipped with fish-meal plants, accompanied by 20-30 pair trawlers and Danish seiners, caught yellowfin sole on the eastern Bering Sea flats, and turbot along the continental slope in the eastern Bering Sea for production of fish meal. From 1964, the fleet switched to production of minced fish with a minced-fish plant, utilizing pollock caught in the eastern Bering Sea. The fleet also has freezing facilities and produces frozen fish.

4/ Longline-gillnet fleet: The fleets, each composed of a small mothership of 200-2,500 tons, accompanied by gillnetters and longliners, caught halibut, cod, blackcod, and herring to be frozen. The fishing grounds were along the continental slope from the Pribilof Islands and Cape Navarin-Gulf of Olyutorskii.

5/ North Pacific trawl fishery: This fishery is conducted by independent large trawlers, and the catch is frozen on board. The number of trawlers larger than 3,000 tons engaged in this fishery, on board which minced fish and fish meal are produced, has increased since 1968. Transport vessels were not used in this fishery until 1966. However, since 1967 a considerable number of transport ships have been used to carry the products of this fishery. The figures for 1967 and thereafter indicate the numbers of vessels licensed for this fishery.

6/ North Pacific longline-gillnet fishery: This fishery is conducted by independent longline-gillnetters, and the catch is processed on board. When filled with frozen products they return to their bases in Japan. The numbers of vessels in this table are the numbers licensed annually for this fishery.

7/ Landbased trawl fishery: This fishery consists of independent operations by Danish seiners and stern trawlers of 100-350 tons. The vessels process the catch on board, produce frozen goods, and return to Japan when they are filled. Extensive areas, including the Okhotsk Sea and waters around the northern Kurile Islands, are permitted for their operation. The number of vessels operated in the Bering Sea is not known. The figures in this table indicate the number of vessels licensed.

8/ From 1972-76 these fleets are included in the freezing fleets.

The mothership fishery has accounted for the largest share of the Japanese catch in the Bering Sea since 1954. In the recent period of 1971-76 the mothership fishery took 64% of the total catch, the North Pacific trawl fishery 31%, the land-based fishery 5%, and North Pacific longline-gillnet fishery 0.3% (Sasaki 1977).

Mothership fishery.--Forrester et al. (1974) divided the history of the mothership fishery into three periods based on target species, methods of processing catches, and expansion of fishing grounds.

In the first period (1954-57), the fishery was relatively small involving two to four 8,000 gross ton motherships of the freezer-factoryship type and trawlers of the 200-300 ton class as catcher boats. The fleets operated for about one month between August and October between the salmon driftnet and Antarctic whaling seasons. Fishing was off Bristol Bay and the catch, consisting of flounders (primarily yellowfin sole) was frozen.

In the second period (1958-63), the fishery expanded throughout the Bering Sea with diversification of fishing methods and target species (Table 6). Fish meal operations were initiated in 1958 utilizing flounders in the eatern Bering Sea which were processed by 9,000 gross ton motherships operating from April to September. Each mothership was supplied with fish by 20 Danish seiners and pair trawlers. The freezing fleets described in the previous period also continued to fish and catches of yellowfin sole reached their peak in this period, ranging between 4?0,000 and 554,000 mt annually in 1960-62 including catches by the USSR.

Another mothership operation beginning in the 1958-63 period was the longline-gillnet fishery consisting of 500 gross ton motherships and 100 gross ton longliners. These vessels fished for halibut and sablefish for freezing along the continental slope off Cape Navarin starting in 1958. In 1960 they began fishing operations for Pacific ocean perch along the continental slope between the Pribilof Islands and Cape Navarin and in 1963 expanded their area of operations to Bowers Banks off the Aleutian Islands.

The fleets involved in the yellowfin sole fishery for freezing also extended their operations to include halibut, sablefish, and Pacific ocean perch and together with the longline-gillnet fleets expanded their area of operations to the continental slope in the central and northern Bering Sea and to Aleutian Island waters. The fishing season which had previously been about one month was lengthened to four to nine months and winter fishing was initiated in 1961-62.

The third period (1964 to present) is characterized by the development of the pollock fishery. With the decline in abundance of yellowfin sole (due to overfishing in the early 1960's), and the development in 1964 of techniques for processing minced fish (surimi) on-board motherships, the main Japanese effort shifted to pollock. Fish meal and frozen products became a by-product of these operations. Pollock has dominated Japanese catches since 1962 and from 1971-76 has formed over 80% of the total Japanese groundfish catch in the eastern Bering Sea and Aleutian Islands area. The pollock fishery has become a year-around effort while the flounder fishery principally for yellowfin sole became a winter fishery in 1969-70 with the season generally lasting from October to March. Catcher boats in the mothership fishery have been pair trawlers, Danish seiners, side-trawlers, and stern trawlers. Side-trawlers have been phased out of the fishery and the number of Danish seiners has declined with pair trawlers becoming the mainstay of the fleet.

The winter fishing grounds for flounders were mainly north of Unimak Island and occasionally west and east of the Pribilof Islands. The major fishing grounds for pollock have been along the outer continental slope and upper slope from Unimak Pass northwestward toward Cape Navarin. Typical fishing areas of the mothership fishery are shown in Figure 5.

North Pacific trawl fishery.--This second major type of Japanese fishery consists of independent factory trawlers larger than 500 tons that both fish and process their own catch (Forrester et al. 1974). Products are minced fish, frozen fish, and fish meal. The products are transshipped to Japan by refrigerated transport.

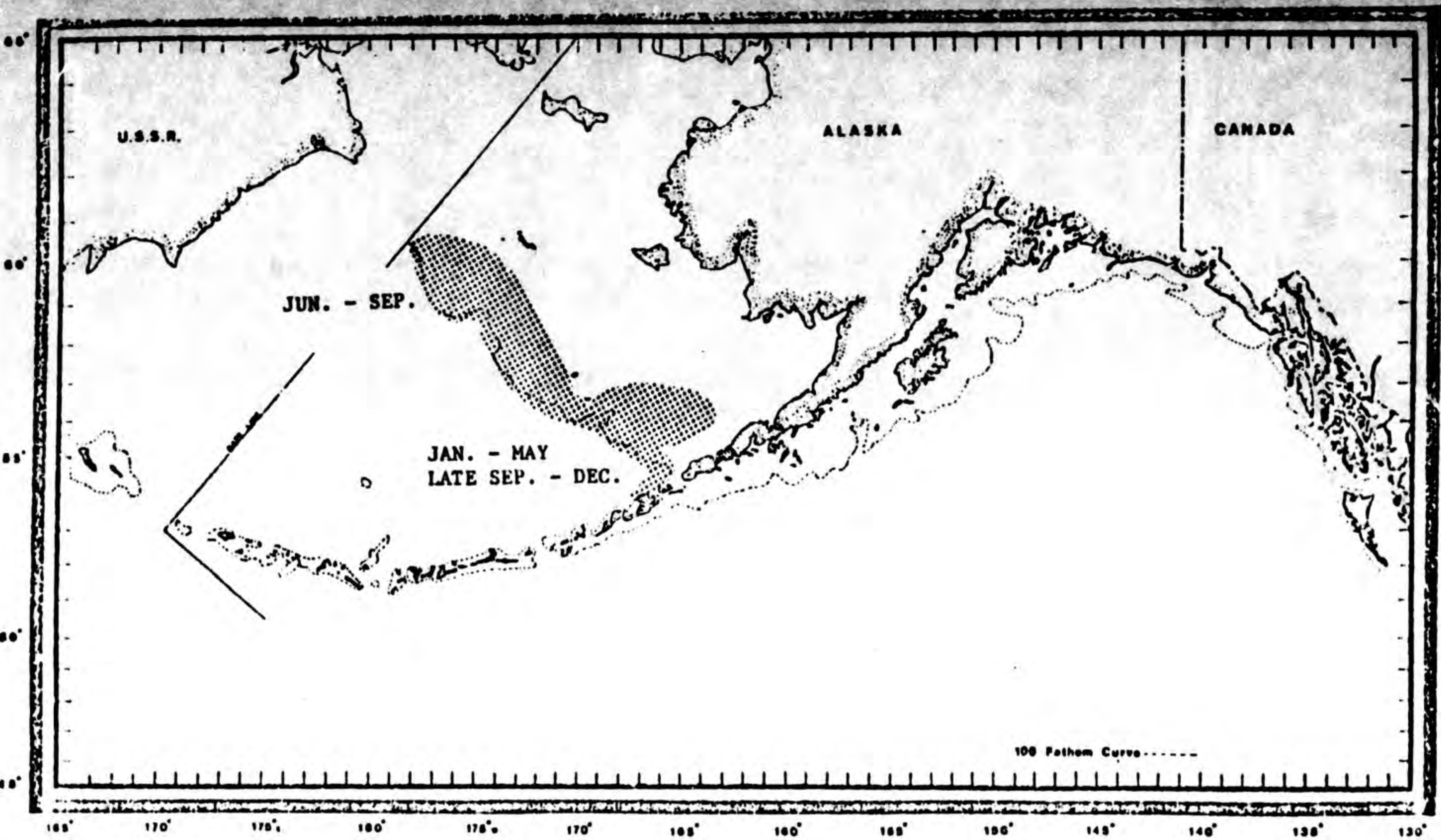


Figure 5.--Areas fished by the Japanese mothership fleets in 1972 (from Law Enforcement Division 1974).

In the intial period of this fishery (1954-59), one to three independent trawlers fished in the eastern Bering Sea for yellowfin sole. Since 1961 they have also exploited (for freezing) halibut, sablefish, Pacific ocean perch, and other species along the continental slope in the central and northern Bering Sea and in Aleutian Island waters. In 1967 the number of licenses issued for independent trawlers was increased to 42 and has ranged from 35 to 54 in later years (Table 6). Greater numbers of larger trawlers in the 3,000-5,000 ton class (equipped with machinery for producing surimi) resulted in a rapid increase in the pollock catch by this fishery. By 1970, 80% of the total groundfish catch by these vessels was pollock.

The main effort by the independent trawlers is in the eastern Bering Sea where year-around operations are conducted for pollock. Other species taken are cod and various flounders. The number of vessels generally increase from a low in mid-winter to a peak in summer invovling from 20 to 40 trawlers (Enforcement and Surveillance Division 1971 and 1973; Law Enforcement Division 1974, 1975, and 1977).

In the Aleutian Islands the trawlers target on Pacific ocean perch and take lesser amounts of pollock and various other groundfish. Fishing in the Aleutians is concentrated along the shelf edge in the central and western part of the chain with some effort in the eastern Islands. Maximum effort is in summer or early fall with the number of vessels reaching 7 to 18 in peak months (Enforcement and Surveillance Division 1971 and 1973; Law Enforcement Division 1974, 1975, and 1977).

Areas of the fishery are illustrated in Figure 6.

North Pacific longline-gillnet fishery.--Herring and sablefish are the principal species taken by this fishery. The vessels operate independently, and when filled with fresh fish or frozen products, return to Japan. From 1963 to 1966 there were 18-19 vessels licensed in this fishery to operate north of 50°N and between 170°E and 170°W, but records of the number of vessels actually operating, the areas of operation, and the species taken are not available (Forrester et al. 1974).

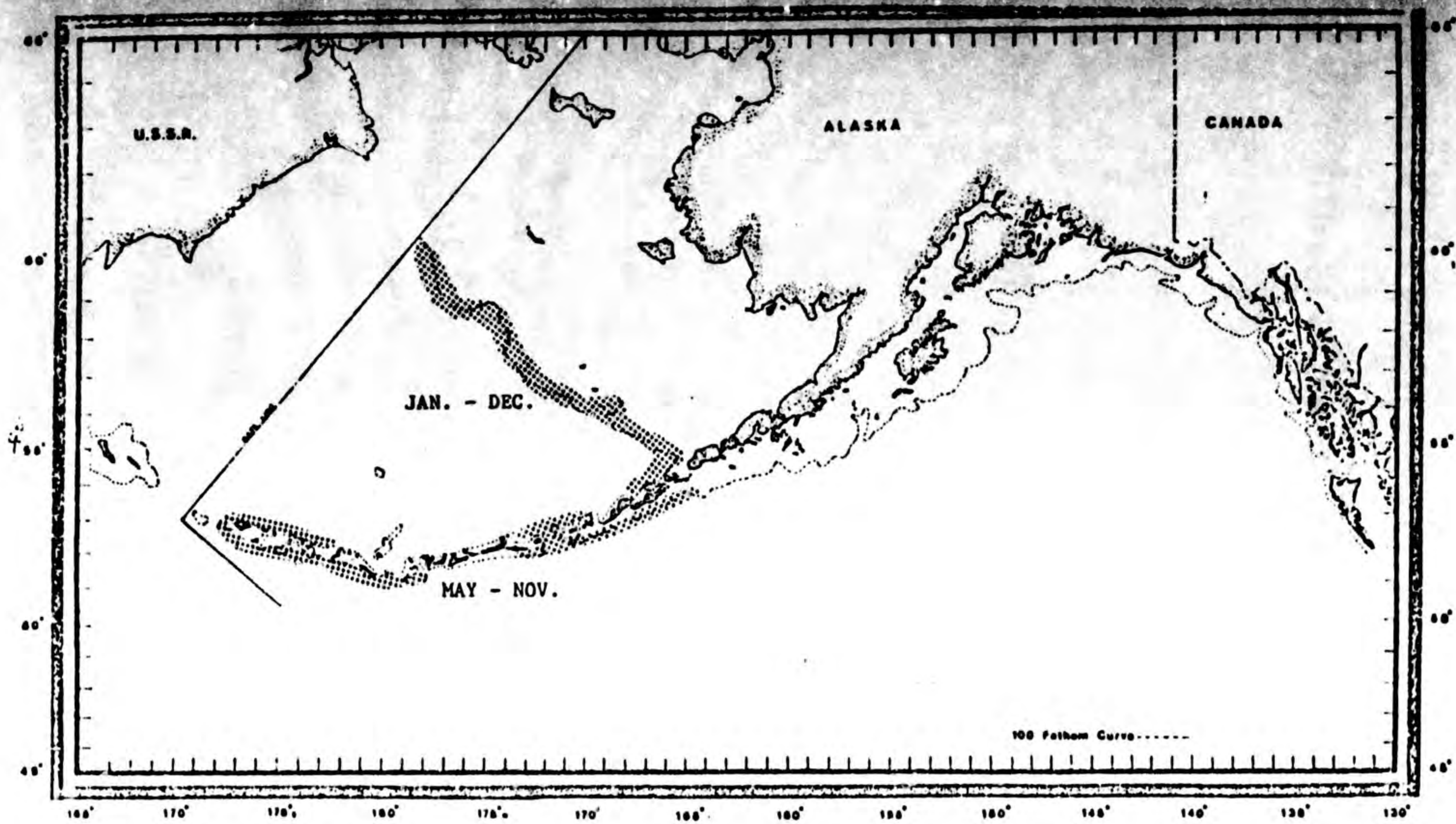


Figure 6.--Areas of the eastern Bering Sea and Aleutian Islands fished by the Japanese North Pacific trawl fishery (Law Enforcement Division 1974).

In 1967 the number of longline-gillnet vessels licensed was increased to 22. Fishing by these 200-500 gross ton vessels has mainly been in the northeastern Pacific ocean where the catch was almost exclusively sablefish with some rockfish taken. The vessels operate year-around and normally remain on the grounds for two to four month periods until their hold capacity of about 400 mt is reached (Law Enforcement Division 1974).

Fishing for sablefish in the eastern Bering Sea and along the Aleutian Islands by the North Pacific longline vessels has been sporadic with only a few vessels fishing briefly each year. The areas of fishing in these regions as well as in the Gulf of Alaska in 1974 are shown in Figure 7.

Landbased trawl fishery.--This fishery, conducted by independent trawlers of 100-350 tons are prohibited by regulation from transshipping their catch in offshore waters (Forrester et al. 1974) and therefore return to Japan when storage capacity is filled. Their catches are chiefly flounders, Pacific ocean perch, and sablefish. When initiated in the early 1960's, the fishery was restricted to waters north of 48°N and between 153°E and 170°E. In June 1963 the area was expanded eastward to 175°W and in September 1967 to 170°W. Major fishing grounds are along the continental slope from Cape Olyutorskii to Cape Navarin and off the Pribilof Islands. Gear consisted mainly of Danish seines early in the fishery but stern trawls became the major gear in later years. From the 54 vessels licensed to operate in the fishery in 1961, the number grew to 184 in 1968 and has been 182 since 1969 (Table 6). The number of licensed vessels actually operating in this fishery is unknown.

5.2.2.1.2 Soviet fishery

The first commercial-scale operations by the USSR off Alaska, following exploratory work in 1957-58, was a fishery for flounders in the eastern Bering Sea starting in 1959 (Chitwood 1969). Like the Japanese, the Soviets have expanded their fisheries since its inception in terms of effort, target species, and fishing areas. There have been three major groundfish fisheries in the eastern Bering Sea and Aleutian Islands: a flounder fishery in the southeastern Bering Sea, a rockfish

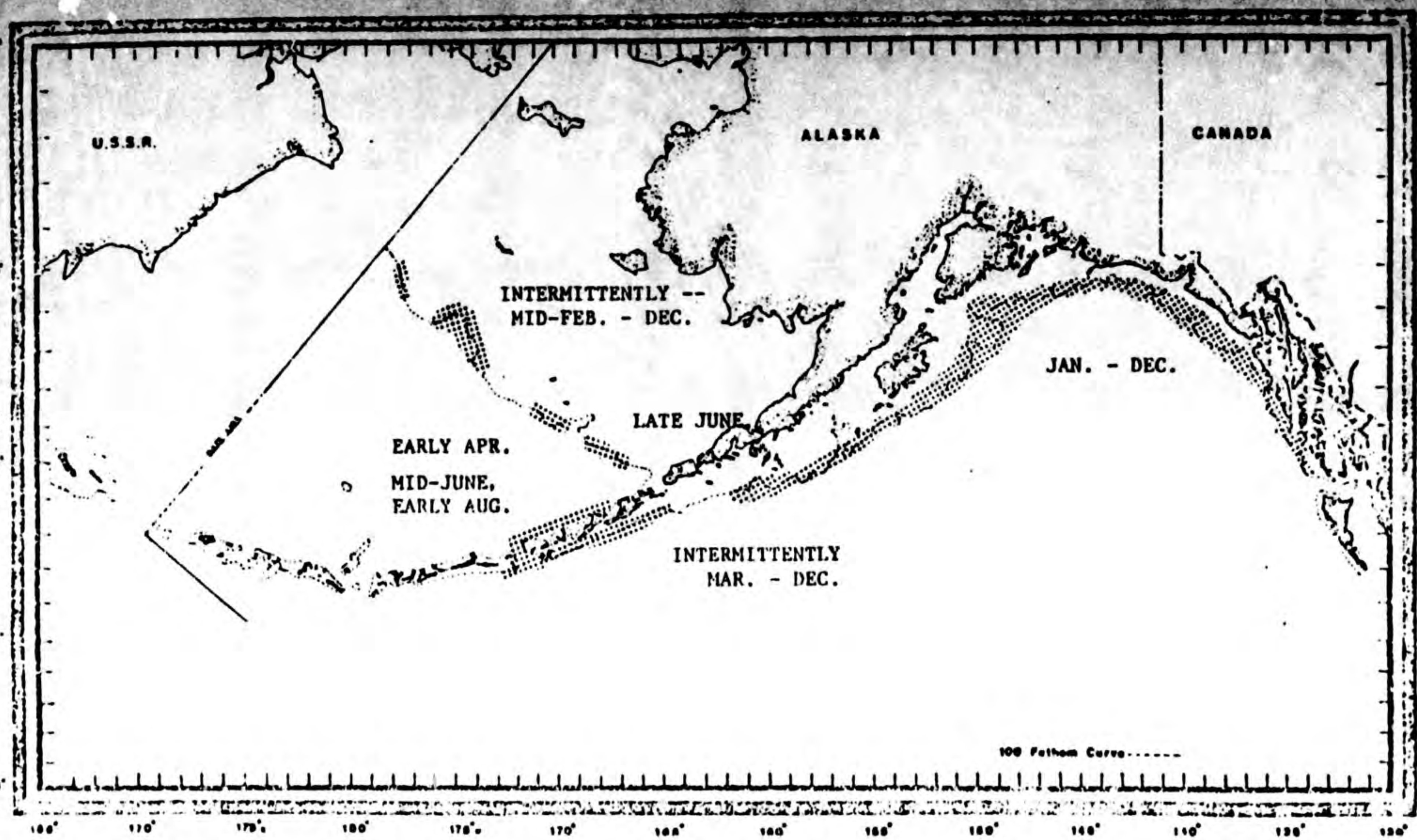


Figure 7.--Areas fished by Japanese North Pacific longline vessels in 1974 (Law Enforcement Division 1977).

fishery primarily in the Aleutian Islands, and a pollock fishery along the other continental shelf from Unimak Pass to northwest of the Pribilof Islands. In describing these fisheries, information is used from Chitwood (1969), Forrester et al. (1974), Haskell (1964), Office of Enforcement and Surveillance (1965, 1967-70), Enforcement and Surveillance Division (1971, 1973), and Law Enforcement Division (1974, 1975, 1977).

Flounder fishery.--The Soviet flounder fishery was a winter operation throughout its history extending usually from November to April and peaking in February or March. The fishing grounds (Figure 8) were in areas where aggregations of yellowfin sole and other flounders form in winter after migrations from shallower waters of the inner shelf. The primary target species was yellowfin sole which comprised a high proportion of the catches with other flounders such as rock sole, flathead sole, Alaska plaice, starry founder, and arrowtooth flounder making up most of the remainder. Vessels participating in this fihsery have ranged from smaller side trawlers (SRT) to medium (SRTM) and large independent stern trawlers (BMRT) and support vessels (see Section 5.2.2.2 for description of vessel types). Side trawlers delivered this catches to factory ships or processing refrigerated transports, which froze the fish for later transport to the Soviet Union. The larger trawlers freeze their own catches.

The first few years of the Soviet flounder fishery (1959-63) involved about 30 trawlers supported by a factory ship and refrigerated transport vessels. Catches in that period probably ranged between 60,000 and 155,000 mt. In the next three years effort was increased in this fishery with the number of trawlers rising to 40 in 1964, 50-60 in 1965, and 70-100 in 1966. The fishery peaked in terms of numbers of trawlers from 1966 and 1968 with the maximum number reaching 70-100 in the peak months of fishing in January, February or March. In those peak years, the flounder fishery represented the largest effort by the Soviets in Alaskan waters.

Starting in 1969, the Soviet effort for flounders generally declined, presumably because abundance of yellowfin sole was lower than in previous

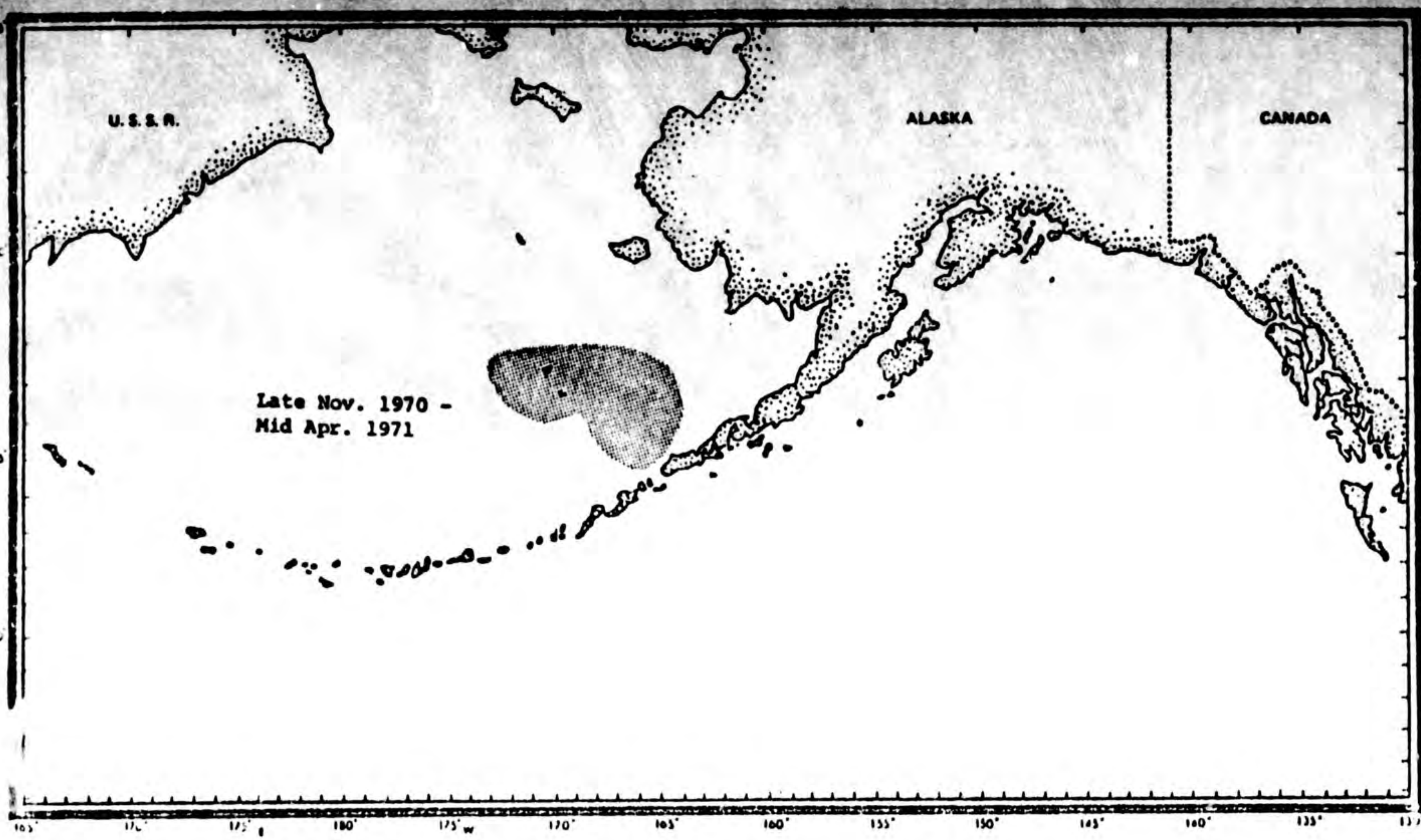


Figure 8.--USSR fishing area for flounders in the eastern Bering Sea in 1971 (Enforcement and Surveillance Division 1973).

years. The numbers of vessels in peak months decreased to between 50 and 80 in 1969-72. Although a peak of 70 vessels fished in 1972, there was a sharp drop in catches of flounders to about 13,000 mt from over 70,000 mt or more in the previous three years. In 1973 the flounder fishery failed to develop. Effort was limited to a two-week period by four trawlers. The Soviets have not resumed this fishery to the present time.

Pacific ocean perch fishery.--The Soviet fishery for Pacific ocean perch and other rockfish begain in 1960 when 25 to 30 trawlers fished along the edge of the continental shelf in the eastern and central Bering Sea. In subsequent years the fishery became centered in the Aleutian Islands and Gulf of Alaska (Figure 9). The Aleutian Island fishery has been mainly by larger BMRT factory trawlers fishing along the continental shelf edge at depths of about 15-280 m. Catches were headed, eviscerated, and frozen until transferred to refrigerated transport vessels for delivery to the Soviet Union.

Following concentration of effort for Pacific ocean perch in the Aleutians and Gulf of Alaska in 1963, directed effort to Pacific ocean perch in the eastern Bering Sea decreased and was eventually eliminated. Catches from this region in later years were a by-catch of the pollock fishery. The early years of the Aleutian Island fishery were the most productive with reported catches of 61,000 mt in 1974 and 71,000 in 1965. Although the catch increased in 1965, the catch per trawler declined and search time for concentrations of perch increased substantially.

Whereas the fishery was continuous through 1965, effort in 1966 was sporadic, apparently because of reduced abundance of rockfish. The effort in 1967 and 1968 was approximately the same as in 1966 with fishing starting in spring months and continuing through the end of the year. In 1969 there was further reduction in effort with only one-half to two-thirds the number of vessels fishing compared to 1968. This level of effort generally continued in the next few years with relatively few vessels targeting on Pacific ocean perch, and then for relatively short periods in widely separated areas of the Aleutian Islands. By

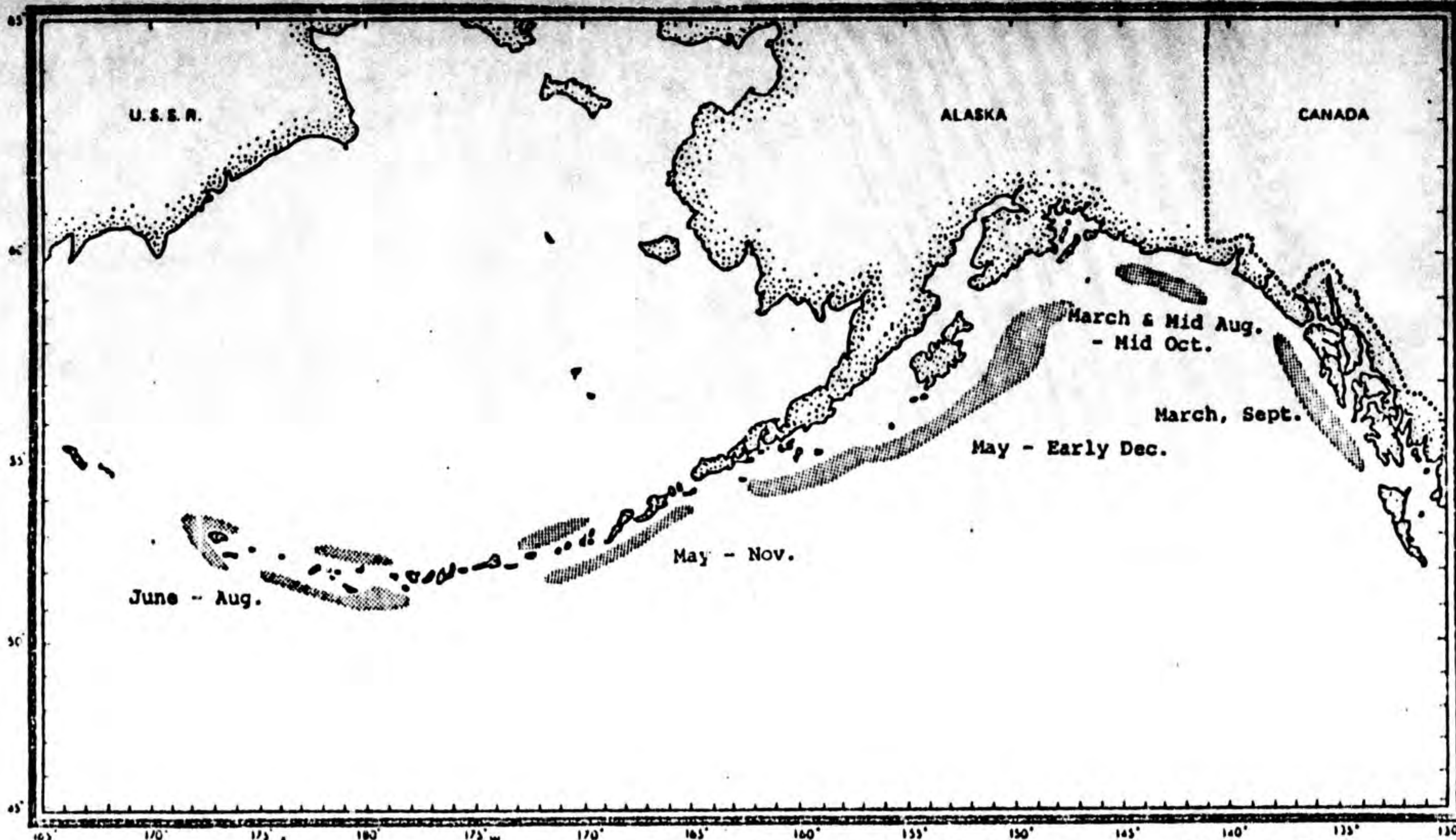


Figure 9 .--Areas fished for Pacific ocean perch by the USSR in 1971 (Enforcement and Surveillance Division, 1973).

1973 and 1974 the fishery was at an extremely low level with catches of only about 3,000 mt in 1973 and 800 mt in 1974. Catches in 1975 and 1976 were somewhat higher, ranging from 7,000 - 8,000 mt.

Pollock fishery.--The fishery that eventually developed into the pollock fishery began in 1967, but initially targeted on sablefish and large flounders (arrowtooth flounder and Greenland turbot) in the region immediately north of the eastern Aleutian Islands. Fishing was at depths of about 550 to 730 m on the fairly extensive deep-water plateau in the area immediately north of Dutch Harbor in the eastern Aleutian Islands. This fishery was continued in 1968, but the area of fishing was extended north along the edge of the continental shelf to the central Bering Sea. Sablefish and arrowtooth flounder were the principal species taken just north of Dutch Harbor, but farther north, pollock, cod, rockfish, and various flatfish were principal species. In 1969, this fishery became a year-around operation and took on the general appearance that has characterized the fishery to the present time. Vessels utilized in the fishery changed from primarily medium-sized SRTM trawlers to also include the smaller SRT trawlers and large BMRT trawlers. The two larger type trawlers processed their own catches and periodically off-loaded to refrigerated transports for shipment to the USSR. The SRT side trawlers off-loaded their catches to factory ships and other support ships for processing. The fishing area became relatively standardized (Figure 10) with two principal areas used, the first immediately north of the eastern Aleutian Islands and the other northwest of the Pribilof Islands. Effort normally peaked in late winter when fishing vessels from the herring and flounder fishery joined the pollock fleet.

In 969 and 1970 the fishery targeted on arrowtooth flounder, sablefish, and pollock with incidental catches of cod, rockfish, and other bottomfish. Emphasis of the fishery shifted mainly to pollock in 1971 with catches rising from about 36,000 mt in 1970 to 234,000 mt in 1971. Pollock has remained the predominant species in the catch to the present time. Peak catches of pollock occurred in 1974 when almost 310,000 mt was taken. Catches of other species since 1972 have not exceeded 20,000 mt annually with the exception of rockfish in 1974 at 32,000 mt and rattails at 48,000 in 1972. Large catches of rattails were taken in 1972.

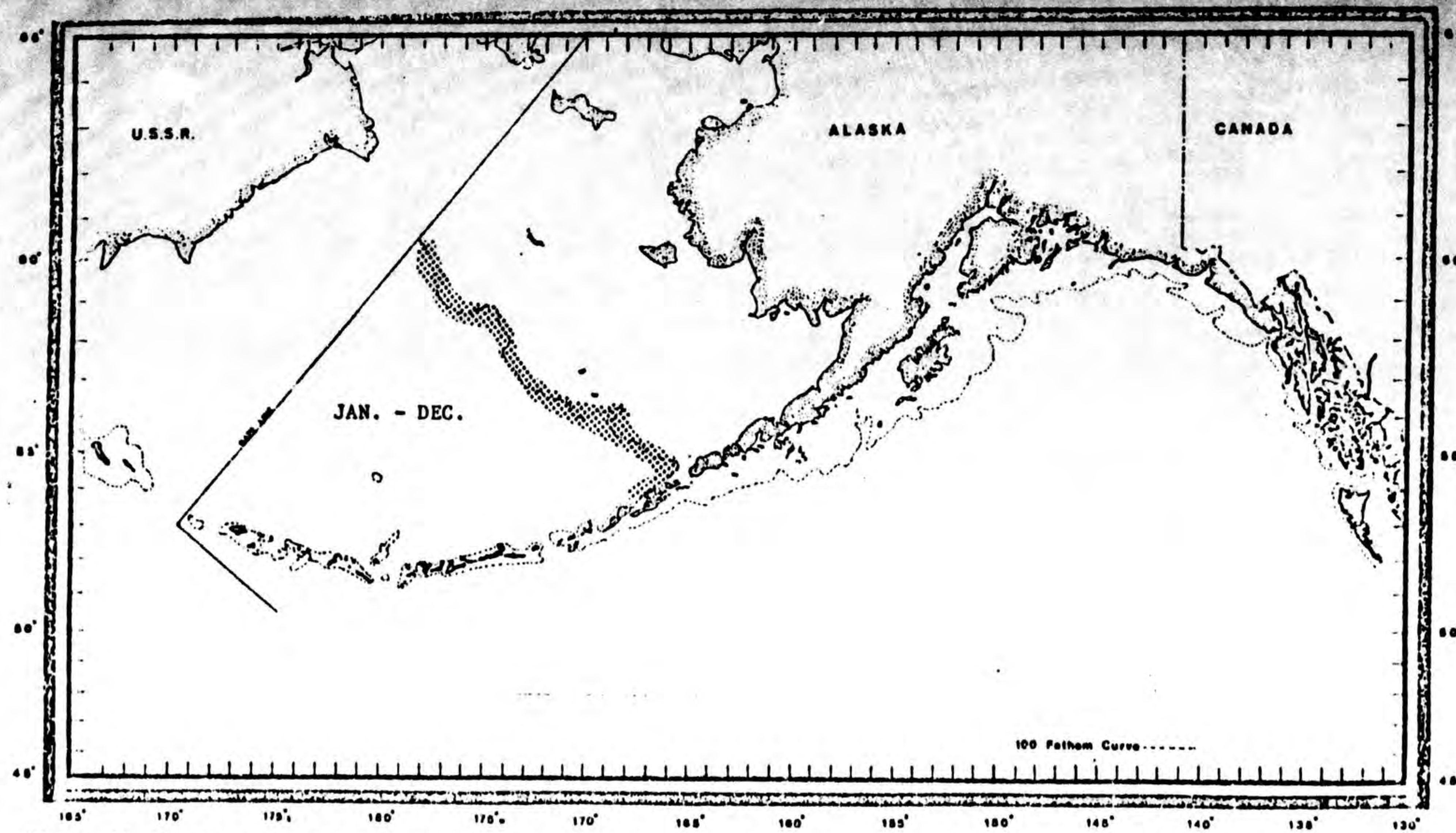


Figure 10.--Fishing areas in the eastern Bering Sea for the USSR fishery targeting mainly on pollock (Law Enforcement Division 1974).

The USSR has continued to trawl along the Aleutians in recent years, but at a relatively low level of effort. Major species in the catches besides rockfish have been pollock and Atka mackerel. Atka mackerel has become a target species of this fishery in winter and spring months.

The monthly range in numbers of vessels employed in the USSR fishery in the eastern Bering Sea and Aleutian Islands is given in Table 7. Peak periods of fishing in the eastern Bering Sea have been in winter, usually in February. In the Aleutian Islands the peak period of fishing has varied, reflecting apparent changes in target species or other factors.

5.2.2.1.3 Korean (ROK) fishery

Fisheries by the Republic of Korea in the eastern Bering Sea and Aleutian Islands have been much smaller than those of Japan and the USSR (Office of Enforcement and Surveillance 1968, 1969 and 1970; Enforcement and Surveillance Division 1971 and 1973; Law Enforcement Division 1974, 1975 and 1977). Following exploratory fishing in these regions in 1966, an ROK fleet returned to Alaskan waters in September-November 1967 with a commercial operation consisting of a refrigerated transport vessel and eight pair trawlers. The operation was plagued by bad weather and tragedy. Crew members and two of the pair trawlers were lost enroute to the fishing grounds in a storm south of the Aleutian Islands. Continued stormy weather permitted only five days of fishing, two of which were south of Unimak Island and the remainder in the Gulf of Alaska.

The ROK expedition was more successful in 1968 conducting operations around the eastern Aleutian Islands and west of the Pribilof Islands from May to July. The fleet, targeting on pollock, consisted of a processor, six pair trawlers, and a refrigerated transport vessel. An independent stern trawler also operated in the eastern Bering Sea in 1968, but the purpose of their fishing activity is not known; it may have been exploratory in nature.

In later years the ROK fishing fleet was enlarged to include factory ships and additional pair trawlers and independent stern trawlers, and

Table 7.--Monthly range in number of USSR vessels operating in the eastern Bering Sea and Aleutian Islands in 1966-77 (Office of Enforcement and Surveillance 1967-70; Enforcement and Surveillance Division 1971 and 1973; Law Enforcement Division 1974, 1975, and 1977).

Year	Range in monthly number: Factory ships 1/	Factory stern trawlers	Other trawlers	Support 2/	Total	Month of maximum number
Eastern Bering Sea						
1966	0-14	0-15	0-40	0-3	0-72	Mar.
1967	0-15	0-12	0-60	0-3	0-90	Feb. - Mar.
1968	0-13	0-25	2-60	0-2	2-99	Feb.
1969	0-8	0-50	6-67	1-23	7-147	Feb.
1970	0-7	0-52	8-92	0-22	9-173	Feb.
1971	0-8	0-65	5-87	0-21	6-171	Feb.
1972	0-8	0-39	1-89	0-21	3-155	Feb.
1973	0-6	1-27	6-60	0-6	7-82	Feb.
1974	0-5	4-30	6-51	1-10	14-79	Feb. and Apr.
1975	0-4	4-13	5-36	1-7	13-51	June
1976	0-5	2-30	7-48	0-6	13-86	Apr.
Aleutian Islands						
1966	0-3	0-10	0-10	0-1	0-24	Aug.
1967	0-6	0-12	0-21	0-3	0-42	June
1968	0-4	0-14	0-23	0-1	7-28	Mar.
1969	0	0-7	0-13	0-1	3-14	Jan. and Dec.
1970	0	0-5	0-14	0-1	1-15	Jan.
1971	0	0-6	2-15	0-1	6-17	May
1972	0-1	0-5	3-19	0-1	4-21	Dec.
1973	0	0-4	6-17	0-3	6-20	Apr.
1974	0	0-2	0-19	0-5	0-24	Mar.
1975	0-1	0-30	0-10	0-4	2-33	Sept.
1976	0	0-27	0-4	0-5	0-32	May

1/ Including all processing and refrigerated transport vessels.

2/ Including tankers, tugs, cargo, and repair ships.

eventually longliners and a Danish seiner (Table 8). Based on the number of vessels in the fishery, ROK effort reached its maximum in 1976. The number of vessels shown in Table 8 includes those fishing for herring in the eastern Bering Sea and for other species in the Gulf of Alaska. The principal target species along the edge of the continental shelf in the eastern Bering Sea has continued to be pollock. Some of the trawlers have also fished in the Aleutian Islands for rockfish and pollock. Until 1972, fishing was limited to spring and summer months, but by 1973 the independent stern trawlers had begun to fish in winter months as well. By 1974 the areas of fishing by the trawl fleet had become fairly extensive (Figure 11). Estimates by U.S. surveillance of the ROK fishery indicated that pollock catches ranged between 1,200 and 26,000 mt from 1968 to 1975. The pollock catch reported by the Koreans for 1976 was 85,000 mt in the eastern Bering Sea and 500 mt in the Aleutian Islands area.

An ROK longline fleet, which has mainly fished sablefish in the Gulf of Alaska, began fishing sablefish for brief periods in the Aleutian Islands in 1974. The effort by longliners in Aleutian waters has apparently increased in more recent years.

5.2.2.1.4 Taiwanese (ROC) fishery

The Taiwanese fishery, which began in December 1974, has involved only one or two independent stern trawlers. The trawlers have fished in winter and spring months along the continental shelf edge west and southwest of the Pribilof Islands. The vessels are believed to have targeted on pollock and flounders.

5.2.2.2 Description of vessels and gear

5.2.2.2.1 Japanese fishery

As outlined in Section 5.2.2.1, the Japanese employ two types of operations in their groundfish fishery, fleet operations involving a factory mothership and catcher boats and vessels that operate independently and process their own catch. Vessels used in each of these fisheries are discussed separately.

Table 8.--Number of vessels operating in the Korean groundfish fishery in the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska, 1968-74 (Office of Enforcement ard Surveillance 1969, 1970; Enforcement and Surveillance Division 1971, 1973; Law Enforcement Division 1974, 1975, and 1977).

Year	Pair trawlers	Stern trawlers	Long-liners	Danish seiners	Factory ships	Processors and/or transport vessels	Total
1968	6	1	0	0	0	2	9
1969	7	4	0	0	1	3	15
1970	11	2	0	0	2	2	17
1971	10	3	0	0	1	3	17
1972	0	6	0	0	0	0	6
1973	8	10	1	0	3	0	22
1974	22	5	8	1	2	3	41
1975	0	13	9	1	0	0	23
1976	29	16	12	0	1	0	58

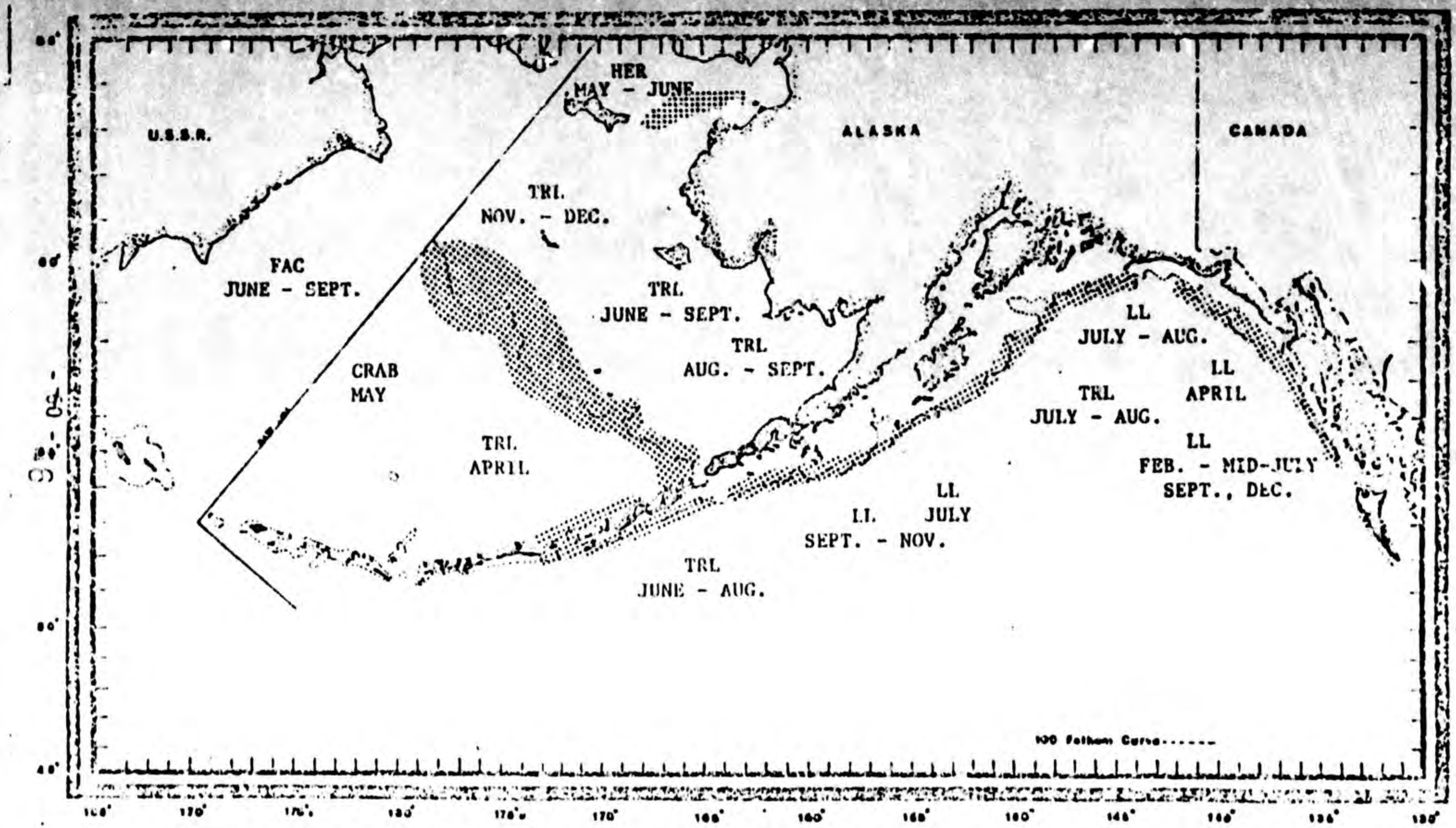


Figure 11.--Fishing areas of the Republic of Korea fisheries in 1974 (Law Enforcement Division 1977).

Types of mothership fleets and the range in size of motherships as reported by Forrester et al. 1974 are as follows:

Type of fleet	Size of Motherships (gross tons)
Flounder freezing fleets	7,000 - 9,000
General freezing fleets	5,000 - 10,000
Minced fish and fish-meal fleets	9,000 - 27,000
Longline-gillnet fleets	200 - 2,500

The motherships are equipped to process catches into such products as frozen fish for human consumption, minced fish (surimi), and meal and oil. Catcher boats supplying the motherships with fish have been of five major types: longline-gillnetters, side trawlers, pair trawlers, Danish seiners, and stern trawlers. Side trawlers have been phased out of the fishery and the number of Danish seiners have declined. Pair trawlers have become the principal vessel type in the freezing and minced fish and fish-meal fleet.

Side trawlers that operated in the fishery were 30 to 52 m long, 150 to 370 gross tons, and had crews of 20 to 30 (Dickinson 1973). The side trawlers usually set and retrieved the trawl from the starboard side, but some were rigged to set from the stern and retrieve to the side. The trawlers usually operated within 55 km of the mothership and used detachable codends so that a number of tows could be made prior to returning to the mothership.

Danish seiners are generally 27 to 46 m in length and 100 to 150 gross tons with crews of 18 to 20 (Dickinson 1973). Danish seiners set the net over the stern and usually retrieve on the port side. The catch is normally brailed aboard, but some newer seiners have stern ramps to haul the catch aboard. Typical gear dimensions of the Danish seiners as determined from a sample of the Japanese fleet are given in Table 9.

Pair trawlers work in two-boat teams, one vessel setting the trawl and the second vessel securing its warp to one wing of the net. When the tow is completed, the net is hauled until one wing can be passed to

Table 9 . Range in size of catcher boats in the Japanese mothership fishery and typical trawl gear used based on a sample of the fleets in 1970 and 1975 (Data for 1969 from Forrester et al., 1974 and for 1975 from Fisheries Agency of Japan 1975).

	Vessels			Typical gear type			
Year	Type	Range in gross tons	Range in horsepower	Headrope length (m)	Groundrope length (m)	Cod-end mesh size (cm)	Otter board size (m)
1970	Danish seine	85 - 300	440 - 850	93	101	7.3	--
1975	Danish seine	96 - 125	450 -1350	115	130	9.0	--
1970	Pair trawl	88 - 195	310 -1200	139	152	9.1	--
1975	Pair trawl	115 - 215	650 -1400	146	162	9.0	--
1975	Stern trawl	297 - 349	1200 -2500	48	57	9.0	1.9 x 3.2

the other vessel to complete the haul. Detachable cod-ends are used on pair trawlers. Older pair trawlers are 27 to 46 m in length and 100 to 150 gross tons with crews of 15 to 20 (Dickinson 1973). Newer pair trawlers are 37 m in length and 185 gross tons with crews of 14 to 16 men. Typical trawl dimensions used by pair trawlers are observed from sampling the fleet in 1970 and 1975 are shown in Table 9. These data indicate that the average size of vessels and gear increased between 1970 and 1975.

Stern trawlers operating as catcher boats in the mothership fishery are mainly of the 300-350 ton class (Table 9). These smaller stern trawlers average 43 to 50 m in length and carry 20 to 30 men (Dickinson 1973).

Vessels in the Japanese groundfish fishery operating independently of the motherships and processing their own catches consist of stern trawlers and longliners. The independent stern trawlers range in size from about 350 gross tons to over 5,000 gross tons (Table 10). The smaller of these trawlers have operated in the flounder and rockfish fisheries while those targeting on pollock in 1974 and 1976 were larger than 2,000 gross tons. Trawl dimensions were greatest for the larger vessels operating in the pollock fishery (Table 10).

An example of a smaller independent stern trawler is a 500 gross ton vessel averaging 52 to 58 m in length and carrying a crew of 20 to 35 men (Dickinson 1973). The vessels are usually equipped with limited processing equipment, ship freezing units, and refrigerated holds. A medium sized independent stern trawler is 1,500 gross tons, averages 70 to 82 m in length, and carries 70 to 90 men. They normally have a large processing area with modern machinery for washing, heading, gutting and filleting the catch. Plate freezers and refrigerated holds are standard equipment along with reduction plants for producing fish meal. The larger stern trawlers of 2,500 to over 5,000 gross tons range in length from 88 m to over 120 m and carry crews of from 90 to 135. These vessels have equipment for heading, gutting, filleting, and skinning the catch and freezing facilities. Most have reduction plants for producing meal and oil and the larger vessels have equipment for producing minced fish.

Table 10.--Range in size of vessels in the North Pacific trawl fishery and typical gear used for principal target species from a sample of the fleet in 1974 and 1976 (Fisheries Agency of Japan 1974 and 1976).

Target Species	Year	Range in vessel size		Gear			
		gross tons	horsepower	Headrope length (m)	Groundrope length (m)	Cod-end mesh size (cm)	Otter board size (m)
Pollock	1974	3037-5460	4000-5900	66	65	10	3.2 x 5.0
	1976	2455-5470	3500-5700	66	89	10	2.6 - 4.3
Yellowfin sole	1974	349- 499	2100-2500	53	60	9	2.1 - 3.3
	1976	349-3500	1600-4000	57	69	10	2.4 x 3.0
Rockfish	1974	499-3608	1500-4400	50	64	9	2.4 x 3.8
	1976	349-3914	1420-4400	60	73	10	2.2 x 3.3

Independent longline vessels are 36 to 52 m long and 200 to 500 gross tons with crews of 25 to 30 (Dickinson 1973). Their primary target species is sablefish. Some rockfish are taken incidentally. Individual vessels fish about 23 km of longline with approximately 8,000 hooks. The gear is allowed to soak for 12 hours. Frozen squid is used for bait. Typical dimensions of fishing gear is given in Table 11. The vessels are equipped with sharp freezers and refrigerated holds. The longlines remain on the fishing grounds from two to four months until the maximum hold capacities of about 400 mt is reached, after which they return to home ports (Law Enforcement Division 1974).

5.2.2.2.2 Soviet fishery

Similar to the Japanese groundfish operations, the USSR fishery also employ catcher boats that deliver their catches to factory ships or to processing and freezing transport vessels and vessels that operate independently of factoryships and process their own catches. The USSR has perhaps utilized the flotilla concept of fishing operations to a greater degree than any other nation (Pruter 1976). To allow the fishing vessels to operate at sea for long periods, they are closely supported by numerous other types of vessels including base ships that carry fleet administrators and staff and provide logistic support, factoryships for processing catches, refrigerator transports to replenish stores on the catcher vessels and to receive, freeze, and transport their catches to home ports, and oil tankers, passenger ships, tugs, patrol vessels and occasionally even hospital ships. Refrigerated transports are the mainstays of the support operations. They are of various sizes ranging from 46 to 151 m and from 650 to almost 9,700 gross tons (Law Enforcement Division 1977). Base and factory ships are 110 to 174 m and 5,000 to 18,000 gross tons.

Two basic kinds of fishing vessels have been used by the Soviets, side trawlers and factory stern trawlers (Pruter 1976). Three size classes of side trawlers have been used. Smallest and oldest of the side trawlers is the SRT of 265-335 gross tons, 38 m in length with crews of 22-26 men. The next larger of the side trawlers is the SRTR class of refrigerated medium trawlers of 505-630 gross tons and about 52 m, carrying crews of 26-28. Largest of the refrigerated side trawlers

Table 11--Range in size of longline vessels and typical fishing gear used in the North Pacific longline-gillnet fishery from a sample of the fleet in 1969, 1972 and 1976 (Fishery Agency of Japan 1969 1973 and 1976).

	Vessels		Groundline			Gangion			
	Range in gross tons	Range in horsepower	Length of hachi (m)	Gear diameter (mm)	Number hooks per hachi	Length (m)	Diameter (mm)	Size of hook (mm) or size number	Bait
1969	275-499	510-1230	75	9.0	40	1.5	2.0	63 x 14	Frozen squid
1972	300-500	710-1800	75	8.0	35	1.3	---	20	Frozen squid
1976	382-500	540-1110	75	8.0	42	1.3	---	20	Frozen squid

is the SRTM class of about 700 gross tons and 54 m with a crew of about 30. The larger of the side trawlers, particuarly the SRTM's frequently operate independently processing and freezing their own catches, but some may tranship their catches to factoryships for processing. A new class of trawler designated as SRTK's have appeared in the fishery in more recent years and are apparently an imporvement on the SRTM's. The SRTK's are about 775 gross tons, have stern ramps for more efficent trawling over the stern

The largest of the Soviet fishing vessels are the factory stern trawlers, the most common of which is the BMRT of 3,170 gross tons, 85 m in length, and carrying a crew of about 90 (Pruter 1976). The factory trawlers usually process and freeze their own catch. A newer class of factory stern trawler, the RTM has come into increasing use in recent years. They are somewhat smaller than the BMRT's, the most common of which is 2,657 gross tons and 82 m long, but has the advantage of a larger deck area aft for handling gear and fish.

Dimensions of typical gear used on Soviet BMRT trawlers fishing for pollock and Atka mackerel are given in Table 12. Data from U.S. observer reports indicate that vertical openings on trawls used for pollock may range from 5-30 m.

5.2.2.2.3 Korean and Taiwanese fisheries

Information on vessels and gear used in the ROK groundfish fisheries is not as well documented as that for the Japanese and the USSR fisheries. Methods of operation are similar to those of the Japanese and Soviets in that they also use factoryship-catcher boat operations as well as stern trawlers, longliners and Danish seiners operating independent of factoryships. The number and size of vessels has increased since the fishery began. Initially, the Koreans used pair trawlers of about 33 m and 133 gross tons and processed the catch aboard vessels ranging in size from 828-957 gross tons (Office of Enforcement and Surveillance 1969). In 1969 they employed a 9,400 gross ton factoryship, 142 m long to process catches of the pair trawl fleet. Independent stern trawlers also entered the fishery in 1969 ranging in size from 131-1,518 gross tons and 35 to 77 m in length (Office of Enforcement and Surveillance 1970).

Table 12.--Typical trawl dimensions used on Soviet BMRT factory stern trawlers for pollock and Atka mackerel based on data of U.S. Observers in 1976 and 1977.

	Range in vessel size			Typical gear dimensions				
Target Species	Length (m)	gross tons	Horsepower	Headrope length (m)	Groundrope length (m)	Cod-end mesh size (cm)	Cod-end liner mesh size (cm)	Otter boards
Pollock	78-87	2657-3837	2000-2320	77.4	77.4	5.0 - 6.0	3	Round to oval variable in size 1600-1800 kgs.
Atka mackerel	78-87	2581-3510	2000	31.0	44.0	5.0	3	Round to oval 1200 kgs.

The subsequent modernization of the Korean fleet is illustrated by information from U.S. Observer reports in 1977 (Table 13). These data indicate that independent stern trawlers in the ROK fleet are comparable in size to the largest trawlers in the Japanese and Soviet fleets with some exceeding 5,000 gross tons. The three vessels observed were targeting on pollock and gear dimensions given in Table 13 may be representative of trawls used by ROK independent trawlers in the pollock fishery.

The Taiwanese have used 1 or 2 independent stern trawlers in their small scale fishery in the eastern Bering Sea. The size of the vessels and dimensions of the gear used are unknown.

5.2.2.3 Catch trends

Complete catch statistics for groundfish taken by foreign fisheries in the eastern Bering Sea and Aleutian Islands regions have not been available throughout the history of the fishery. Japan has provided the longest and most detailed series of catch data. However, even the Japanese have not always identified some of the flounders to species in their catch cata (INPFC 1976). Beginning in 1964, Japan has submitted detailed statistics for their groundfish fisheries to the United States and Canada through INPFC. The identification of catches and reporting of all principal commercial species has probably improved since then. The USSR began to report catch statistics to the United States through bilateral agreement in 1967. Not until 1972 was there a reasonably good breakdown of catches to individual species and even then a detailed area breakdown of their catches was not available. The ROK did not report their catch statistics in detail until 1976. Prior to the reporting of statistics by the USSR and the ROK, their catches have been estimated through U.S. surveillance of the fisheries.

Because of the lack of statistics from some nations and the irregular method of reporting certain species, available catch data for foreign fisheries may not reflect actual exploitation of all spcies. Statistics for primary target species such as pollock, yellowfin sole, rockfish and sablefish are assumed to be relatively accurate. Since 1970 the catch data for most other commercially important species has probably improved.

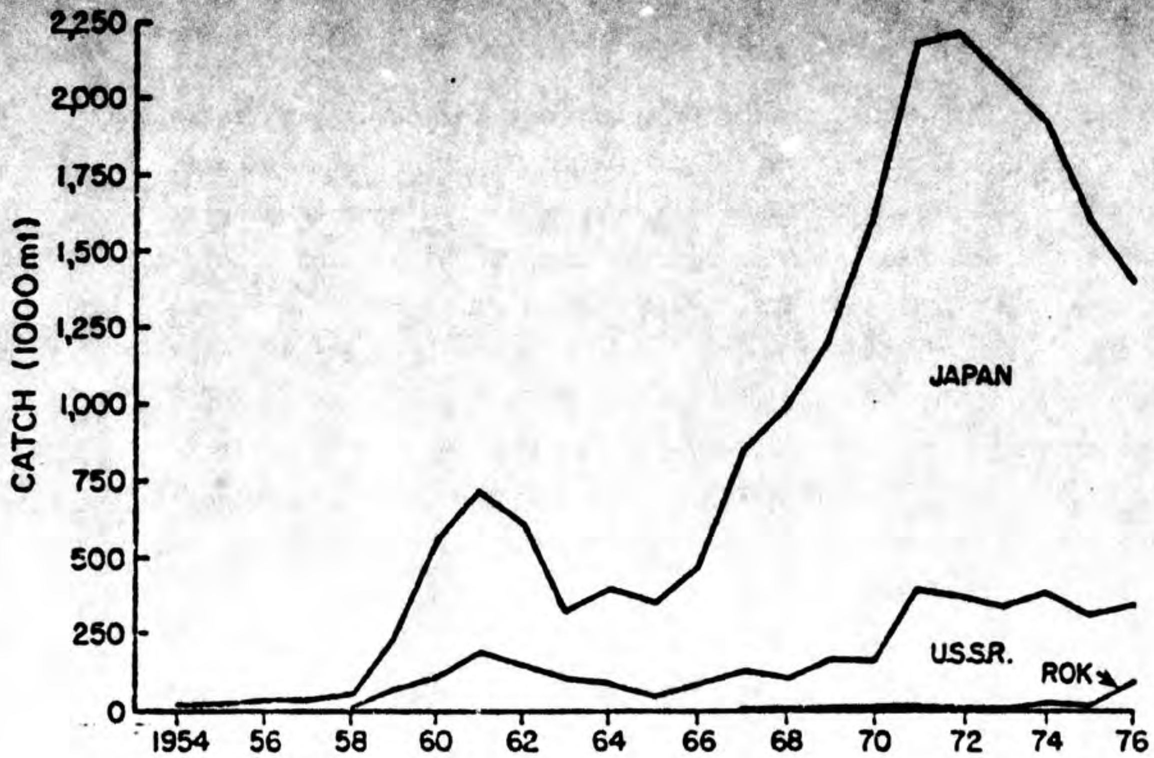
Table 13.--Vessel size and fishing gear dimensions of three ROK independent stern trawlers boarded by U.S. Observers in 1977.

Vessels					Gear				
Name	Length (m)	Gross tons	Horsepower	Number in crew	Headrope length (m)	Groundrope length (m)	Vertical opening (m)	Cod-end mesh size (cm)	Otter board size (m)
Salvia	84	2285	3200	58	59	78	6	10	2.5 x 3.8
Shin An Ho	106	5680	6000	157	80	75	7	10	3.0 x 5.0
Heung Yang Ho	104	5377	5800	92	74	105	38	10	3.0 x 4.8

Eastern Bering Sea.--Historical trends in total groundfish catches by foreign fisheries in the eastern Bering Sea since 1954 are illustrated in Figure 12; catch statistics by individual species and nation are given in Annex IV. Total catches of groundfish in the eastern Bering Sea have reached two peaks. The first and smaller of these peaks occurred between 1959 and 1963 when Japan and the USSR were targeting on yellowfin sole. Total estimated catches of yellowfin sole and other species reached a maximum of 715,000 mt in 1961. Catches dropped sharply in the succeeding two years, because of a decline in abundance of yellowfin sole, ranging between 300,000 and 400,000 mt during 1963-65. With the development of the Japanese pollock fishery, total groundfish catches rose rapidly after 1965 and by 1971 exceeded 2 million mt. The total catches of groundfish peaked at 2.2 million mt in 1972 and then declined as catch restrictions were placed on pollock and other species through bilateral agreements between the United States and Japan and the USSR. These catch restrictions stemmed from evidence of deterioration of the various resources. By 1976 total catches had been reduced to less than 1.5 million mt. Throughout the history of foreign exploitation of groundfish in the eastern Bering Sea, Japan has been by far the major user nation (Figure 12). In the early years of the fishery, when yellowfin sole was the major target species, Japan accounted for 68-90% of the total annual groundfish catch in the eastern Bering Sea. This proportion has remained high in later years as pollock became the major target species, ranging from 76-89% annually. Japanese catches peaked at 1.8 million mt in 1972.

Through 1970, the USSR fished primarily for flounders in the eastern Bering Sea and until that year their total catches of groundfish remained less than 200,000 mt (Figure 12). In subsequent years, as their pollock fishery developed, catches of groundfish increased, peaking at 410,000 mt in 1974.

Catches by the ROK have apparently been relatively small. Estimated catches based on U.S. surveillance of their fisheries were no larger than 26,000 mt through 1975 (Annex IV). In 1976, however, the ROK reported a total groundfish catch in the eastern Bering Sea of 88,000 mt. Pollock accounted for 85,000 mt of this total.



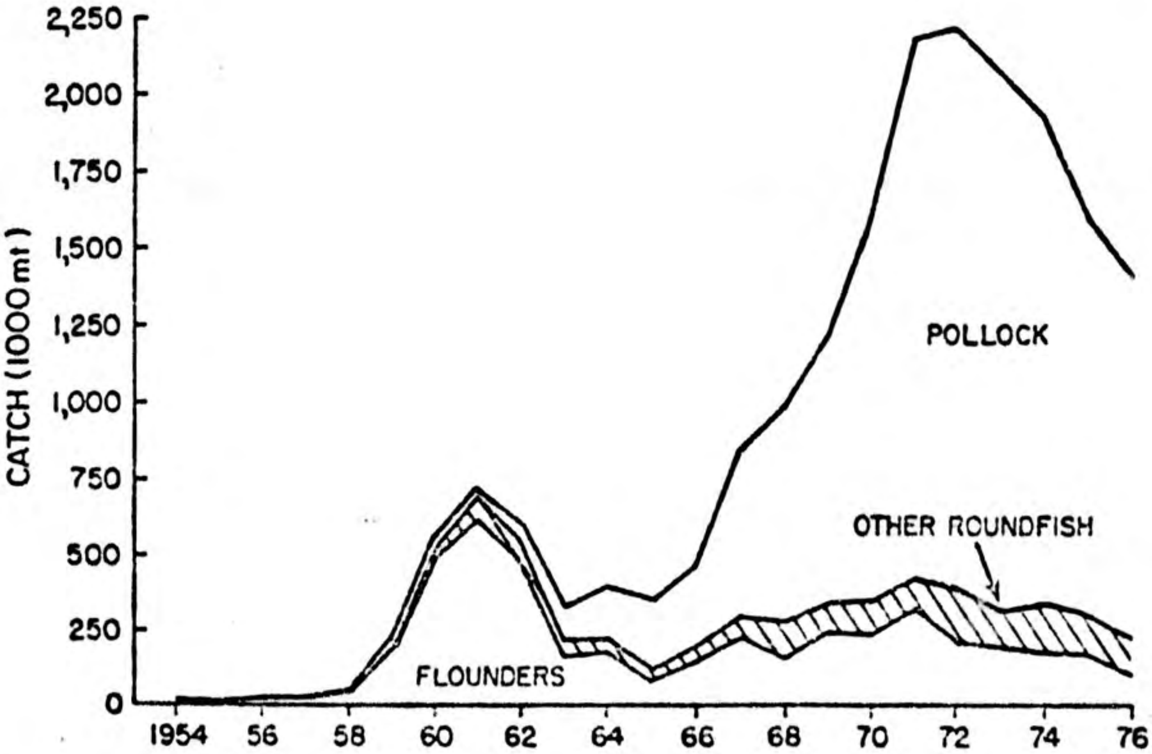


Figure 12.--Foreign catches of groundfish in the eastern Bering Sea (east of 180°) by nation (upper panel) and by species or species group (lower panel), 1954-76.

Flounders (primarily yellowfin sole) were the major species in the eastern Bering Sea catches until 1964, after which pollock predominated (Figure 12). The proportions of pollock in foreign catches generally increased between 1965 and 1970 ranging from 57-79%. From 1971 to 1976 they formed 81-85% of the total groundfish catch. Species of roundfish, other than pollock, have been less abundant than pollock and flounders in catches.

Catch trends of individual species of flounders in the eastern Bering Sea are illustrated in Figure 13. Catches of yellowfin sole reached extremely high levels from 1960 to 1962 with removals of over 1.4 million mt by Japan and the USSR. Catches of this magnitude were more than the stock could sustain and abundance of yellowfin sole declined. Following this deterioration of the resource, catches fell to about 100,000 mt or less, but increased again to reach the 160,000-170,000 mt level in some years between 1967 and 1971. Since 1971, catches have fallen well below 100,000 mt, in part due to the absence of a directed fishery on flounders by the USSR and perhaps to winter area closures in the southeastern Bering Sea which may have reduced catches of yellowfin sole by Japan.

As discussed previously, rock sole, flathead sole, and Alaska plaice have not always been identified in catches, particularly prior to about 1970. Reported catch statistics may therefore inaccurately reflect actual catch trends for these species. Catches of flathead sole apparently peaked in 1971 at 51,000 mt and those for rock sole in 1972 at 61,000 mt (Figure 13). Catches have declined substantially in more recent years which may have resulted to some degree from the reduction in the yellowfin sole fishery where these species are taken incidental to yellowfin sole. There have been no indications of recent substantial reductions in abundance of these species (Bakkala and Wakabayashi 1977).

Catches of Alaska plaice have not shown major fluctuations (Annex IV). This species is also taken incidentally in the yellowfin sole fisery and may not always have been identified in catches. The largest reported catch for this species was about 6,900 mt in 1969. Catches since 1969 have ranged from about 300 mt to 3,400 mt.

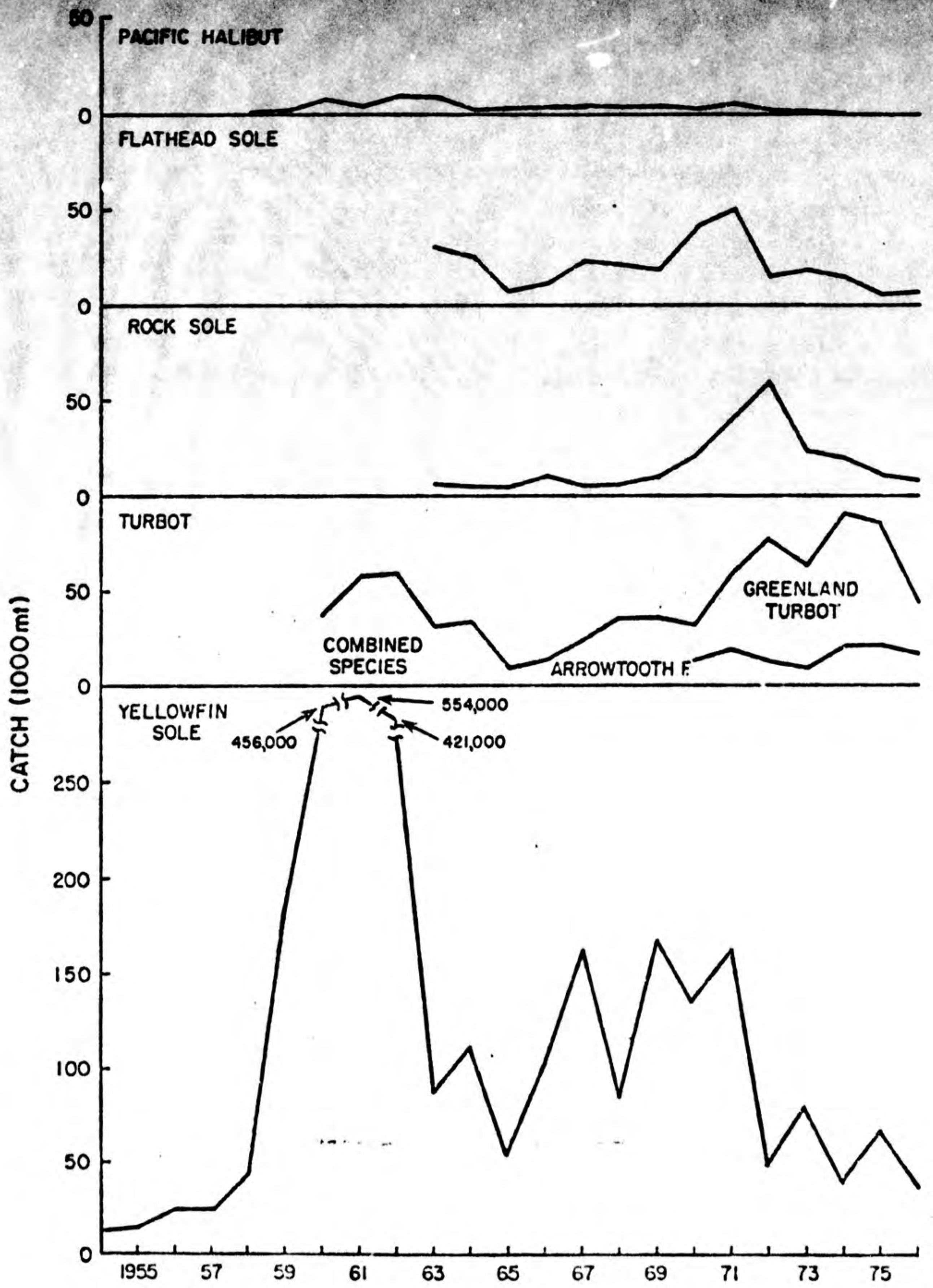


Figure 13.--Catch trends of flounders by foreign fisheries in the eastern Bering Sea, 1954-76.

Catches of turbot (arrowtooth flounder and Greenland turbot) were relatively high in early years of the eastern Bering Sea fishery ranging over 50,000 mt in 1961 and 1962. Japanese fisheries targeted on arrowtooth flounder in this period for the production of fish meal (Takahashi 1976). Catches dropped below 40,000 mt in 1963-70 as these species were only taken incidentally in the pollock and other directed fisheries. Catches of Greenland turbot increased markedly after 1970 in both the Japanese and the USSR fisheries (Annex IV). Total catches of Greenland turbot reached almost 70,000 mt in 1974 and since 1972 have approached or exceeded catches of yellowfin sole.

Reported catches of Pacific halibut in the eastern Bering Sea were relatively small compared to those of other principal flounders. Largest annual catches were made in 1960 (6,900 mt), 1962 (7,900 mt), and 1963 (7,500 mt), and 1971 (4,900 mt). Catches have declined in subsequent years reaching a low of 145 mt in 1976.

Not shown in Annex IV are incidental catches of halibut taken by Japanese trawl fisheries targeting on other species. Japan is prohibited from retaining trawl-caught halibut in the eastern Bering Sea, but most released fish die from injuries received during capture. Estimates from observer data indicate that the incidental catch in the eastern Bering Sea increased from about 50 mt in 1954 to over 2,000 mt in 1961; after declining during 1962-63, the catch again increased and peaked at about 3,000 mt in 1971-72 (Hoag and French 1976). Since then, the incidental catch has declined as a result of reduced fishing effort and time/area closures, designed to protect halibut.

Before 1977, Soviet trawlers retained trawl-caught halibut in the Bering Sea. Their catch of halibut, however, was included with other species and not reported separately until 1972. The reported catch since then declined from 490 mt in 1972 to 58 mt in 1976 (Annex IV). The reported catch, however, may be too low. Hoag and French (1976) estimated that the Soviet halibut catch averaged about 750 mt during 1959-1970 and then increased sharply to about 2,000 mt during 1971-1974. The catch has probably declined since then due to restrictions on the Soviet fishery.

With the concentration of Japanese fishing effort on pollock starting in 1964, catches of this species rose rapidly to reach 700,000 mt in 1968 (Figure 12). With the entry of the USSR and the ROK into the pollock fishery and greater effort by the Japanese, catches continued to increase reaching a peak of over 1.8 million mt in 1972. With the implementation of catch limitations stemming from evidence of overfishing on pollock, catches declined, falling to about 1.2 million mt in 1976.

Catch trends of demersal roundfish, other than pollock, are illustrated in Figure 14. Peak catches of sablefish and Pacific ocean perch were taken rather early in the fishery. Maximum harvests of sablefish occurred in 1961 and 1962 when 26,000 and 28,500 mt were taken. Catches were relatively stable at a lower level of 9,500-16,000 mt from 1966 to 1972, but declined thereafter falling to 2,700 mt in 1976. Following the peak catch of Pacific ocean perch in 1961 of 47,000 mt, catches dropped to a level of 17,000-29,000 mt from 1962 to 1968 and then declined to 3,600 mt in 1973. A second peak of 39,000 mt was reached in 1974 which was followed by another decline to 16,000 mt in 1976.

Catches of Pacific cod increased steadily in earlier years of the fishery to reach levels of more than 50,000 mt by 1968. Annual catches have been relatively stable since then, ranging around 50,000 mt with the largest catch of 70,000 mt taken in 1970.

The "other groundfish" category represents catches of various species of non- or low commercial value that are taken incidental to target species. Major species groups in this category are probably sculpins, poachers, eelpouts, skates and rattails. Reported catches of this group increased sharply after 1970. A large catch of rattails (48,500 mt) by the USSR mainly accounted for the exceptionally large total catch of "other groundfish" in 1972. The recent general increase in catches of this species category may stem from better reporting rather than an actual increase in catches.

Aleutian Island.--Characteristics of the foreign fisheries in the Aleutian Island region differ from those in the eastern Bering Sea in a number of respects. Overall catches have been much lower in the Aleutians, trends in catches and major species in catches have differed in the two

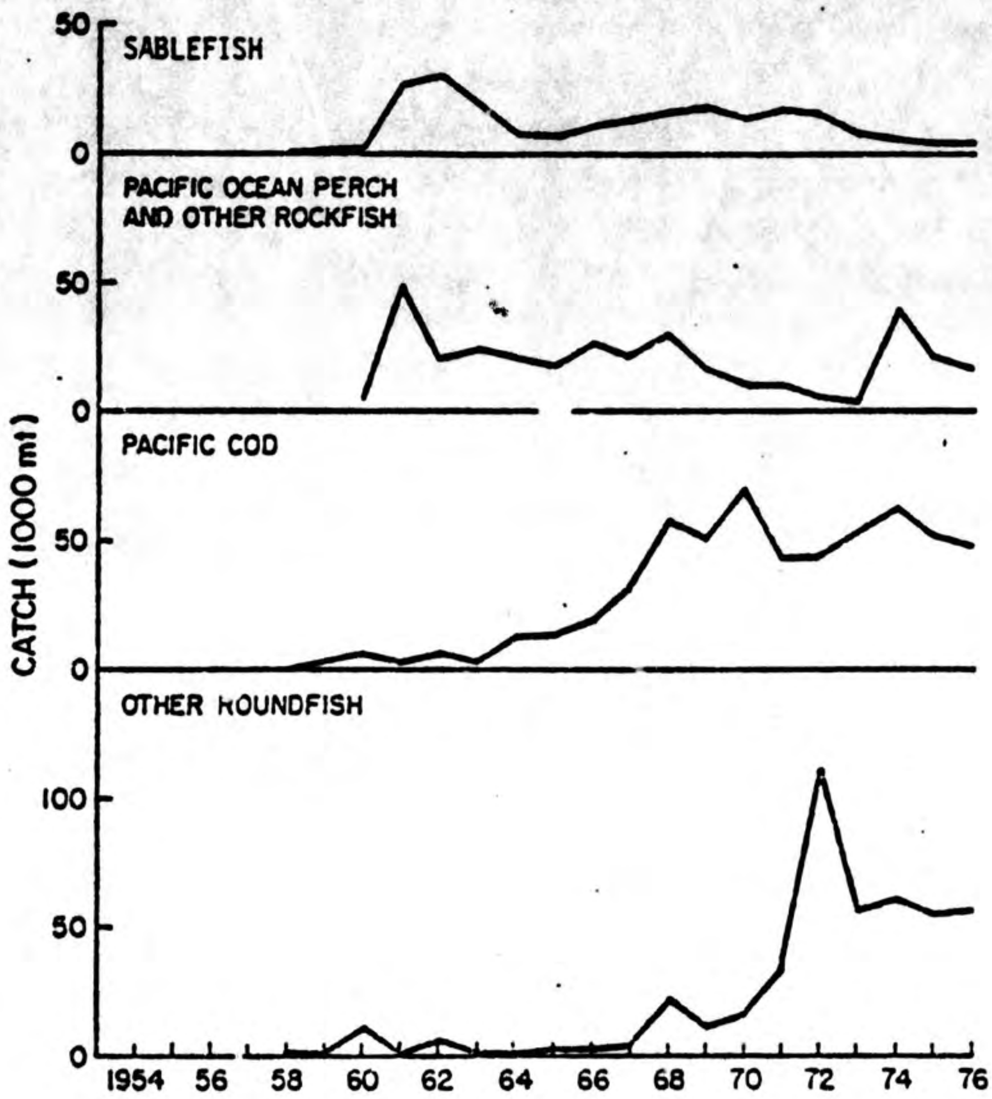


Figure 14.--Catch trends of roundfish (other than pollock) by foreign fisheries in the eastern Bering Sea, 1954-76.

regions, and the USSR rather than Japan has taken the greatest share of the catches in the Aleutians (Figure 15, Annex IV). Total catches of groundfish reached their peak early in the history of foreign exploitation of the Aleutian Island resources (Figure 15). Due almost entirely to catches of Pacific ocean perch and other rockfish, catches of all groundfish reached a peak of 114,000 mt in 1965. Since then, total catches have fluctuated at a lower level and shown a general overall decline. In 1975 and 1976, catches were in the range of 55,000-60,000 mt. The USSR has taken the largest share of the catches in the Aleutians with the exception of some recent years. Rockfish (mainly Pacific ocean perch) has been the primary target species in the Aleutians of both Japan and the USSR. Catches of demersal roundfish have increased markedly since 1973, perhaps due in part to better reporting of these species, but also because the USSR has had a target fishery on Atka mackerel in this period. Catches of Atka mackerel reached 20,000 mt in 1976. Catches of "other roundfish" have exceeded those of rockfish since 1973 because of the decline in abundance of Pacific ocean perch (Low et al. 1977) and the increase in catches of Atka mackerel and better reporting or actual increases in catches of such species as pollock and Pacific cod.

Flounders have formed a relatively small proportion of the total catches in the Aleutians. The small flounders (yellowfin sole, rock sole, flathead sole and Alaska plaice) occupy this region in low abundance based on catch statistics (Annex IV). The main species of flounders taken have been Greenland turbot and arrowtooth flounder.

Catches of Pacific ocean perch and other rockfish reached their peak in 1965 at 109,000 mt (Figure 15). Since then they have shown an almost continual decline with minor increases in 1970, 1972, and 1974. Catches fell again following 1974 to range from about 17,000-18,000 mt in 1975 and 1976.

Catch trends for individual species of roundfish, other than rockfish, are illustrated in Figure 16. Catches of Pacific cod have been small, showing some increases in recent years with a peak catch of 3,800 mt in 1976. This increase may simply reflect better identification and reporting

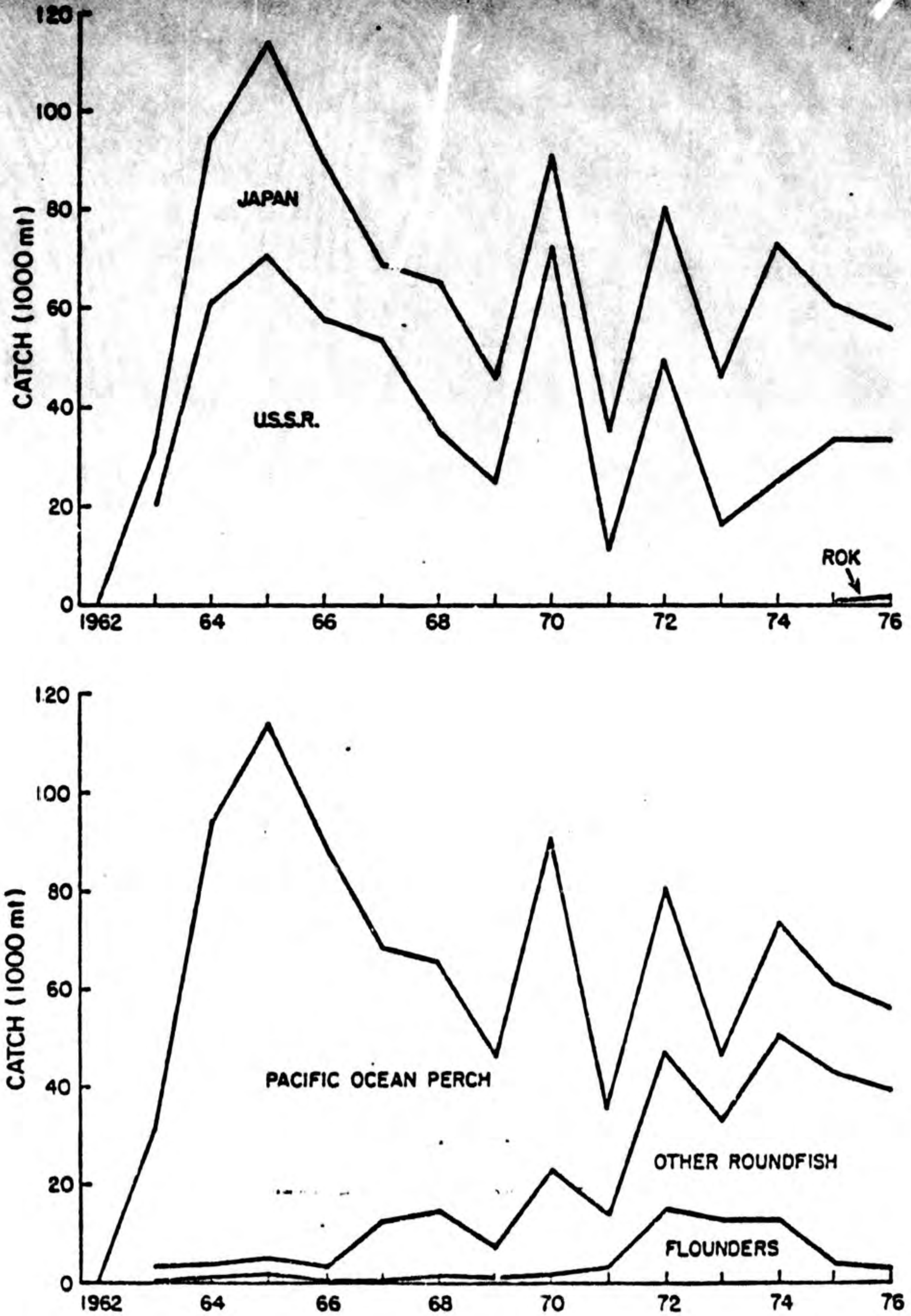


Figure 15.--Foreign catches of groundfish in the Aleutian Island area (170°W - 170°E) by nation (upper panel) and by species or species group (lower panel), 1962-76.

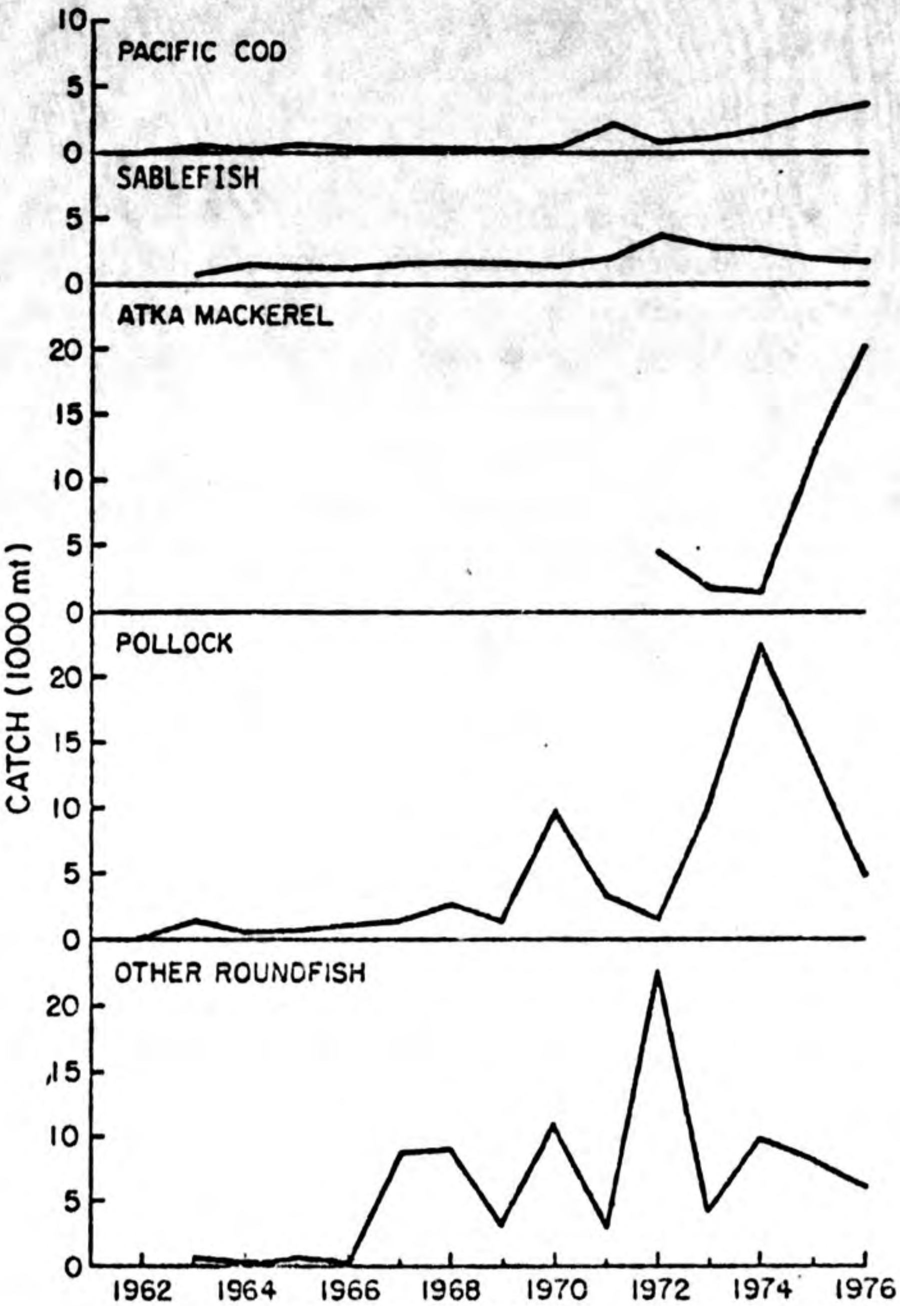


Figure 16.--Foreign catches of commercially-important species of roundfish (other than Pacific ocean perch) in the Aleutian Island area, 1962-76.

of cod in the fisheries. Catches of sablefish have remained relatively stable at a low level throughout the period of foreign fishing in the Aleutians. The largest catch of 3,600 mt was taken in 1972. Sablefish have been a target species of longline fisheries by Japan and the ROK in Aleutian Island waters.

The USSR began to report significant catches of Atka mackerel in 1972. From 1974 to 1976 catches rose rapidly as the Soviets concentrated effort on this species, reaching 20,000 mt in 1976 and exceeding catches of any other groundfish species in the Aleutians in that year. Reported catches of pollock have also increased in recent years reaching a peak of 23,000 mt in 1974. Almost all of the catch in 1973-76 was taken by USSR fisheries. It is unknown whether the Soviets directed some effort to pollock in the Aleutian region in these years or whether they were an incidental part of catches in other fisheries.

Catches of "other groundfish" have shown fluctuations from year to year, but no definite trend. This category probably consists mainly of non-commercial species or species of low commercial value such as sculpins and rattails. Fluctuations in this catch category may result partially from methods of recording and reporting these species. In 1972, when the largest catch of "other groundfish" occurred, the USSR reported 5,300 mt of rattails and 9,700 mt of sculpins. In later years the Soviets did not identify these species in their catch statistics and their total annual catches of "other roundfish" ranged from only about 200-1,600 mt. The reported Japanese catches of "other groundfish" increased from 1968 reaching 8,000 mt in 1974 and 1975.

Flounders have in most years formed only a minor part of the total groundfish catch in the Aleutian Islands area (Figure 17). Reported annual catches of small flounders have usually been less than 100 mt. After reaching a peak of almost 1,300 mt in 1975, annual catches of Pacific halibut have ranged from about 400 mt to less than 150 mt. Reported catches of arrowtooth flounder and Greenland turbot were also low until 1970, after which they increased sharply, with Greenland turbot the primary species taken. Catches in 1972-75 ranged from about 12,000 to 14,000 mt. Japanese fisheries were responsible for this rise in catches of turbot (Annex IV).

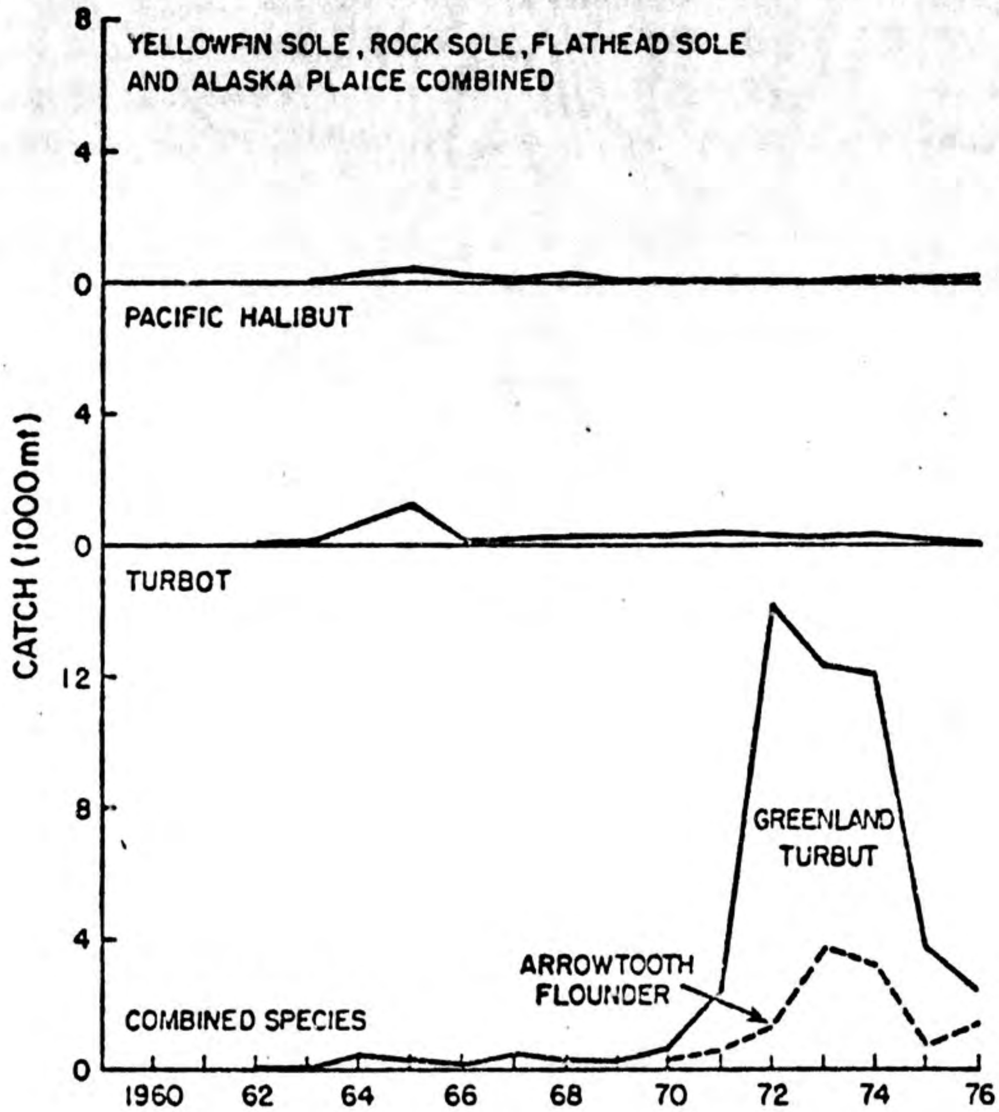


Figure 17.--Catch trends of flounders by foreign fisheries in the Aleutian Island area, 1962-76.

6.0 HISTORY OF MANAGEMENT

6.1 Domestic

6.1.1 Measures employed to regulate fishery

Fishery restrictions on U.S. Nationals have been established by the U.S. Bureau of Commercial Fisheries (the predecessor of the National Marine Fisheries Service), the State of Alaska and the International Pacific Halibut Commission. The BCF was responsible for both research and management of domestic fisheries in Alaska before statehood in 1958. The BCF imposed restrictions on the size, character, and operation of trawls to be used to capture groundfish (Table 14). In 1959 the State of Alaska assumed responsibility for regulating the groundfish fisheries of Alaska. A history of the state's groundfish regulations is included in Table 14. Many of the regulations were specific to the Gulf of Alaska where domestic fisheries have been more active.

In addition to regulations given in Table 14, the State of Alaska requires all commercial fishermen landing any species of fish or shellfish in Alaska to possess a commercial fishing license, and the captain or owner of all fishing vessels are required to license their vessels and the fishing gear employed. Buyers are required to keep records of each purchase and show the number and name of the vessel, the State license number of the vessel, date of landing, pounds purchased of each species, statistical area in which the fish was caught, and the kind of gear used in taking the fish.

The chronology of different regulatory measures for the Pacific halibut fishery as well as their rationale are discussed by Dunlop et al. (1964), Bell (1967) and Skud (1977). Before 1963, the North American halibut fishery in the Bering Sea was managed by the International Pacific Halibut Commission (IPHC). From 1963 to 1977, IPHC recommended regulations, but these had to be approved by the International North Pacific Fisheries Commission (INPFC). Since the onset of regulations in 1932, several changes have occurred in the boundaries defining regulatory areas in the Bering Sea and Aleutians. Some of the changes were in response to tagging studies that indicated a relationship between halibut

Table 14. —Historical summary of Alaska groundfish regulations.

Year	Legal gear, definitions, and other regulations
- - - - - -	Earlier records not available- - - -
1940	Use of trawls prohibited except for shrimp, flounders when not not capturing, injuring or destroying other food fish, and spider and King crab west of 150°W. longitude exclusive of Cook Inlet.
1942	Trawls prohibited in fishing for salmon, herring, and Dungeness crab.
1948	Gear restrictions: Trawls. The size, character, and operation of otter trawls in Alaskan waters are limited as follows: (a) Otter trawls having mesh smaller than 5 inches stretched measure between knots in the bag and 6 inches stretched measure between knots in the wings are prohibited: Provided, that otter trawls now in use having mesh smaller than that specified may be used through the calendar year 1949 if registered with the Regional Director, Fish and Wildlife Service, Juneau, Alaska. (b) The use of any devices attached to the footrope or elsewhere, such as chain "ticklers", which may cause undue disturbance or destruction of the bottom, is prohibited. (c) The use of otter trawls in any area which the International Fisheries Commission has found to be populated by small immature halibut and accordingly has closed to all halibut fishing, is prohibited. (d) All operators of otter trawls shall maintain a running log on forms furnished showing date, type and size of mesh of trawl used, each locality fished, the time and duration of each tow and the estimated poundage and number or average weight of each species caught. Such logs shall be available for inspection by representatives of the Fish and Wildlife Service at any reasonable time, and the duplicate sheets shall be transmitted to the Fish and Wildlife Service at periodic intervals. On or before December 15 of each year complete statistics of operation shall be submitted to the Fish and Wildlife Service on forms provided for the purpose. (e) The use of any trawl in commercial fishing for salmon, herring, and Dungeness crabs is prohibited.

Table 14. --Historical summary of Alaska groundfish regulations. (Cont'd)

Year	Legal gear, definitions, and other regulations
1949	The following species besides salmon were defined as commercial fish: Albacore (Germo alalunga) tuna Cod (Gadus macrocephalus) codfish, true cod, grey cod Eulachon (Thaleichthys pacificus) smelt, hooligan Halibut (Hippoglossus stenolepis) Herring (Clupea pallasii) Lingcod (Ophiodon elongatus) Rockfish (all species of genus Sebastodes also known as rockcod and sea bass) Sablefish (Anoplopoma fimbria) black cod Sheefish (Stenodus mackenzii) inconnu Sole and flounder (all species of family Pleuronectidae)
1958	Trawl fishermen no longer required to fill out log books.
1959	Alaska Statehood Trawls illegal for taking crab.
1960	Longlines and trawls may be used to take groundfish. Longlines are the only legal gear with which to take sablefish within S.E. Alaska. Halibut are to be regulated according to IPHC regulations 5AAC 39.390.
1961	All defined legal gear became legal for the taking of groundfish excepting S.E. sablefish.
1967	S.E. sablefish: a 2½", #20 thread or less gillnet may be aboard vessel for taking bait.
1968	S.E.: sablefish taken incidentally by longline or otter trawl may be retained in an amount not to exceed ten percent, by weight, of each landing.
1970	Pots became legal sablefish gear within S.E.
1972	Incidental allowable catch of sablefish increased to 20%. 1962 regulation (5 AAC 39.390) referring to IPHC management of halibut repealed.

Table 1A. —Historical summary of Alaska groundfish regulations. (Cont'd)

Year	Legal gear, definitions, and other regulations
1976	**An untreated cotton escape for sablefish pots required within S.E.** **Also under General Provisions, Groundfish Fishery, Gear for Groundfish.** **(a) Groundfish may be taken by trawls, hand troll gear, seines, longlines and pots except as legal gear may be further restricted by groundfish gear regulations of chs. 03-39 of this title and except as follows:** **(1) king and tanner crab pots as defined in chs 34 and 35 of this title may not be used to take groundfish in the areas where the regulations define those pots:** **(2) groundfish taken by power gurdy troll gear being fished for salmon consistent with applicable state laws and regulations are legally taken and possessed.** (3) All commercial longline or skate gear buoys or kegs shall be marked with the permanent department registration number of the vessel fishing this gear.
1977	Crab pots are not defined for all areas. The most restrictive definitions are as follows: A king crab pot is a pot with rigid tunnel eye openings and which individually are a <u>minimum</u> of five inches in one dimension, and tunnel eye opening perimeters which individually are larger than 30 inches. A tanner crab pot is a pot with rigid tunnel eye openings which individually are a <u>maximum</u> of five inches in one dimension, and tunnel eye opening perimeters which individually are larger than 30 inches; or a pot which tapers from its base to a top consisting of one horizontal opening of undescribed size. Same as 1976 except that sunken or diving gillnets may be used for groundfish upon issuance of a permit by the commissioner (ADF&G).

stocks in the Aleutians and the Gulf of Alaska. However, most of the changes were designed to obtain a desired distribution of fishing effort and to facilitate enforcement.

Except for a period in the late 1940's and early 1950's and again in 1963-64, quotas have not been used to manage Bering Sea halibut stocks. Instead, restrictions have been based on the length of the season. Until the late 1950's, the Bering Sea season coincided with that of IPHC Area 3 (the Gulf of Alaska west of Cape Spencer), but by the early 1960's, the opening of the Bering Sea often was a month earlier than in Area 3. The earlier opening was established to encourage fishermen to exploit Bering Sea stocks. Since 1965, the fishing time has been limited to three weeks or less in the spring and fall or both. This curtailment was necessary because of the drastic decline in abundance of halibut.

Other regulations include licensing requirements, gear restrictions, minimum size limits, and closed areas. IPHC requires that all setline vessels over 5 net tons be licensed; there is no fee and annual renewal is not required. Licensed vessels must maintain a log book showing the daily catch, effort, and the fishing area. From 1932 to 1973, vessels also were required to "clear" for fishing a particular area and submit a "statistical return" at the completion of each trip. These requirements have since been deleted.

In 1938, the regulations prohibited the use of set nets for catching halibut. Nets of any kind were prohibited in 1944, and this restriction has continued to the present day. The definition of nets was expanded to include pots in 1972. IPHC's justification of trawl prohibition was based on evidence that halibut caught by trawls usually are below the optimum harvesting size.

The size limit of halibut was introduced into the regulations in 1940. The minimum size that that time was 5 pounds, head-off, dressed. The purpose of the size limit was to reduce the catch of halibut that were below the optimum harvest size, but there also was an economic reason. The industry favored the regulation because small halibut were often of poorer shipping quality and of lower value. In 1973, the minimum size limit was increased and expressed in terms of length: 32 inches from the tip of the lower jaw to the end of the middle of the tail. The increase was justified based on an increase in growth rate.

In 1967, IPHC Area 4E in southeastern Bering Sea was declared a nursery area and a year-round closure was instituted that still is in effect.

6.1.2 Purposes of regulatory measures

The limited number of groundfish regulations implemented by the State of Alaska were primarily designed for the protection of species of high commercial value such a salmon, herring, juvenile halibut, and shellfish. Examples of such regulations were the restrictuions on use of pot gear, gillnets, otter trawls, and seines (Table 14).

With regard to halibut, IPHC is restricted by the present convention to manage for MSY and cannot consider other goals or economic factors. Regulations in the Bering Sea and Aleutians were designed to accomplish this goal. Specifically, season and quota restrictions controlled fishing mortality; minimum size limits, gear restrictions, and closed areas reduced the mortality on optimum sized halibut; the timing of the seasons and the area designations affected the distribution of fishing effort and facilitated enforcement; licensing, and statistical requirements provided scientific information on stock condition.

6.2 Foreign

6.2.1 Measures employed to regulate the fishery

A number of regulatory measures affecting groundfish fisheries have been implemented through public laws and international agreements prior to enactment of the U.S. Fishery Conservation and Management Act of 1976. Initial regulatory measures originated from the International Convention for the High Seas Fisheries of the North Pacific Ocean involving Canada, Japan, and the United States, which was brought into force in 1953. The Convention provided for establishment of the International North Pacific Fisheries Commission (INPFC) to provide and coordinate scientific studies necessary to ascertain and recommend conservation measures required to ensure maximum sustained productivity of fishery resources in the Convention area (Forrester et al. 1974). One of the provisions of the Convention prohibited Japan from fishing halibut in certain areas and, starting in 1958 Japan agreed to abstain from fishing halibut providing that stocks of halibut continued to meet qualifications for abstention, e.g., that the stocks were under substantial exploitation by two or more of the contracting parties.

In 1962 member nations of INPFC agreed that halibut east of 175° W in the Bering Sea no longer continued to qualify for abstention (Forrester et al. 1974) Following the removal of halibut from the abstention list, joint conservation measures were implemented by member nations of INPFC in 1963 which included a catch quota of 5,000 mt in a triangular area east of 170° W. Following a catch of 5,000 mt in the quota area in 1963, catches dropped abruptly and Japan withdrew her longline fleet from the quota area after 1964. Although agreement between INPFC member nations was never reached to return halibut to the abstention list, Japan has not chosen to conduct a target fishery on halibut east of 175o W since 1964.

U.S. Public Law 88-308, enacted in May 1964, made it unlawful for foreign vessels to fish within the 3-mile territorial waters of the United States or to fish for designated fishery resources of the adjacent U.S. Continental Shelf. In October 1966, U.S. Public Law 89-658 established a 9-mile contiguous fishery zone adjacent to the U.S. 3-mile territorial sea. The law provided that the United State would have the same jurisdiction over fisheries within this newly created zone as it had within its 3-mile territorial waters subject to the continuation of traditional fisheries by foreign nations.

In 1964, the U.S. initiated bilateral agreements with Japan and the USSR to allow continuation of their traditional fisheries within the contiguous zone in certain areas of Alaska (Office of Enforcement and Surveillance 1968). One provision of the 1964 agreements was the establishment of a king crab pot sanctuary adjacent to the north side of Unimak Island and the western Alaska Peninsula that prohibited trawling year-round. The purpose of the sanctuary was to prevent gear conflicts between mobile foreign gear and domestic fixed gear. An adjacent area, closed to trawling during winter, in order to reduce incidental catches of juvenile halibut, was added in later bilateral agreements.

The agreements with Japan and the USSR were renegotiated at two-year intervals. Subsequent agreements created some changes in areas of fishing withing the U.S. contiguous zone, and provided areas within the zone for transshipment of cargo between foreign fishing and support vessels. This series of agreements was expanded to include Canada in 1970, allowing for reciprocal fishing privileges within the contiguous fishing zone. Agreements were also signed with the ROK in November 1972, and with Poland in May 1975. No fishery agreements have been signed with Taiwan.

Starting in 1973, the bilateral agreements between the United States and Japan and the USSR begin to include catch quotas for these nations in the eastern Bering Sea and Aleutian Island regions. Annual quotas for the years 1973-76 are given in Table 15.

In addition to the crab pot sanctuary, the bilateral agreements have provided other area-time closures to Japanese and Soviet trawl fisheries for the protection of halibut. These closures are designed to reduce the incidental catch of halibut by trawl fisheries in areas and time periods that halibut form concentrations. Area-time closures currently in effect for these fisheries are shown in Figures 17 and 18.

Restrictions on Polish and ROK fishing vessels in the eastern Bering Sea and Aleutian Island regions are shown in Figures 19 and 20.

Current regulations pertaining to foreign groundfish fisheries are found in Section V-A of the Preliminary Fishery Management Plan for the Trawl Fishery of the Bering Sea and Aleutian Islands, and include catch limitations, prohibition on the retention of certain species of importance to the United States, and time-area closures to prevent gear conflicts and provide protection to halibut. Catch limitations imposed on foreign fisheries in 1977 are listed in Table 16.

Table 15.—Catch quotas applicable to Japanese and Soviet fisheries in the eastern Bering Sea and Aleutian Island region in 1973-76. (MT)

Area/fishery	Species	1973	1974	1975-76
		Japan		
Eastern Bering Sea Mothership-North Pacific Trawl	Pollock	1,500,000	1,300,000	1,100,000
	Groundfish other than pollock	—	—	160,000
	Herring	1969 level (33,000)	1969 level (33,000)	15,000
North Pacific Longline-Gillnet	Herring	1971 level (4,600)	1971 level (4,600)	3,000
Landbased Dragnet	Groundfish (All species)	—	—	35,000
Aleutian Region Mothership-North Pacific Trawl and Longline-Gillnet	Pacific ocean perch	—	—	9,600
	Sablefish	—	—	1,200
Landbased Dragnet	Groundfish (All species)	—	—	8,500
		U.S.S.R.		
		(1973-74)		
Eastern Bering Sea	Flatfish	100,000		(Included in other species)
	Pollock	—		210,000
	Herring	—		30,000
	Other species	—		120,000
Aleutian Region	Rockfish	—		12,000
	Other species	—		16,000

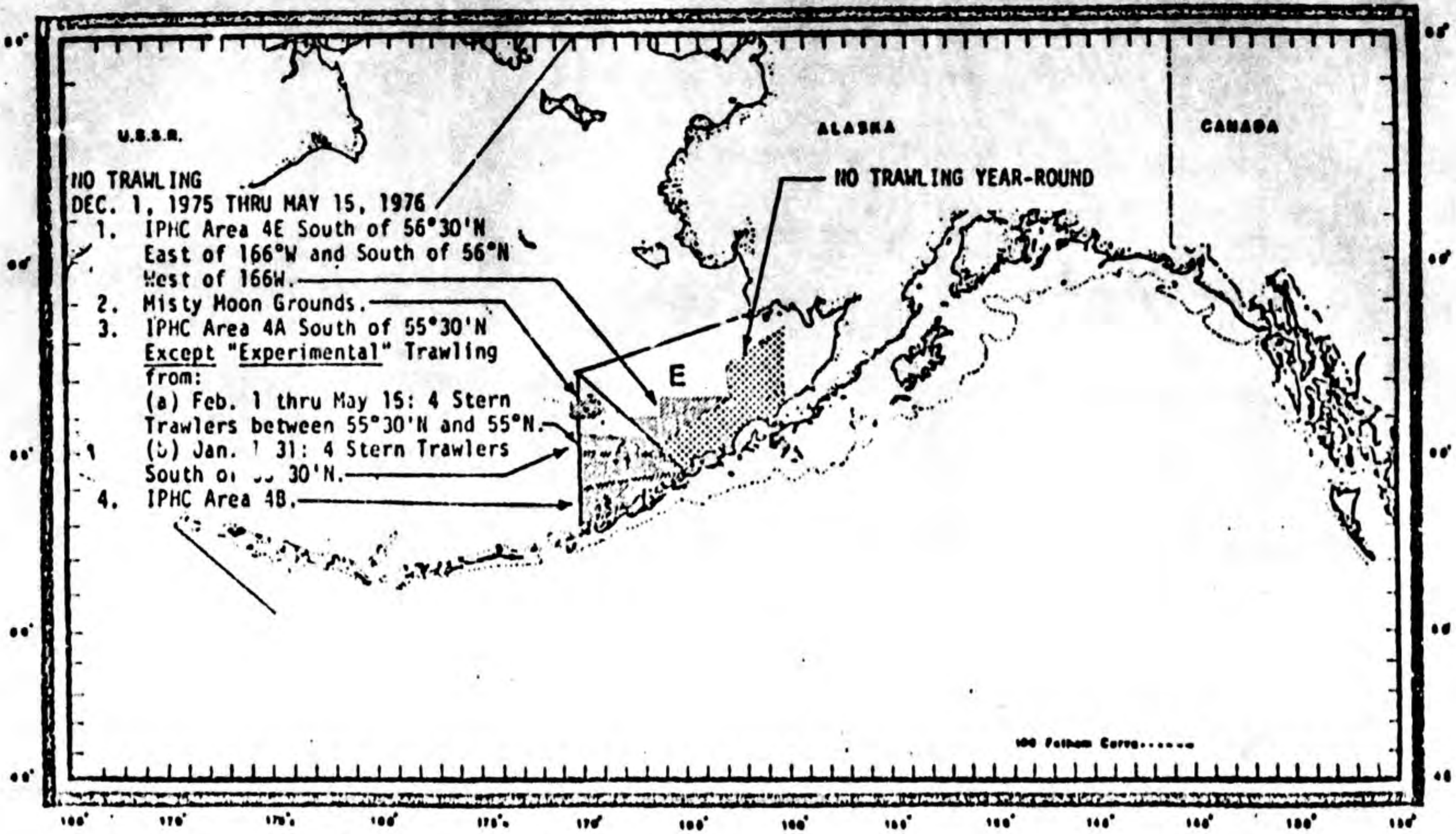


Figure 1%--Area-time closures and restrictions for Japanese trawl fisheries in southeastern Bering Sea, effective through December 31, 1976.

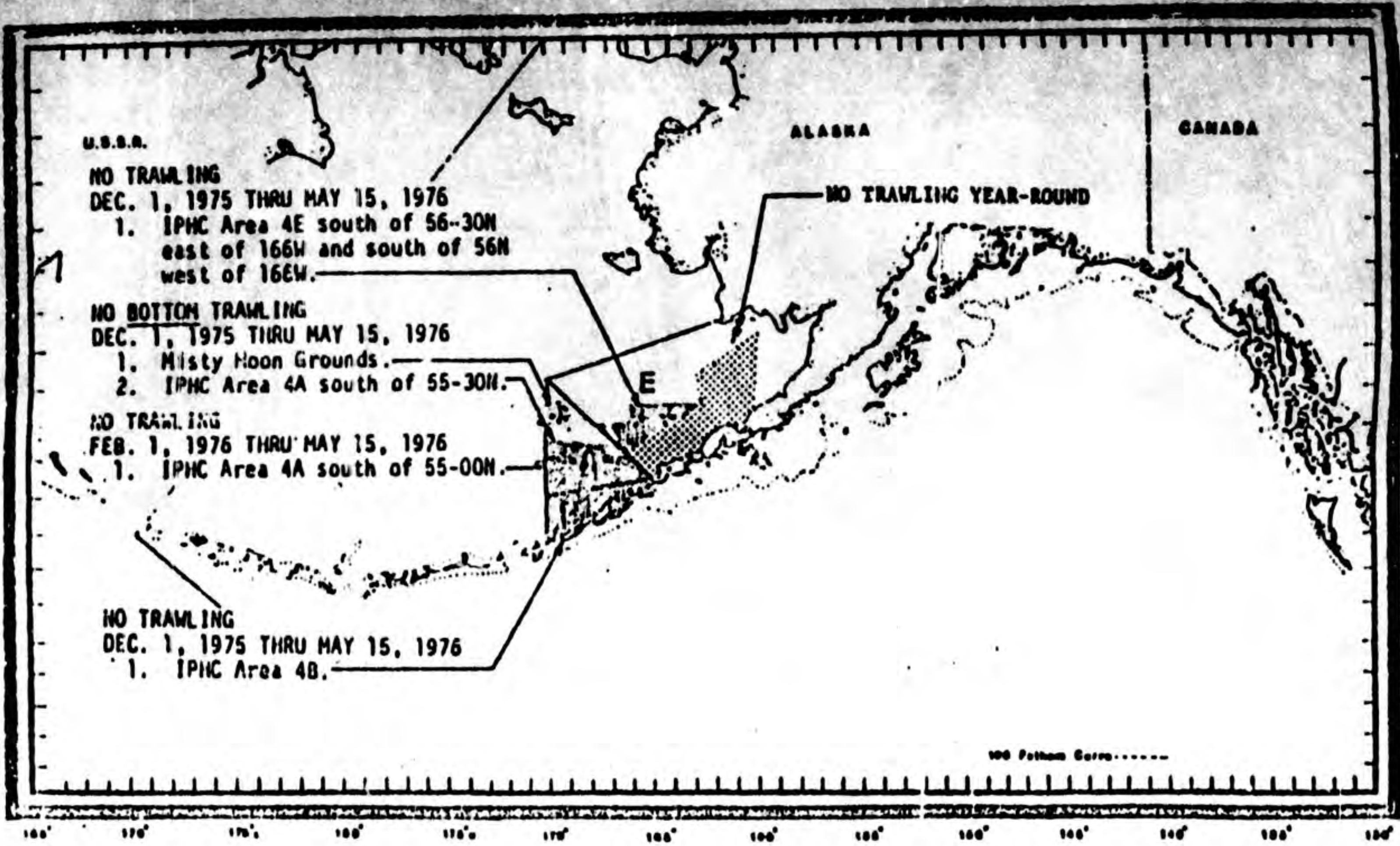


Figure 18.--Area-time closures and restrictions for Soviet trawl fisheries in southeastern Bering Sea, effective through December 31, 1976.

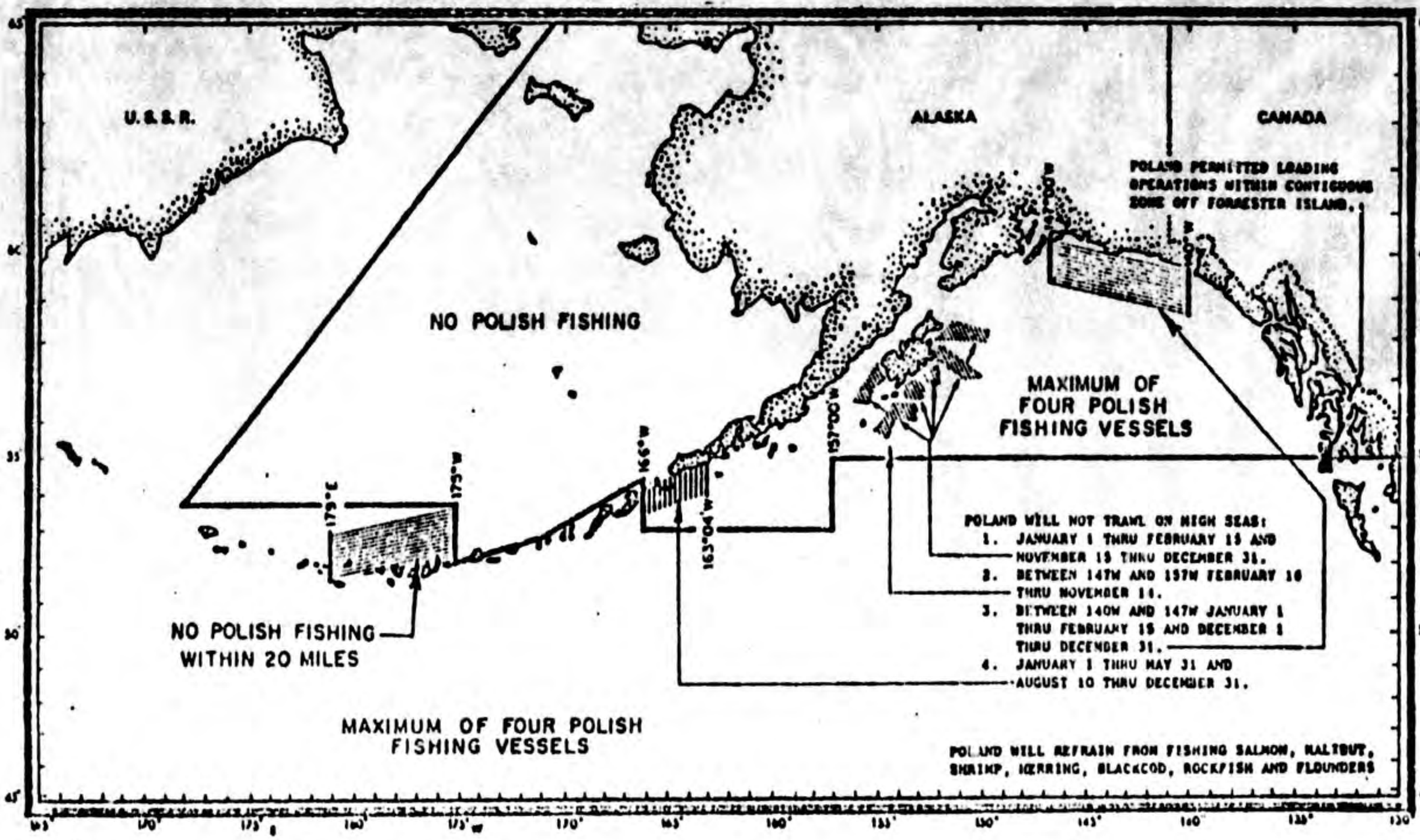


Figure 19.--Area-time closures and restrictions for fisheries of the Polish People's Republic in the Gulf of Alaska and Bering Sea, effective through December 31, 1976.

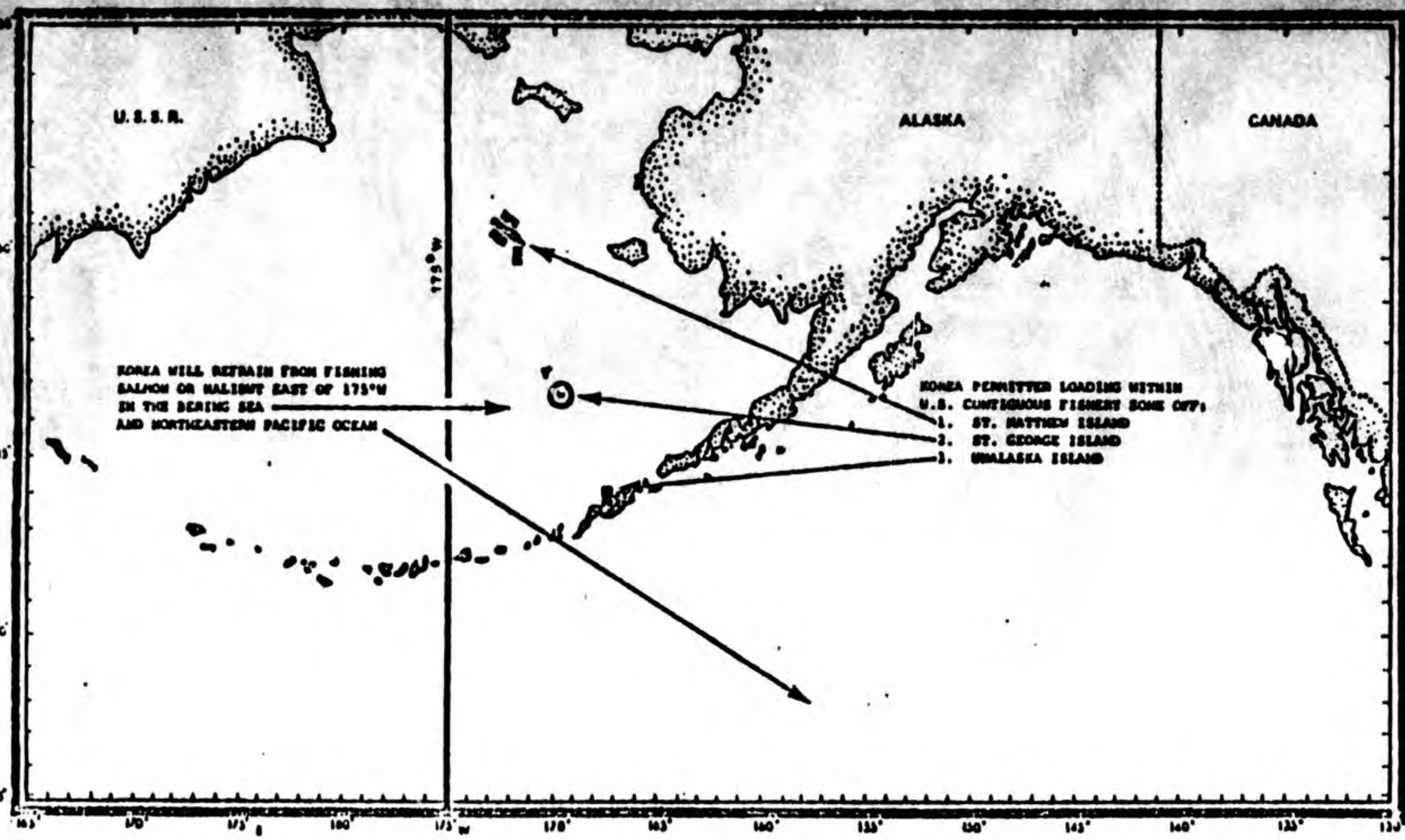


Figure 20.--Provisions of the United States-Republic of Korea Fisheries Agreement effective through December 12, 1977.

Table 16.—1977 Groundfish and squid catch limitations (1000 mt) for foreign fisheries in the eastern Bering Sea and Aleutian Islands region.

Species	Area	Nation: Japan	USSR	ROK	Taiwan	Total assigned	Unassigned[1]	Total foreign allocation
Pollock	Bering Sea/ Aleutians	792.3	112.7	40.0	5.0	950.0	0	950.0
Sablefish	Bering Sea	3.6[2]	0.6[3]	0.4[2]	0.2[3]	4.8	0.2	5.0
	Aleutians	2.0[2]	0.2[3]	0.2[2]	0	2.4	0	2.4
Pacific cod	Bering Sea/ Aleutians	38.1	17.2	0	0	55.3	2.7	58.0
Yellowfin sole	Bering Sea/ Aleutians	62.1	40.8	0	0	102.9	3.1	106.0
Other flounders	Bering Sea/ Aleutians	61.5	40.4	0	0	101.9	3.1	105.0
Pacific ocean perch	Bering Sea	2.8	3.5	0	0	6.3	0.2	6.5
	Aleutians	6.5	8.1	0	0	14.6	0.4	15.0
Other groundfish	Bering Sea	40.4	17.4	1.6	0.2	59.6	0	59.6
	Aleutians	23.1	9.9	0.89	0.11	34.0	0	34.0
Squid	Bering Sea/ Aleutians	10.0	0	0	0	10.0	0	10.0

1/ Portion of total foreign allocation unassigned for possible use by a domestic fishery.

2/ Includes incidental trawl catch.

3/ Incidental catch only.

6.2.2 Purposes of regulatory measures

Most of the regulatory measures pertaining to foreign groundfish fisheries in the eastern Bering Sea and Aleutian Islands were implemented for conservation of halibut stocks and to prevent gear conflicts between foreign trawlers and domestic fixed gear (crab pots and halibut setlines). In negotiating these restrictions on foreign fisheries in international waters, certain concessions were provided the fisheries involved in terms of fishing and loading privileges within the U.S. contiguous fishing zone.

With the decline in abundance of halibut in the eastern Bering Sea in the mid-1960's, negotiations were directed toward reducing or preventing foreign fisheries from targeting on halibut. When it became apparent that these measures were not creating the desired improvement in the condition of the halibut stock, other measures involving time-area closures were negotiated to reduce the incidental catch of halibut by foreign trawl fleets. The retention of trawl-caught halibut was also prohibited.

As evidence became available of deterioration in the condition of other bottomfish stocks in the eastern Bering Sea and Aleutian Islands, negotiations were initiated to limit or reduce foreign catches of these species in an attempt to arrest these declines and restore the resources to higher productivity. Catch quotas for Japanese and Soviet fisheres were first implemented in 1973 and were carried forward, with some modifications, until 1977 when foreign fisheries came under jurisdiction of the U.S. Fishery Conservation and Management Act.

6.3 Effectiveness of Management Measures (foreign and domestic)

Closures to foreign trawling of crab and halibut fishing areas have undoubtedly reduced conflicts between the foreign trawlers and U.S. fixed gear. Gear losses have continued, but recent losses have occurred outside areas closed to foreign trawling.

Restrictions on the North American setline fishery have reduced fishing mortality on stocks of adult halibut, but the primary problem appears to be a reduction in the number of young halibut entering the fishery. Recent time-area closures have reduced the incidental catch by foreign trawlers and the abundance of young has increased since 1972 (Table 17). Although the increase is encouraging, it will not improve conditions in the setline fishery for several years, and abundance is still well below that in the 1960's. The present poor condition of the resource probably is a result of several factors: excessive setline removals in the early 1960's, high incidental catches of juvenile halibut by foreign trawlers in the 1960's and early 1970's, and reduced productivity from adverse environmental conditions (Hoag, 1976). Because halibut are a long-lived species, rehabilitation of the resource will be a lengthy process regardless of present management measures.

Regulations in the form of catch quotas implemented in 1973 and later years to mitigate the deterioration in condition of other groundfish species in the eastern Bering Sea and Aleutians have perhaps begun to show some benefit for certain species while not for others. Other factors such as year-class strength, time-area closures designed to protect halibut but also beneficial to other species, and the reduction of effort on some species, may have also influenced the current status of some stocks.

Catch limitations have reduced the catch of pollock from over 1.8 million mt in 1972 to 950,000 mt in 1977. Based on analysis of catch and effort data from the commercial fishery the abundance of pollock declined through 1975 (Low et al. 1977). Preliminary evidence that abundance in 1976 was similar to that in 1975 (INPFC 1977) offers some indication of an arrest in the decline of pollock abundance in the eastern Bering Sea. Lower fishing mortality, stemming from the catch limitations, have probably helped to lessen the decline in the pollock stock and may be contributing to a halt in this decline.

For species such as Pacific ocean perch and sablefish there has been, as yet, no evidence that catch restrictions have improved the poor condition of these stocks. In the case of long-lived and slow growing species like Pacific ocean perch and sablefish several years will be required before evidence is available to judge the effectiveness of current management policies.

Table 17. Relative abundance of juvenile halibut by age groups from the Bering Sea Index Stations, 1966-1977 (from IPHC 1977b).

Year	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Total
			Number per hour trawled				
1966	0.2	17.2	4.9	7.6	0.9	0.2	31.0
1967	0.6	4.3	4.6	6.0	0.5	0.6	16.6
1968	0.3	6.4	1.8	3.1	0.5	0.4	12.5
1969	2.7	4.1	4.7	0.4	0.7	0.2	12.8
1970	0.4	8.8	2.0	0.7	0.2	-	12.1
1971	3.7	2.6	7.6	0.3	-	-	14.2
1972	0.1	2.0	0.5	0.4	0.1	-	3.1
1973	0.1	3.7	1.9	0.7	0.2	-	6.6
1974	0.1	1.2	3.7	0.8	0.3	-	6.1
1975	0.5	3.2	5.3	2.0	0.7	0.1	11.8
1976	0.3	6.5	4.5	1.2	0.3	0.1	12.9
1977	0.4	5.4	9.5	2.1	1.4	0.1	18.9

There is evidence that the condition of stocks of yellowfin sole, rock sole, flathead sole and Alaska plaice have improved or remained relatively stable in recent years (Wakabayashi and Bakkala 1977; Bakkala and Wakabayashi 1977). Their condition has benefited from a series of relatively strong year-classes originating in the late 1960's. Winter time-area closures in the southeastern Bering Sea, designed for the protection of halibut, also benefit these species because they form winter concentrations in this area as well. The absence of a directed Soviet fishery on these species of flounders since 1972 may have additionally benefited the stocks. Thus, factors other than management measures directly applicable to the four small flounder species may be responsible for their current status. Catch limitations, however, are designed to maintain and improve their productivity.

For other principal species considered in the plan (Pacific cod, Atka mackerel, arrowtooth flounder, Greenland turbot, and squid) information is lacking to adequately assess the current condition of the stocks relative to the recent past. There is no evidence to suggest that the stocks are depressed and catch limitations are designed to maintain the population at current levels.

7.0 HISTORY OF RESEARCH

Investigations of groundfish resources of the eastern Bering Sea have been conducted by the United States, Canada, Japan, and USSR. U.S. research efforts have been of the longest duration (1880 to present) and were initiated to assist the development of U.S. cod and halibut fisheries. As these and other fishery resources of the eastern Bering Sea became increasingly utilized, and in some cases overfished in the decades of the 1960's and 1970's, investigations became more directed towards providing guidelines for resource management and conservation.

7.1 United States1/

The first major study of the demersal fishery resources of any consequence occurred in 1890 when the U.S. Fish Commission's steamer Albatross was directed into the southeastern Bering Sea to determine the locations and characteristics of important cod-fishing grounds (Rathbun 1894). Later in 1911, the Albatross also investigated halibut banks just north of Unimak Island (Alexander 1913). In 1930 the International Pacific Halibut Commission (IPHC) conducted exploratory setline fishing along the Aleutian Islands and tagging of halibut in Makushin Bay on the north side of Unalaska Island (Dunlop et al. 1964).

The first extensive and systematic survey of demersal fishery resources of the eastern Bering Sea was conducted in 1941 by the U.S. Fish and Wildlife Service (Fishery Market News 1942). Bottom trawling was conducted in the southeastern Bering Sea north to St. Lawrence Island, and in Norton Sound. Although the primary purpose of the survey was to locate areas of king crab abundance, information was also collected on the quantities and types of demersal fish encountered.

Continued interest in the commercial potential of crab and groundfish of the eastern Bering Sea resulted in further investigations after World War II. There were cooperative U.S. Government-industry ventures in the northeastern Bering Sea in 1947 (King 1949) and in 1948 (Wigutoff and Carlson 1950). The IPHC resumed exploratory setline fishing and tagging of halibut in the eastern Bering Sea in the 1950's (Dunlop et al. 1964).

1/ Includes Canadian research done in cooperation with the U.S., within the framework of the International Pacific Halibut Commission.

With the development and intensification of fisheries in the eastern Bering Sea in the 1950's and 1960's, U.S. and IPHC research surveys began to be conducted in a more systematic and standardized manner. These investigations initially sought improved information on changes in abundance and recruitment of king crab and halibut, but other species were also later included. The U.S. Bureau of Commercial Fisheries (now the National Marine Fisheries Service) began systematic annual bottom trawl surveys in the southeastern Bering Sea in 1955 to obtain information on the distribution, abundance, biology, and recruitment of king crab. These surveys were interrupted for the period 1962-1965, but were continued in 1966. In 1968, Tanner crab was included in these surveys and received special study, and in 1971 biological studies of important groundfish species were also added. These annual crab-groundfish surveys are a continuing activity by the NMFS. In the late summer of 1975 and spring of 1976, NMFS conducted multivessel groundfish and shellfish surveys in the eastern Bering Sea to provide baseline environmental information to the Bureau of Land Management's Outer Continental Shelf Environmental Assessment Program.

Beginning in 1963 and annually since 1965, the IPHC has been systematically monitoring by means of bottom trawl surveys the distribution and abundance of young halibut in the eastern Bering Sea (Best 1969a and b; 1970; 1974).

In recent years, U.S. observers have been placed aboard foreign fishing and processing vessels to examine catches of target species (primarily pollock), and incidentally-caught halibut.

7.2 Foreign

Japanese research investigations in the eastern Bering Sea began in the mid-1950's, although there had been some experimental trawl fishing on bottomfish by Japanese commercial interests in this region in the early 1930's (Kibesake 1965). In 1956 the Oshoro Maru engaged in limited exploratory trawl fishing in the eastern Bering Sea. The Oshoro Maru has continued investigations from the 1950's to present time (Hokkaido

University 1957, 1960, 1964-66). Other limited trawling investigations were conducted in 1961 through 1964 (Shimonoseki University of Fisheries 1966; Tsuruta et al. 1962).

Extensive and systematic surveys of eastern Bering Sea groundfish by the Japanese were begun in 1963 by the Japan Fishery Agency (JFA), and have continued annually with the exception of 1972 (Japan Fishery Agency 1975 b). These surveys have covered broad areas of the continental shelf, and in some years the shelf edge and upper continental slope. Included in the Japanese investigations have been tagging studies on halibut, sablefish, pollock, and yellowfin sole.

The Japanese have been collecting catch and effort statistics and biological information from their groundfish fisheries since 1964, and providing these data to the U.S. through the International North Pacific Fisheries Commission.

Although the Soviet Union conducted limited exploratory surveys in the eastern Bering Sea in the early 1930's and early 1950's (Moiseev 1963), their first extensive investigations of demersal fish and shellfish resources in the eastern Bering Sea were during 1957-63. The main purpose of these surveys was the determination of the extent and potential uses of resources prior to commercial exploitation by the Soviet fleet. Information was als o gathered on the biology of important species populations and environmental features associated with their distributions (Moiseev 1963-64; 1970).

Since 1963, the Soviet Union has continued its research on eastern Bering Sea fishery resources, which have included pollock and other demersal fishes.

8.0 SOCIO-ECONOMIC CHARACTERISTICS OF THE DOMESTIC FISHERY

8.1 Commercial Fishery

8.1.1 Commercial fishing fleet

In 1977 less than 100,000 pounds of groundfish was landed and sold for human consumption. The number of vessels operating in the fishery has been so small that specific information cannot be disclosed without violating the confidentiality of individual reports. There is a slightly larger groundfish fishery for bait for use by crab boats operating in the area, although fish tickets are not made out systematically when the groundfish are caught or sold. Alaska Department of Fish and Game biologists, extrapolating from a similar bait fishery operating in the Gulf of Alaska, and considering the size of the crab fishery and number of boats known to be catching groundfish for bait in the Bering Sea area, have estimated the harvest for this purpose at about 450 mt in 1977, and as high as 1,300 mt in 1978.

In all, the total domestic commercial groundfish catch in the Bering Sea/Aleutian region (excluding halibut) is believed to have been no more than 1,500 mt in any recent year.

8.1.2 Domestic commercial processing industry

Although substantial freezing and transshipping facilities are located at Dutch Harbor, with the exception of very small amounts of groundfish frozen for crab bait no groundfish processing (except halibut) has occurred in this region in recent years.

8.1.3 Products and Markets

The viability of a domestic Bering Sea groundfish fishery will ultimately depend on the ability of U.S. industry to market products at prices which cover their production costs. An understanding of these market conditions will be important for the accurate determination of DAH. Although the U.S. and world groundfish markets are not fully understood, it appears that there are not at present significant opportunities to market Bering Sea groundfish at prices which will cover U.S. costs of production. For at least the near term, the domestic groundfish fishery in the Bering Sea will be limited to local markets for bait and to demonstration projects. The market for fishery products is in a state of change, however, and it is entirely possible that new markets could open up in the near future. One possible change might come from management actions taken to deliberately influence market conditions.

It is at least theoretically possible that the determination of OY could influence markets and prices. For any commodity a reduction in supply from one course, such as foreign groundfish landings, may improve market opportunities for other suppliers, such as U.S. fishermen. At present there is no information on whether this relationship is significant for Bering Sea stocks, or whether it might be sufficient to overcome costs of U.S. operations.

Table 18 illustrates the importance of the Northeast Pacific (FAO area 67), including the Pacific Coast above California) in production of pollock, flounders, and cod. In 1975 the Northeast Pacific produced 20% of the world's pollock, 16% of the world's flounders, and 3% of the world's cod. For these groundfish species the likelihood of influencing world price through manipulation of OY is low due to the relatively small share of world production coming from the northeastern Pacific. For example, if the pollock OY for the eastern Bering Sea was to be set 30 percent below ABC in an attempt to increase the world price for that species, world pollock supply would be reduced by something less than 6 percent (30% x 20% = 6%). However, for particular markets (e.g., the Japanese market for "surimi", it might be possible for reductions in foreign allocations to have an influence on either price offered for U.S. products or the willingness of customers to consider buying such specific products from U.S. processors.

If it were found that such a relationship did exist, its exploitation would present an additional set of tradeoffs between the management objectives of domestic industry development, consumer interest and price, full utilization of the resource and U.S. foreign policy interests. No such relationship has yet been identified; therefore, no adjustments to OY for this purpose have been made.

	World Total	Northeast Pacific (FAO Area 67)	Percentage Produced in Northeast Pacific
Pollock and Saith	5709117	1117858	20
Flounders	1146276	179145	16
Atlantic and Pacific Cod	2589086	70815	3

Table 18. 1975 World and Northeast Pacific production of selected groundfish (metric tons).

Published information on U.S. groundfish utilization and prices is reported in Table 18a. Apparent consumption for any period is a derived figure; the sum of beginning stocks, domestic productions and imports, less ending stocks and exports.

In 1977 U.S. apparent groundfish consumption was 803.4 million pounds, 364 million pounds of fresh and frozen fillets and 438.9 million pounds of sticks and portions. Eighty percent of fillets and essentially all the frozen blocks used in sticks and portions were imported.

1977 retail prices for groundfish fillets ranged from $3.32 per pound for fresh flat fillets to $1.68 per pound for frozen ocean perch fillets. An average price for all sticks and portions was $1.77 per pound. Historically groundfish prices have risen at a greater rate than general inflation, while prices of substitutes such as beef, pork and poultry have not kept pace.

The distribution of groundfish consumption by region and market type is not available from published sources. However, approximations were obtained by consultation with industry. Over half the stick and portion production is sold to institutions; the remainder is sold to households. Within the institutional category, most fish sticks are sold to such public institutions as schools, hospitals, and military installations, whereas restaurants are the major institutional buyers of fish portions.

Institutions buy an even greater proportion of frozen fish fillets. Within the institutional category, most fillets are sold to restaurants.

On a geographic basis, frozen groundfish consumption is higher in the midwest and south where alternate fish products are not as readily available.

8.2 Recreational Fishery

Historically, there was no recreational fishing in the Bering Sea/ Aleutian area; presently, the effort is small, if indeed it exists, and is conducted in inshore waters.

8.3 Subsistence Fishery

Subsistence fishing activities of Native Alaskans in the Bering Sea/Aleutian area pre-date history. To what extent the subsistence effort was conducted in offshore waters can be based only on scant

Table 18a. U.S. GROUNDFISH UTILIZATION AND PRICES

Product and Species	Beginning Stocks	Domestic Production	Imports	Total	Ending Stocks	Apparent Consumption
	Supplies and Utilization (Millions pounds product weight)					
Fresh and frozen fillets	53.2	70.7	303.9	427.8	63.3	364.5
Cod	16.2	25.4	122.2	163.8	27.2	136.6
Flatfish (Flounder and Turbot)	17.6	24.2	95.6	137.4	18.9	118.5
Haddock	5.1	10.5	40.9	56.5	7.7	48.8
Ocean perch	14.3	10.6	45.2	70.1	9.5	60.6
Sticks and Portions	31.1	(437.8)*	.6	469.4	30.5	438.9
Sticks, Cooked						
Cod						
Haddock						
Pollock						
Whiting						
Portions, raw breaded						
Cod						
Haddock						
Pollock						
Whiting						
Blocks	61.1	4.6	385.1	450.8	7[illegible]2	(377.6)**
Cod						
Cod minced						
Flounder						
Haddock						
Pollock						
Pollock, Alaska						
Whiting						
Wolffish						
TOTAL	145.4	75.3*	689.6		167.0	803.4**

Table X 1977 U.S. Groundfish Supplies, Utilization and Prices
Source: National Marine Fisheries Service, NOAA, Foodfish Market Review and Outlook, December 1977

* Excludes production of sticks and portions from imported blocks

** Excludes blocks but includes sticks and portions.

Table 18a. continued

U.S. GROUNDFISH UTILIZATION AND PRICES

Prices (cents per pound 1977 dollar)

	Wholesale			Retail	
	Exvessel	Fresh	Frozen	Fresh	Frozen
Fresh and frozen fillets					
Cod	25.5	162.3	91.1	253.1	169.7
Flatfish (Flounder and Turbot)	47.6		116.7	331.5	235.5
Haddock	33.6	161.6	104.9	253.7	185.3
Ocean perch	15.3		93.1		168.0
Sticks and Portions					177.0
Sticks, cooked					
Cod			109.1		
Haddock			111.3		
Pollock			74.9		
Whiting			72.3		
Portions, raw breaded					
Cod			109.7		
Haddock			111.7		
Pollock			73.7		
Whiting			70.3		
Blocks					
Cod			97.8		
Cod minced			36.1		
Flounder			95.6		
Haddock			101.4		
Pollock			60.4		
Pollock, Alaska			60.7		
Whiting			54.4		
Wolffish			87.9		

historical reference and oral tradition. The vast majority of these efforts were concentrated on salmon, anadromous char and river herring, taken for the most part by various methods in inshore waters.

Additional efforts were conducted offshore on halibut and cod. One example of the cod fishery is that of the village of Mekoryuk, on Nunivak Island, where fishing activity offshore was conducted until the late 1940's, when, for reasons unknown, the cod failed to appear in their accustomed waters. As a consequence, that fishery does not exist at the present time. The bulk of the subsistence effort offshore was directed against otter, seal, sea lion, walrus, polar bear and birds and eggs inhabiting islands and rocks.

8.4 Indian Treaty Fishery

No Indian (Native Aleut-Indian-Eskimo) treaty fishing rights are reserved in the Fishery Conservation Zone.

8.5 Area Community Characteristics

Profiles for over 100 Alaskan coastal communities, several of which are located in or near the Bering Sea/Aleutian region, are available for reference at the following sites:

North Pacific Fishery Management Council headquarters, Anchorage, AK
National Marine Fisheries Service, Alaska Regional Office, Juneau, AK
National Marine Fisheries Service, Northwest Regional Office, Seattle, WA
Alaska Department of Fish and Game headquarters, Juneau, AK

A sample community profile is shown in Appendix I.

8.6 Interaction Between User Groups

8.6.1 Trawl vs halibut

The halibut fishery in the Bering Sea and Aleutians is affected by domestic fisheries for crab and shrimp and by foreign fisheries for groundfish. The kind of impacts include destruction of gear, preemption of fishing grounds, and a reduction in abundance that results from the incidental capture of halibut. The North American setline catch peaked in 1963 at 4,900 mt but has been below 500 mt since 1972.

The effects of current domestic operations on both the halibut fishery and resource are less than those of foreign fisheries. Gear conflicts are minimal, and the annual incidental catch of halibut by domestic trawlers is probably less than 100 mt (however, domestic king crab and shrimp fisheries may take incidentally up to 1,000 mt of halibut). A greater impact on the halibut fishery could occur if domestic effort toward groundfish increases.

Regarding foreign fisheries, halibut fishermen occasionally report instances of gear destruction or preemption of grounds. The most important effect of foreign fishing is that of incidental catches. Foreign vessels target on species other than halibut but halibut are taken incidentally in substantial numbers; although regulations require that halibut be released, most die from injuries received during capture.

Hoag and French (1976) used data collected by observers on Japanese trawlers to examine the incidental catch of halibut. The average incidence and size during 1969-1974 is shown by area and month in Table 19. The incidence was highest in the southeastern Bering Sea in the winter and spring. The majority of the halibut were 3 to 7 years old and less than 5 kg. More recent data from observers (Hoag and French, ms.) show a similar seasonal picture, although the rate of incidence is lower because critical areas have been closed to trawling. In February and March 1978, observers were, for the first time, aboard two Japanese longline vessels fishing the southeastern Bering Sea. Their data show that when the longliners fished in shallow water (220-320 m) for Pacific cod the incidence of halibut became extremely high (30 halibut per mt of catch; about 14% by weight). The incidence was much lower (1.5 halibut per mt) when the vessels fished in deeper water (500-620 meters) and the target species were Greenland turbot and sablefish. The average weight of halibut was about 5 kg and the observers reported that most of the halibut were released alive.

Hoag and French (1976) estimated the annual incidental catch of halibut by the Japanese and Soviet trawl fisheries from 1954 to 1974. Their estimates show that the total incidental catch in the Bering Sea peaked in 1971 at 11,500 mt but then dropped to about 5,800 mt in 1974.

Table 19 The average incidence and weight of halibut in Japanese trawls in the Bering Sea, by month and area, 1969-1974.

Month	Area					
	A	B	C	De	Dw	E
	Incidence (Number per metric ton)					
January	—	—	0.054	—	0.070	25.437
February	0.163	—	2.787	—	0.196	2.629
March	5.779	4.930	0.476	—	0.720	8.073
April	2.935	1.341	1.465	—	0.012	2.516
May	7.145	6.976	[illegible]	—	0.131	3.062
June	—	0.000	1.155	—	1.114	1.937
July	—	—	0.040	0.013	0.066	0.000
August	0.021	—	0.157	0.013	0.103	—
September	0.008	0.000	0.187	—	0.007	—
October	0.018	0.000	0.023	—	0.037	0.022
November	0.064	—	—	—	0.049	1.266
December	0.014	—	0.249	—	0.074	27.643
	Average size (kg)					
January	—	—	3.20	—	2.28	0.39
February	0.69	—	1.14	—	5.90	1.07
March	0.90	0.81	1.46	—	2.66	0.48
April	0.93	0.80	1.00	—	0.68	1.33
May	0.64	0.41	1.22	—	1.59	1.13
June	—	—	2.76	—	6.11	1.94
July	—	—	3.01	3.50	7.45	—
August	17.73	—	7.42	3.50	2.03	—
September	7.30	—	3.68	—	4.44	—
October	3.55	-	8.70	—	4.70	2.38
November	1.33	—	—	—	5.15	2.17
December	0.66	—	5.37	—	2.57	0.85

However, about one-third to one-half of this catch occurs in the western Bering Sea and may have only limited effect on the North American fishery. Since 1974, foreign trawling has been prohibited in specific areas of the southeastern Bering Sea during the winter and spring to reduce the incidental catch of halibut. These closures along with a reduction in fishing effort have sharply reduced the incidental catch. Preliminary projections indicate that the incidental trawl catch in the eastern Bering Sea has declined from about 7,000 mt in 1971 to less than 2,000 mt in 1976.

The incidental catch of halibut in the Aleutians is much less than in the Bering Sea, probably around 500 mt.

Hoag (1976) used estimates of the incidental halibut catch and assessed the effect of trawling on the North American setline fishery. The results showed that trawling reduced the survival of juvenile halibut and, therefore, recruitment to the setline fishery. Because the incidental catch consists of juvenile halibut, the yield loss to the setline fishery occurs for many years after a given incidnetal catch, i.e. over the projected lifetime of the fish in the setline fishery. Also, the magnitude of the eventual loss is about 20 percent greater than the magnitude of the incidental trawl catch itself because growth exceeds natural mortality at young age. In the eastern Bering Sea, the estimated annual yield loss in recent years has been about 5,000 mt and represents over 95% of the total potential catch (i.e. of the total potential production, setlines take less than 5 percent). The recent reductions in the incidental catch will not significantly benefit the setline fishery for several years.

In 1977, the average incidence rate for halibut in all foreign trawl fisheries is estimated to have been 0.267 individuals per metric ton of total groundfish catch; average weight of incidentally caught halibut was 8.99 kg.

8.6.2 Trawl vs crabs

U.S. observers aboard foreign trawlers sample the catch prior to sorting by species and count the number of crabs in each sample per unit weight of the entire sample. This provides an incidence rate, expressed as number of crabs per metric ton of total catch. Average incidence rates for particular statistical areas and quarters are then multiplied by the corresponding total catch of each country, and summed over quarters to arrive at an estimate of total incidental crab catch, by nation, for the year.

Before 1977, U.S. observers were only aboard Japanese independent stern trawlers (large trawlers) and groundfish motherships. No valid technique was available for extrapolating incidence rates observed in those two fleets over the Japanese landbased dragnet (small trawlers), Soviet, or Korean trawl fleets. In 1977, however, all fleets were observed and estimated incidental catches of crabs are as follows (number of crabs):

Country	King Crab	Tanner Crab
Japan	583,400	17,446,000
USSR	1,200	3,500
ROK	11,200	54,000
Total	595,800	17,503,500

Between 65 and 70 percent of the incidental Tanner crab catch was *C. opilio*. Incidence rates for both king and Tanner crabs were highest in the Japanese landbased dragnet fleet.

To provide some insight into recent trends, estimates of incidental crab catches by the Japanese mothership and independent stern trawl fleets during 1973-77 are (number of crabs):

Year	King Crab	Tanner Crab
1973	465,600	112,000,000
1974	489,900	155,000,000
1975	155,900	60,000,000
1976	?	26,000,000
1977	297,300	9,600,000

In 1977, the average incidence rate for king crabs in all foreign trawl fisheries is estimated to have been 0.481 individuals per metric ton of total groundfish catch; average weight of incidentally caught king crabs was 1.15 kg. Comparable values for Tanner crabs are estimated to have been 12.970 individuals/mt and 0.33 kg average weight.

8.6.3 Trawl vs salmon

Using the same sampling methods as for halibut and crabs, data collected by U.S. observers produced the following estimates of incidental salmon catches in 1977:

Country	Total number of salmon
Japan	23,890
ROK	23,798
USSR	42
Total	47,730

Of this total, 91 percent were chinook salmon (*O. tshawytscha*) and 9 percent chum salmon (*O. keta*).

In 1977, the average incidence rate for salmon in all foreign trawl fisheries is estimated to have been 0.030 individuals per metric ton of total groundfish catch; average weight of incidentally caught salmon was 4.0 kg.

8.6.4 Trawl vs sablefish longlines and pots

Japanese longline fishermen report that the trawl fishery has expanded geographically and bathymetrically to the point where traditional sablefish longline grounds have been pre-empted. If the condition of sablefish stocks in this region improve to the point where they could support a viable domestic fishery (see Section 9.6.6), the stated interest of U.S. fishermen for developing a longline and pot fishery for that species could be thwarted by the risk of gear conflicts with trawlers unless gear separation measures are affected.

8.6.5 Foreign vs. domestic trawling

With the exception of a very small crab bait fishery, no domestic trawling has taken place in the region. Many U.S. fishing interests perceive the presence of fleets of large foreign trawlers as a de facto impediment to the development of a domestic groundfish trawl fishery in the Bering Sea because of the possibility of: (1) preemption of favored grounds by concentrations of foreign vessels that are 2-3 times the size of the largest U.S. trawlers, and (2) competition for fish by foreign vessels that can apparently operate successfully at levels of abundance and average fish sizes that are less than that required for economic operation of domestic trawlers. (See also Section 10.4).

8.7 Revenues Derived from Fishery

Federal revenues are based on charges placed on foreign fisheries, while state (Alaska) revenues are based on fees and taxes placed on the domestic fishery.

8.7.1 Federal revenues

A summary of U.S. revenues expected in 1978 from charges placed on foreign nations fishing for groundfish within the FCMA zone in the Bering Sea/Aleutians area is presented below:

<u>Expected revenue from foreign nations, Bering Sea/Aleutians, groundfish, 1978</u>

Type of revenue	Total dollars	Source of dollars Japan	U.S.S.R.	R.O.K.	Taiwan
Income - vessel fee	566,700	226,000	269.500	65,800	4,800
Income - poundage fee	7,230,600	4,995,400	2,012,900	202,400	19,900
Reimburseable income (U.S. observer cost)	294,100	224,900	54,500	14,700	--
Fines and penalties	--	--	--	--	--
TOTAL	8,090,800	5,446,300	2,336,900	282,900	24,700

Revenues from vessel and poundage fees total $7,796,700 for 1978. Reimbursable income (to cover the cost of placing U.S. observers aboard froeign fishing vessels in the Bering Sea/Aleutians area) is tentatively estimated at $294,100. Fines and penalties are tied to violations and are, therefore, variable income items. The expected total federal revenue for 1978 is around $8,090,800.

8.7.2 State revenues

Aside from the halibut fishery, virtually no domestic groundfish fishery has existed in the Bering Sea/Aleutians area in recent times. The approximate state revenues derived from the fishery in 1977 are presented below:

Type of revenue	State-wide total, 1977 1/	Bering Sea/Aleutians groundfish fishery: Halibut	Other
	DOLLARS		
Raw fish tax	3,830,280	5,000	*
Cold storage tax (including freezer ship)	2,372,785	5,000	*
Vessel and gear license	654,220	200	*
Commercial fish licenses	430,836	50	*
TOTAL	7,288,121	10,250	*

* negligible to none

1/ Source: Alaska State Department of Revenue

9.0 BIOLOGICAL AND ENVIRONMENTAL CHARACTERISTICS OF THE FISHERY

9.1 Life History Features

Most of the principal groundfish species spawn either in the winter or early spring. Cod, sablefish, and the large flounders, Pacific halibut, arrowtooth flounder, and Greenland turbot, spawn during the winter months in deep water. Most other groundfish species reproduce during the spring (March-June). Atka mackerel is a summer spawner.

The principal groundfish species can be placed into three groups based on their reproduction. Cod, rock sole, and Atka mackerel lay adhesive demersal eggs. Pollock, sablefish, and most flatfish have pelagic eggs. Pacific ocean perch have internal fertilization and release pelagic larvae.

There is considerable variation between species in the amount of eggs or young produced (Table 20). Upon reaching maturity, cod may release over 1,000,000 eggs. Halibut and sablefish are also highly fecund. Pacific ocean perch and Atka mackerel are the least fecund of the groundfish group. Fecundity of all species is generally directly related to size of the female, a characteristic which, among vertebrates, is unique.

Among the principal groundfish species are the long-lived fishes which reach sexual maturity late in life, such as the Pacific ocean perch and the large flounders, Pacific halibut and Greenland turbot. Mortality due to natural causes is relatively low in these species. In contrast, pollock, cod, and Atka mackerel are short-lived and mature at an early age (3-4). Both pollock and cod have relatively high natural mortality and growth rates. Sablefish, Alaska plaice, and the various species of sole mature at ages intermediate to those species groups mentioned above.

Squid is made up of several species where life history features are poorly known. They live at midwater and near surface depths as compared to the near or on-bottom habitat of groundfish. The season of spawning for at least some species may extend from spring to fall. Sexual maturity may be reached in two years or less. Like Pacific ocean perch, fertilization

Table 20--Life history characteristics of principal groundfish species in the eastern Bering Sea and Aleutians.

Life history characteristics	SPECIES											
	Pollock	Cod	Sablefish	Ocean perch	Halibut	Arrowtooth flounder	Greenland turbot	Flathead sole	Rock sole	Yellowfin sole	Alaska plaice	Atka mackerel
Bottom depths of common occurrence (fath.)	30-200	10-150	50-430	50-250	10-250	30-300	50-350	30-200	10-100	10-300	20-90	coastal & open sea
Depths of high availability by season (fath.)	100-200 (winter) 50-150 (summer)	50-150 (winter) less than 100 (summer)	200-400 (winter) 100-450 (summer)	150-250 (winter) 80-150 (summer)	50-225 (winter) 10-100 (summer)	150-300 (winter) 80-200 (summer)	300-500 (winter) 80-430 (summer)	100-200 (winter) 50-150 (summer)	20-100 (winter) 20-50 (summer)	50-150 (winter) 20-50 (summer)	50-70 (winter) 20-50 (summer)	offshore (winter) inshore (summer)
Spawning period	March to July	Jan. to May	Dec. to April	March to June	Nov. to March	Dec. to Feb.	Oct.-Dec.	March to June	March to June	June to August	May-June	June to Sept.
Maximum age	17 years	12 years	20 years	30 years	42 years	22 years	25 years	21 years	16 years	21 years	19 years	?
Average age at maturity (female)	3 years	4 years	7 years	7 years	12 years	9-11 years	13-14 years	6 years	4-5 years	9 years	8 years	3-4 years
Average size at maturity (female)	30 cm	73 cm	71 cm	27 cm	125 cm	55 cm	70 cm	29 cm	22 cm	26 cm	30 cm	33-35 cm
Instantaneous natural mortality rate, M 3/	0.43	0.30-0.45	0.22	0.27	0.17	0.2	?	0.2	0.26	0.25	0.2	?
Growth completion rate, K (female)	0.28	0.30	0.14 2/	0.11	0.10	0.10	0.10	0.11	0.15	0.11-0.18	0.1	?
Fecundity at average size at maturity	100,000	1,000,000 to 2,000,000	400,000	10,000	700,000	?	25,000	50,000	200,000	800,000	100,000	9,000

1/ Values and time periods given to this table are approximations.
2/ Sexes combined.

3/ Many of the biological and population parameters shown in this table are being reevaluated with ecosystem modeling techniques and, therefore, are subject to change.

is internal for squid. The fertilized eggs are released enmeshed in a gelatinous material, and the number of eggs spawned per individual is low compared to that of groundfish species.

9.2 Stock Units

The groundfish and squid resources considered in this Plan consist of species that are wide ranging in their general distribution, occurring in the eastern Bering Sea, Aleutian waters, and in the Gulf of Alaska. Within each of these major geographical regions separate stocks or populations of these species may exist, but our state of knowledge is such that we cannot be certain of this possibility for most species. Research results and fisheries information indicate that for most species resident stocks exist in each major region (E. Bering Sea, Aleutians, and Gulf of Alaska). For other species, such as Pacific halibut and those of squid, this may not be the case.

Those species that are generally considered to have separate stocks residing in the Aleutians as well as the eastern Bering Sea are pollock, yellowfin sole, sablefish, Atka mackerel, Pacific ocean perch, Pacific cod, Greenland turbot, arrowtooth flounder and various species of sole.

For pollock the eastern Bering Sea stock is larger than that of the Aleutians. There has also been some speculation that in the eastern Bering Sea proper, this species may be further subdivided into a northern and a southern stock, primarily because spawning concentrations have been found north as well as south of the Pribilof Islands. (Japan Fishery Agency 1974 b). However, it is difficult to confirm such a separation since there apparently is a considerable amount of mixing of fish through seasonal north-south movements as evidenced from tagging studies.

Tagging studies indicate the existance of separate spawning stocks for eastern Bering Sea yellowfin sole, one of which resides in waters north of a line between the Pribilof Islands and Cape Avinof and another south of this line, with only a limited exchange between them (Wakabayashi 1974). Studies of differences in growth rate, meristic features, and genetic characters, however, have not been conclusive (Wakabayashi et al. 1977). Furthermore, U.S. researchers estimate that about 90% of the total yellowfin sole biomass of the eastern Bering Sea lies in the southern stock area, making the question of less practical importance. Therefore, until more definitive results are obtained, all yellowfin sole of the eastern Bering Sea will be considered as belonging to one stock.

Adult sablefish live mainly in offshore waters at bottom depths of 200 meters and greater throughout their geographical range. Their movements appear to be localized from tagging studies which show that most recovered fish have been taken in the same general area where they are had been tagged and released (Low 1977). A few tagged fish, however, have been recovered a considerable distance from their area of release, and some of these movements have been between major geographical areas, such as the Gulf of Alaska and Bering Sea. These extensive movements, although few, demonstrate that some exchange of fish between major areas does occur, and that separate stocks, if they do exist, may be biologically closely related. At this stage of our knowledge it may be best to consider sablefish as being comprised of separate stocks throughout its geographical range, but that minor intermixing of the stocks does occur. For managing fisheries on these stocks, it may be convenient to treat these stocks as four major and distinct groups; an eastern Bering Sea group, an Aleutian group, a Gulf of Alaska group, and a U.S. west coast group.

There is some circumstantial evidence that Atka mackerel may be comprised of localized stocks throughout its geographical range which includes waters off Kamchatka and the Aleutians, and the eastern Bering Sea and western Gulf of Alaska. The species seeks certain bottom areas for spawning and will return to these areas year after year to reproduce (Rass 1970). Only a few of these areas have been determined, but it is likely that more exist and the spawning concentrations associated with each probably should be considered to be discrete stocks. Until more precise evidence of the location of specific spawning areas becomes available, concentrations in the Aleutian area, the eastern Bering Sea area, and the western Gulf of Alaska will be assumed to comprise separate stocks.

For Pacific ocean perch, differences in biological features (e.g., growth rate) between eastern Bering Sea and Aleutian fish suggest that each of these areas has its own unique stock (Chikuni 1974).

Evidence for the separation of other principal groundfish species (cod, turbot, flathead sole, rock sole, and plaice) is not available, but as a conservative measure, each of these species will be considered to be comprised of separate stocks in the Aleutians and eastern Bering Sea.

Available evidence suggests significant movement of halibut between the eastern and western Bering Sea and between the eastern Bering Sea and the northeastern Pacific Ocean (Best 1977, Dunlop et al. 1964). Circulation patterns indicate that eggs and larvae spawned in the eastern Bering Sea should remain within the Bering Sea. However, the cyclonic circulation in the area will transport eggs and larvae in a northwesterly direction and the current is sufficient to transport larvae to the Asian Coast. It is also likely that larvae originating in the Gulf of Alaska are transported into the Bering Sea.

Large numbers of juvenile halibut inhabit the eastern Bering Sea, and this region may serve as a nursery ground for other regions. Recoveries of tagged juveniles are meager but indicate a movement into the Gulf of Alaska. One juvenile tagged west of the Pribilof Islands was recovered in southeastern Alaska five years later. Tagging data are more extensive for adult halibut and show movements as far south as northern California; Dunlop et al (1964) estimated an emigration rate of 24% over a 7-year period. Tagging also indicates movements from the Gulf into the Bering Sea and between eastern and western Bering Sea, but these movements appear to be relatively infrequent.

In the Aleutians, tagging and other studies indicate that the halibut in the region are an intermingling component of stocks in the Gulf of Alaska and British Columbia (Bell 1967). The total amount of bottom area suitable for halibut in the Aleutians is small and the overall productivity of the region is much less than in the Bering Sea and other regions of the northeast Pacific. Nevertheless, halibut are sufficiently concentrated in local areas to provide good catches for a few vessels.

Squid resources of the eastern Bering Sea and Aleutian waters are believed to be mainly comprised of five species that are wide ranging in their distribution in nothern waters. Four of these species (Gonatus fabricii, Gonatus magister, Gonatotopsis borealis, and Morotenthis robustus) inhabit the near surface and mid-waters of the other continental shelf and beyond the shelf. The other species (Rossia pacifica) prefers inshore waters where it forages throughout the water column. All these squid species are, therefore, much more mobile than most of the groundfishes and apparently roam quite freely throughout their range. Because of this capability, it is assumed that there is considerable intermingling of individuals from different regions; hence, each squid species may be considered as having one interbreeding population common to the Bering Sea, Aleutians, and the western Gulf of Alaska.

9.3 Data Sources

9.3.1 Catch and effort data

Catch and effort statistics are collected on a continuing basis from two main sources: from the commercial fishery and from research surveys. Commercial fishery data are used mainly to compute CPUE trends to monitor the relative abundance of stocks under exploitation. In addition to CPUE computation, trawl survey information can also be used to estimate standing stocks. Commercial fishery data of sufficient detail and precision for Bering Sea/Aleutian stock assessment studies are:

(1) Catch and effort statistics of the Japanese mothership, longline-gillnet, and North Pacific trawl and land-based trawl fisheries, as provided through INPFC;

(2) Catch and effort statistics collected by U.S. observers stationed aboard foreign vessels.

Under the FCMA, similar types of rather precise catch and effort statistics will soon become avaialable from all nations participating in this region's groundfish fishery.

Catch and effort statistics are also obtained from research trawl surveys conducted by the United States' National Marine Fisheries Service, Fishery Agency of Japan, and the International Pacific Halibut Commission. Data from the Fishery Agency of Japan are made available to the U.S. in publications, the INPFC and during bilateral scientific meetings. The International Pacific Halibut Commission conducts an annual assessment of juvenile halibut abundance in the Bering Sea which provides catch and effort information concerning not only halibut but many other groundfish species as well.

Statistics from Japanese fishing operations have been among the most detailed and complete of any nation in the world. In general, they are by species, ½° Latitude by 1° Longitude statistical areas, month, gear type, and vessel class. An exception however, has been Japan's land-based trawl fishery from which the available statistics have been less timely and in less detail. This appears to reflect the fact that they have been collected at the provincial level in Japan rather than by the Fishery Agency of Japan, as has been the case for the other fisheries.

Although improving since the early 1970's, statistics provided by the U.S.S.R. have generally reflected only gross catches of imprecise species groupings for very large statistical areas. Until very recently, effort information has either been lacking entirely or in a form that had little utility for assessing relative abundance (e.g., catch per tow without reference to tow duration).

As regards other nations fishing for bottomfish in the Bering Sea/Aleutian Region, Poland has provided statistics in detail comparable to those of Japan for its very limited fishery. Since 1968, South Korea has conducted a growing groundfish fishery in the Region but no statistics concerning it are available for the period prior to 1976 and those acquired since have been incomplete. Operations by Taiwanese vessels have been few and no statistics have yet been reported.

For status of stock evaluations, the catch and effort data bases generally relied upon are those of the Japanese fisheries, and research surveys conducted by Japan, the United States, and IPHC.

9.3.2 Biological data

Biological data concerning Bering Sea/Aleutian groundfish resources are collected on a continuing basis from the commercial fishery and from research surveys. Those from the commercial fisheries have generally been limited to length-frequency samples from the Japanese fisheries until U.S. observers were placed aboard foreign vessels to sample the catch. The observer program covers a significant portion of the several foreign fishing fleets and has been constructing an extensive data base on length, weight, age and sex of the principal species taken by foreign fisheries.

The most comprehensive source of biological information is that collected during trawl surveys conducted by the United States' National Marine Fisheries Service. In these surveys, length, weight, age, and sex information and at times, sexual maturity and stomach content data, are collected for all species encountered during the surveys. Annual research surveys conducted by the Fishery Agency of Japan and the Soviet Pacific Scientific Research Institute of Fisheries and Oceanography have also provided excellent sources of information on life history, abundance, and distribution of principal species.

9.4 Quality of Data

To be most useful in the evaluation of stock condition and sustainable yield, data from the commercial fisheries should include the catch by species and the quality and quantity of effective effort expended to take this catch; they should be provided for relatively small geographical areas and time periods. In this way trends in catch and standardized catches-per-unit-of-effort (CPUE) can be monitored by precise time-area units so reliable inferences may be drawn concerning stock abundance. In addition, biological sampling should be adequate to estimate size and age composition of the catch, by time and area. These basic fisheries data (catch, effective effort, age and size composition) provide much of the input for determining mortality rates, relative year class strength, changes in stock density, recruitment, and other population characteristics upon which the condition of stocks can be measured.

Japan provides very detailed statistics on her fisheries (see Section 9.3), but even these are deficient in terms of fishing effort, age and size data, and completeness in reporting catches by species. The fishing power of the Japanese fleet has increased because of increases in vessel horsepower, improvements in fish detecting and harvesting gears, and experience acquired by the fishermen of the grounds, making difficult (perhaps impossible) adjustments to the reported nominal effort to reflect true fishing power. There is also the problem of determining what proportion of the total fishing effort was expended on each major species.

Until recent years data on size composition of the principal species harvested by Japan were insufficient because of incomplete areal and seasonal coverages, and the lack of associated age data to accompany the size information.

The U.S.S.R. has had a very poor history of reporting on her fisheries. There was virtually no breakdown of the catch by statistical areas that is useful in stock assessment nor were there data on the age and size composition of the catch. Likewise, data provided by other nations have virtually no utility for stock assessment purposes.

The problem of inadequate detail of commercial fishery information has been partially solved as the U.S. observer program has expanded in scope to sample the foreign commercial catch. This program is also addressing the question of the accuracy and precision of reported catch data.

In addition to the observer program which provides a reliable source of catch, effort, and biological data, research vessel surveys provide an independent and, at times, less biased means of estimating the condition of groundfish stocks. The surveys are conducted in such a manner that estimates of age and size composition and other population characteristics can be obtained for the resource complex as a whole within the survey area, whereas commerical fisheries often concentrate on certain species, sizes of fish, and specific areas. Since research surveys can be done in a standardized manner, CPUE from the surveys serves as a very meaningful indicator of changes in fish density by time and area. Furthermore, surveys of juvenile or pre-recruit fish can best be done by means of research surveys; such surveys provide one of the few means by which predictions of incoming year class strengths can be obtained. There is also the relatively new approach of assessing stock size by acoustical sounding.

The main deficiency in existing survey data is the lack of areal coverage. Because of limitations in budget and physical aspects of the gear and vessels, the deeper waters (greater than 200 m) are generally not surveyed. Therefore, portions of the stocks of deep water flounders (arrowtooth flounder and Greenland turbot), sablefish, Pacific ocean perch and even pollock are not fully sampled. What the research surveys lack in coverage, however, is made up in detail which augments the broader but less precise data base obtained from the commercial fisheries.

9.5 Ecological Relationships

9.5.1 Environmental characteristics

The Bering Sea shelf, with an area of some 1 million km2, is about twice the size of that of the Barents Sea or the North Sea. On the average, it is slightly deeper than the North Sea but shallower than the Barents Sea. The bottom is trawlable over most of the shelf. The Aleutian Island shelves are relatively narrow and rocky, similar to that of the Gulf of Alaska.

Relatively weak tidal currents dominate the Bering Sea shelf. The permanent flow is sluggish and, therefore, the exchange of water masses between shallow and deep areas is very slow. On the other hand, the tidal currents around the Aleutian Islands are relatively strong and strong semi-permanent currents flow through the passes between the islands, effecting the water exchange between the deeper part of the Bering Sea and the central North Pacific.

Central and northern parts of the Bering Sea shelf are ice covered part of the year. Due to the absence of temperature and salinity stratification in the waters over the shelf during autumn and winter, cold water (0°C) is formed there under the ice from surface to bottom. This cold water on the bottom can persist until mid-summer and affects the distribution and migrations of demersal fish.

The annual range of temperature change over the Bering Sea continental shelf (from surface to about 150 m depth) can exceed 10°C. Over deep water near the Aleutian chain this annual change is less than 5°C. There is a subsurface temperature maximum of about 3.5°C, with associated high salinity, at a depth of about 150 m in the whole region under consideration. The areas along the continental slope, where this warmer subsurface layer intercepts the slope, are important overwintering areas for many demersal and even some pelagic fish (e.g. herring).

Of the oceanographic processes and their year-to-year variations, the following are the most significant in respect to the biota; 1) year-to-year variation of ice cover in the central and south-central part of the Bering Sea shelf; 2) the autumnal turnover of water masses on the shelf (returning nutrients from deeper layers and near the bottom to surface layers); 3) considerable monthly surface layer temperature anomalies (up to 3°C) in the central and southern Bering Sea; 4) formation of subzero bottom temperatures on the Bering Sea shelf; and 5) rapid flushing of the Aleutian Island shelves.

9.5.2 Biological characteristics

The Bering Sea is a typical high latitude area, with relatively few species, among which some dominate quantitatively to a high degree over the others. In scarcely any other ocean region is one fish species quantitatively so dominant as pollock in the Bering Sea. Rather pronounced cannibalism occurs in dominant species in general and cannibalistic interactions cause long-term quantitative changes in the ecosystem complex.

The most pronounced biological characteristic of the Bering Sea and Aleutian Islands are is the presence of large numbers of marine mammals (e.g. 1.4 million fur seals alone) and birds (ca. 10 million shearwaters arriving each summer), which consume together at least as many fish as the commercial catch of all nations from this region.

Another basic biological characteristic of the Bering Sea is the presence of benthos on the extensive continental shelf, providing a food source (and support) for flatfish communities and for commercially exploitable crabs. The abundant benthos in the northern half of the Bering Sea contains, however, little "fish food"; most of it is made up of large, hard shelled clams. This northern benthos is similar to other high-latitudes benthos, where a phenomenon called "successive accumulation of generations" occurs.

A fourth general biological characteristic of the Bering Sea/Aleutian region is the relatively high basic organic productivity. This high productivity is largely caused by deep autumn/winter turnover which returns regenerated nutrients to the surface layers. This high organic production (combined with relatively slow decomposition rate of organic detritus in colder waters) causes the presence of a high standing crop of larger zooplankters (euphausids) and boreal squids (gonatid squids), which in turn serve as an important food source for fish (and partly for mammals and birds). Thus, several semi-demersal fish species (e.g. pollock, rockfishes, etc.) are less dependent upon benthic food and can live a pelagic life over deep water in the Bering Sea/Aleutian region.

9.5.3 Ecosystem characteristics

In the marine ecosystem there are intensive interactions between different species, their prey items, and environmental factors. Changes in abundance and distribution of one species (e.g. caused by fishery) affect the abundance and distribution of other species as well. Therefore, wise fisheries management requires the quantitative knowledge of all of these interactions; single species population dynamics' approaches are no longer fully adequate for modern fisheries management.

The quantitative processes in the marine ecosystem are beginning to be simulated and studied with numerical, dynamic, deterministic marine ecosystem reproduction models. A few results, pertinent to management of the Bering Sea groundfish fishery are presented briefly in this section. These results originate from the Dynamical Numerical Marine Ecosystem Model (DYNUMES III), currently in use at the Northwest and Alaska Fisheries Center, Seattle.

The DYNUMES III model permits the determination of equilibrium biomasses of individual species and groups of species (Table 21). Individual biomasses have also been calculated for both the juvenile and exploitable portions of populations (Figure 21). It is of interest to note that the total biomass of, for instance, all finfish varies but little from one year to another in a given region, but individual species can have considerable long-period fluctuations (periods usually larger than 10 years) in abundance, whereby some species incline and other decline in abundance.

The DYNUMES model permits the computation of the main component of "natural mortality"--i.e. grazing and the determination of the portions grazed, for instance, by mammals and by other fish (Figure 22). Grazing (consumption) is computed in trophodynamic computations. The results also allow the computation of annual turnover rates of the biomasses (Table 21).

In ecosystem sense, there is no "surplus" production in the sea for man to take. The question is mainly one of balance between ecosystem components, i.e. changes in target species biomasses and the resultant

Table 21

Biomass, annual consumption, annual turnover rate, and relative monthly consumption of different species and/or ecological groups in the eastern Bering Sea, as computed with DYNUMES II.

Species/ecological group	Mean biomass (B) 10^3 tons	Annual (C) consumption 10^3 tons	Annual turnover rate $\frac{C}{B}$	% of biomass consumed per month
Pollock	8,235	5,820	0.7	5.8
Herring	3,260	2,970	0.9	7.7
Other pelagic fish	6,870	6,595	1.0	8.7
Yellowfin sole	1,475	866	0.6	4.9
Other flatfish	2,030	1,630	0.8	6.7
Other gadids	2,840	2,680	0.9	8.1
Other demersal fish	2,550	2,79[illegible]	1.1	9.0
Total finfish	27,260	23,350	0.86	
Squids	4,050	3,020	0.75	6.4
Benthos	25,600	19,730	0.77	6.3
Zooplankton		83,970		
Phytoplankton		(52,500)		

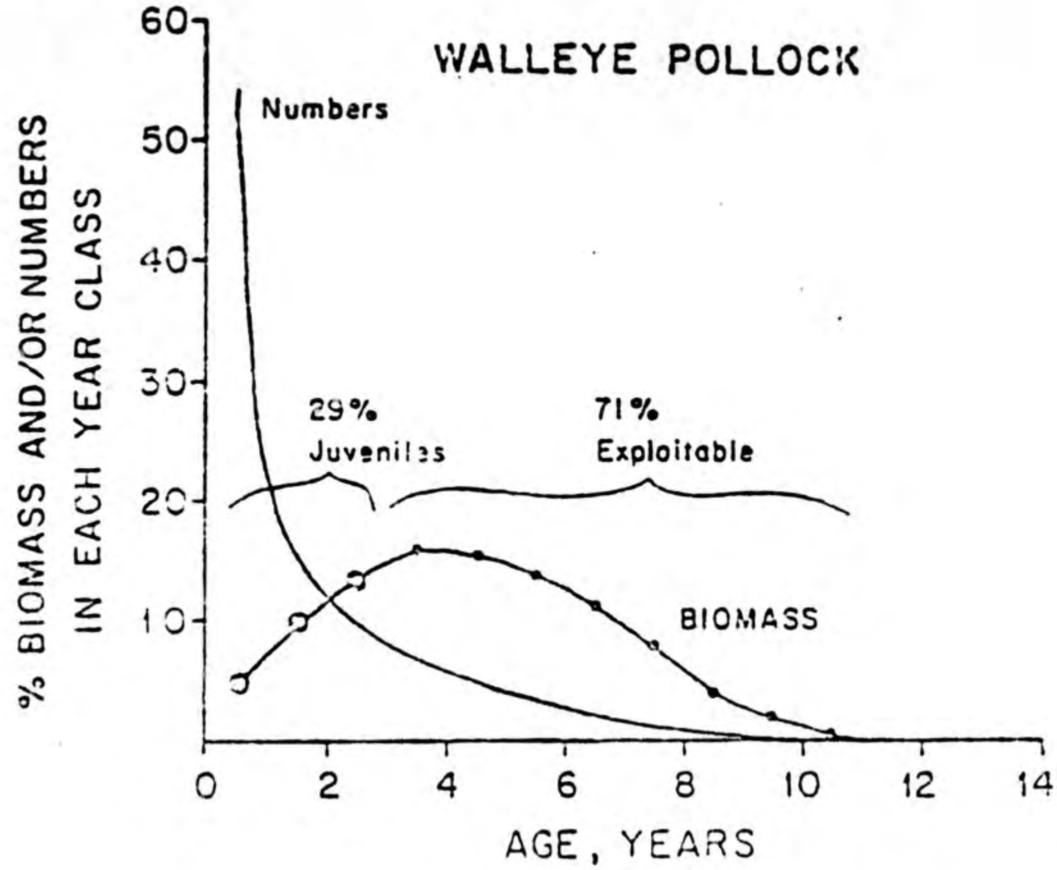


Figure 21--Distribution of biomass and numbers of walleye pollock within different year classes (% of total).

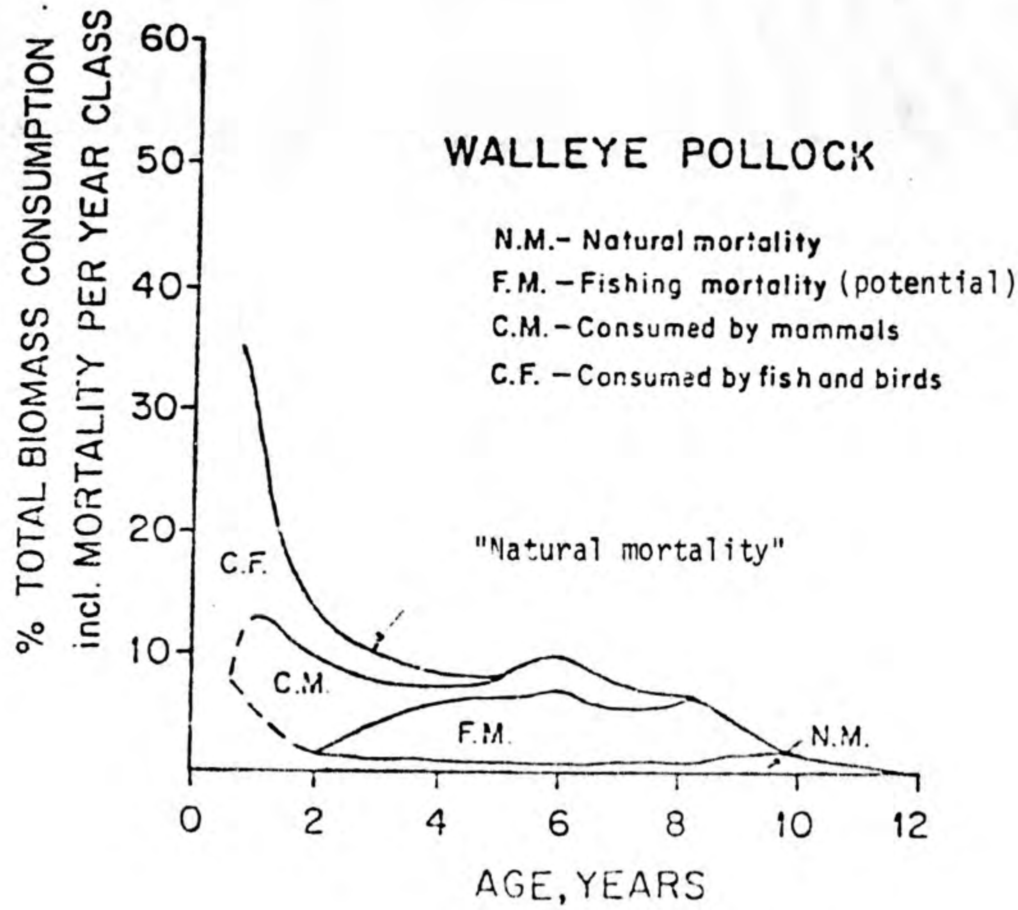


Figure 22.--Distribution of "consumption" with age of walleye pollock, as percent of total biomass.

changes in the biomasses of pray, predator, and competitor species. The determination of such fishery-induced changes is one of the major objectives of the DYNUMES model.

The results of conservative computations of the consumption of fish and other ecological groups by marine mammals and birds in the eastern Bering Sea are given in Table 22 (the computations are conservative in the sense that the lowest estimates of the number of mammals and their food requirements were used). The results show that mammals consume more than twice as much finfish as is taken in the total commerical catch. This strongly implies that finfish yield is at least as much a function of marine mammal abundance as it is a function of the finfish fishery itself.

The DYNUMES model shows that an intensive fishery can be, in some cases, beneficial to the production of biomass. Adult pollock are cannibalistic on juvenile pollock. The growth rate of juvenile fish, which feed mainly on euphausids, is considerably higher than the growth rate of older fish. When an intensive fishery removes older, cannibalastic pollock, the grazing pressure on juveniles is relieved and productivity of the pollock biomass, at large, is enhanced. The model also indicates that in an underexploited population, cannibalistic interaction would result in a self-generating cycle of pollock abundance with a period of about 12 years.

Intraspecific cannibalism, as well as interspecific predator-prey relations cause a partial spatial separation of juveniles and adults (see Figures 23 and 24).

9.6 Current Status of Stocks

Stock assessment studies leading to determination of OY have been conducted on the following Bering Sea/Aleutian groundfish species categories:

Alaska pollock
Pacific halibut
Yellowfin sole

Table 22 --Annual consumption by marine birds and mammals in the eastern Bering Sea (in 10^3 tons), as computed with DYNUMES II ("conservative" inputs).

Species/group of species	Species/group of species consumed: Herring	Other pelagic	Salmon	Pollock	Other gadids	Flatfish	Total finfish	Zooplankton	Squids	Benthos	"Others" (Unspecified)
Marine birds	11.7	40.3	1.5	26.3	+	1.9	81.7	105.2	13.2	2.8	14.3
Fur seal	26.5	8.8	8.8	322.3	22.1	-	388.5	-	44.2	-	8.8
Sea lion	16.8	11.2	22.4	182.2	19.6	-	252.2	-	+	-	+
Bearded seal	25.0	25.0	8.3	83.5	41.7	41.7	225.2	-	66.8	509.2	33.4
Harbor seal	66.9	31.2	6.7	89.2	13.4	8.9	216.3	-	89.2	104.8	13.4
Ringed/ribbon seal	24.2	47.5	3.0	84.7	30.3	-	189.7	-	30.3	+	9.1
Walrus	+	+	1.6	6.6	+	4.9	13.1	-	+	311.4	3.3
Total pinnipeds	159.4	123.7	50.8	768.5	127.1	55.5	1,285.0	-	230.5	925.4	68.0
Baleen whales	20.7	27.7	-	13.8	6.9	-	69.1	1,189.3	124.5	-	+
Toothed whales	231.5	408.5	0.5	340.4	68.1	68.1	1,117.1	-	-	-	245.1
Total, whales, porpoises, dolphins	252.2	436.2	0.5	354.2	74.0	68.1	1,186.2	1,189.3	124.5	-	245.1
Total by birds and mammals	423.3	600.2	52.8	1,149.0	201.1	125.5	2,552.9	1,294.5	479.5	928.2	327.4

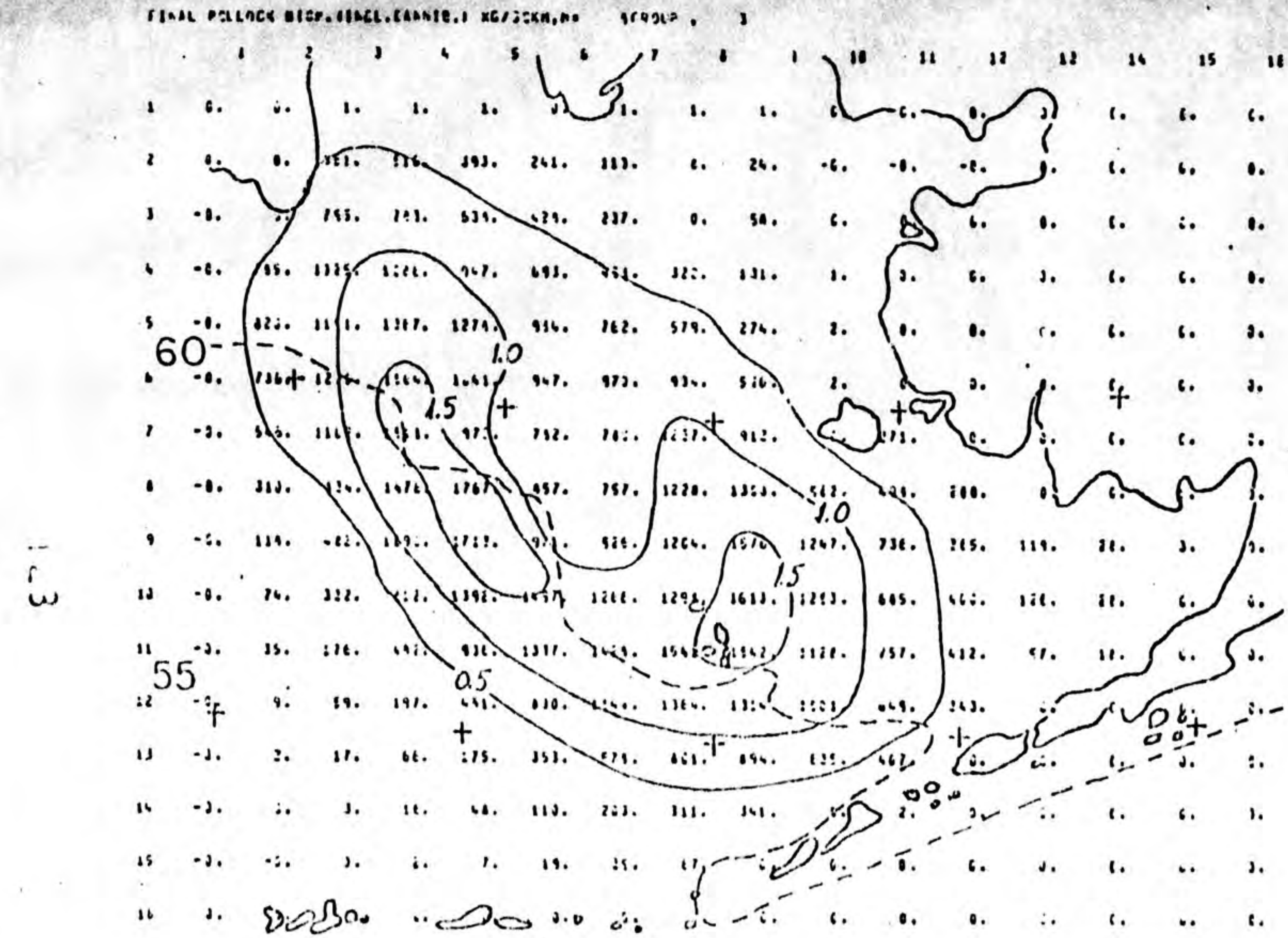


Figure 23 --Distribution of group 3 pollock (35 cm long) in August, computed with DYNUMES II (isopleths in mt/km^2).

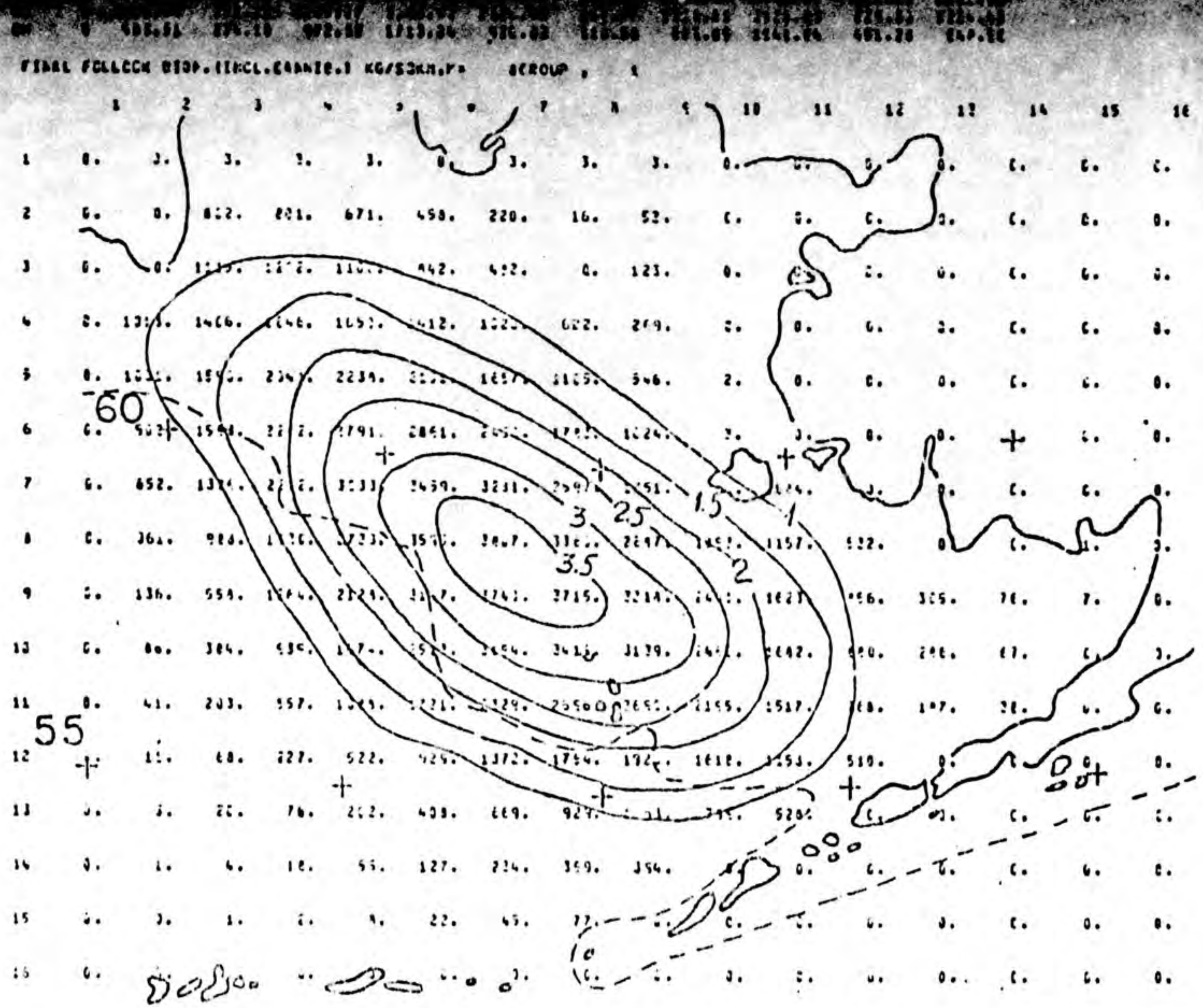


Figure 24 --Distribution of group 1 pollock (juvenile) in August, computed with DYNUMES II (isopleths in mt/km^2).

Turbots (arrowtooth flounder, Greenland turbot)

Other flatfishes

Pacific cod

Rockfishes (primarily Pacific ocean perch)

Sablefish

Atka mackerel

Squid

Others

Results of those studies, including the determination of maximum sustainable yield, current equilibrium yield, and acceptable biological catch are contained in Annex I to this Plan.

The approach used in Bering Sea groundfish assessment is to (1) determine statistical trends that relate to stock condition and/or (2) apply applicable population dynamics theories and models to determine stock characteristics and their dynamics, and finally (3) assess the overall condition of the stock, often-times empirically, by taking into account statistical trends and population dynamics theories and models. The techniques used to analyze the data vary considerably from species to species depending on the quality and completeness of the availabile data bases. For each of the above species or species groups, the biological production potential, in terms of maximum sustainable yield (MSY), current equilibrium yield (EY), and acceptable biological catch (ABC), has been determined. The units for which these biological potentials have been derived are species or species groupings rather than the broader multiple species or ecosystem.

Maximum sustainable yield (MSY) is the largest average catch which can be taken from a stock over a period of years (in this case, generally since the development of significant fisheries in the 1960's) under the environmental conditions which persisted during that same period. This assumes an equilibrium in the population associated with a degree of stability in the environment during the time period considered. Even for such a relatively short time period neither the environment nor the dynamics of many fish populations can be expected to have been constant. The concept of MSY, therefore, is more applicable to longer-lived species in which variations in biomass are buffered by the presence of many year classes. Any long term stability in survival and recruitment, even in these populations is probably exceptional. As a general rule, therefore, MSY cannot be directly applied as a goal for fisheries management without propoer evaluation of statistical trends in stock condition, such as can be inferred from current CPUE and age composition. In some instances, recent changes in envirormental conditions may constrain current population growth to level far below historic levels of MSY. Under such circumstances the population would be at a lower level of equilibrium which may permit only a correspondingly low level of harvest, and even the most drastic of management measures may not restore a stock to some former level of productivity.

The present state of the science is inadequate to predict the capacity of environment for the production of fishery resources, ascertain with any certainty whether the depletion was a consequence of natural factors of overfishing, or to predict with confidence the consequences of remedial management action. The complicated interaction processes associated with the producitivty of marine fish populations in an ecosystem are not very well understood and even such fundamental assumptions as the association between stock size and recruitment strength, which are implicit in manipulation of harvest to achieve MSY, have not been verified or quantified. In fact, it is generally recognized by fisheries scientists that the existing theories and models pertaining to fishery resources management suffer some fundamental inadequacies, and concepts and theories must be developed to answer present and future management demands. Until such new concepts supercede the old, the latter can still serve as a useful basis for deriving management decisions, providing their limitations and underlying assumptions are recognized and evaluated with the best available information. This is the philosophy and approach used throughout this plan.

In contrast to MSY, equilibrium yield (EY) is based on the best estimates of the current condition of stocks. It is the annual or seasonal harvest which, theoretically, will maintain a stock at approximately the same level of abundance (apart from the effects of environmental variation) in succeeding seasons or years. In both under- and overexploited stocks, EY is less than MSY. When, on the basis of statistical trends, survey data, or other information, there is reason to believe that the abundance of stock is below that required to produce MSY, EY is then the maximum production that can be sustained under current population conditions. To rebuild such stocks to more productive levels, the annual or seasonal catch would have to be set below EY. This leads to the concept of acceptable biological catch (ABC).

By definition, ABC is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. It may be set lower than MSY in order to rebuild overfished stocks. Operationally, ABC is the final, biologically-based estimate in the process leading to the determination of optimum yield (OY). The determination of OY is accomplished through the following steps: MSY to EY to ABC and, considering socio-economic elements of the fishery, to OY.

An important factor in determining ABC is an appraisal of the biological data base to evaluate its quality and completeness. If it is found lacking, a conservative approach to exploitation may be called for until evidence is produced to support a contention that higher yields can be sustained. In the absence of such evidence only catch levels which are equal to or less than the low end of the MSY-EY ranges can be considered relatively free from the risk of overexploitation. This concept acknowledges the possibility of overexploitation but, in the biological sense, overexploitation can lead to reduced abundance or undesirable ecosystem imbalance that might prevail for years while underexploitation leaves the resource base in a healthy condition, need only have a temporary effect on user groups, and, to some extent, the temporary loss to the users may be made up the following year.

In instances where a reasonably firm data base indicates that a stock is "healthy" in the context of current environmental and ecosystem conditions--i.e., is capable of producing the maximum equilibrium yield that then prevailing environmental conditions will allow--ABC may appropriately be set well into (rather than at the low end of) the current EY range, even though EY is believed to be lower than MSY. Similarly, next year's ABC may be set higher than this year's EY if higher than average recruitment is predicted (for instance, from prerecruit surveys).

9.7 Estimate of Future Stock Conditions

With the exception of Pacific ocean perch, Pacific halibut, and sablefish all other groundfish species in the Bering Sea/Aleutian Region are believed to be at levels of abundance equal to or greater than those that would produce MSY. The management regime described in Seciton 14.0 is designed to keep those healthy stocks at or somewhat above the level of abundance required for MSY, while providing sufficient relief to halibut, ocean perch, and sablefish so that their stocks can rebuild.

With particular regard to halibut, winter trawl closures of the past several years (which are continued in this Plan) appear to have been responsible for reversing the downward trend in juvenile halibut abundance.

In addition, there is no evidence of natural phenomena that could be expected to cause either serious biological or socio-economic consequences, although the possibility of undetected year class failures, declines in growth rate, or other adverse sympthoms cannot be completely discounted. On the other hand, unforeseem enhancements of stocks condition are equally likely.

With the implementation of this plan, the short-term outlook for stock conditions is good.

In the context of long-term expectations, we are just now beginning to understand and quantify the complex relations among species and between the biota and the environment of this ecosystem (see Section 9.5). Until this understanding is much further developed, we are unable to predict the long-term effect on the ecosystem of the current, single species management strategies or of subtle environmental changes.

10.0 OTHER CONSIDERATIONS WHICH MAY AFFECT THE FISHERY

10.1 International Pacific Halibut Commission (IPHC)

The fishery for Pacific halibut, a species that is part of this region's groundfish community, remains under the jurisdiction of IPHC and is, therefore, exempt from the provisions of this Plan. A major source of the fishing mortality on this species--that by incidental trawl catches--is, however, beyond IPHC control. As long as Council and IPHC objectives concerning halibut utilization remain identical, coordination between the two organizations is easily affected. Should halibut management philosophies diverge--for example, because the broader-based Council constituency objects to constraints on trawl fishery developed caused by overriding halibut-saving measures--a major social, political, and, perhaps, diplomatic (because of Canadian involved in IPHC and in the halibut fishery) confrontation could be precipitated. Furthermore, management actions taken in the Bering Sea that adversely affect halibut are likely to have a significant impact on the Gulf of Alaska halibut stock and fishery because of the interchange of halibut between the two regions.

10.2 Marine Mammal Protection Action of 1972

The FCMA of 1976 specifies that FMP's must be "consistent with...any other applicable law." The Marine Mammal Protection Act of 1972 is one that has a most serious impact on this FMP. There are large populations of many marine mammal species in the Bering Sea which are covered by the 1972 Act. The Act declares that marine mammals have "esthetic and recreational, as well as economic" value. To further these values, it provides that the "primary objective" of marine mammal management "should be to maintain the health and stability of the marine ecosystem." The Act further provides that "whenever consistent with this pimrary objective, it should be the goal to obtain an optimum sustainable population (of marine mammals) keeping in mind the optimum carrying capacity of the environment."

Pursuant to provisions of both Acts, this FMP is cognizant of the ecosystem and mammal population requirements. As reported in an earlier section on "Ecosystem Characteristics," a dynamic numerical marine ecosystem model is currently in use to study ecosystem interactions, including those by marine mammals. The Plan Development Team of this FMP is acutely aware and is striving for an "ecosystem approach" for managing the marine resources. It will, however, be some time (3-5 years) before an appropriate ecosystem model has become far enough developed, and empirically tested, to begin to be relied upon for resource management. Until that time, single species models will be applied to the fishery resources, but in a manner that will retain balance among the various fish components, be generally conservative, and be determined to be not detrimental to current marine mammal populations. The manner in which MSY, EY, and ABC were derived for each fish stock in Annex I has indirectly taken into consideration the volume of fish needed by marine mammals for their sustenance. For example, natural mortality of fish stocks is taken into consideration in stock assessments and in its present application, includes the predation component by marine mammals.

Concerning marine mammal populations in the Bering Sea/Aleutian region, the Team has solicited expert advice from the Marine Mammal Division of the Northwest and Alaska Fisheries Center and summarized information on their distribution and migration, abundance and trends, feeding habits, and any problems induced by fisheries. Accounts of seven important species that are affected by the fisheries are given in Annex V. These species are the northern sea lion, northern fur seal, bearded seal, ringed seal, harbor seal, larga seal, and ribbon seal. Although specific ranges of optimum sustainable population has not been clearly determined for these species, the impact of fisheries can be inferred from marine mammal population trends. The Final Environmental Impact Statement on Consideration of a Waiver of the Moratorium and Return of Management of Certain Marine Mammals to the State of Alaska (DOC and DOI, 1977) considered the population of six species, other than fur seals, to be at levels above the lower level of optimum sustainable population. Northern fur seals are managed for maximum productivity and may also be at or above the lower level of optimum sustainable population.

Of the seven species, the sea lions and fur seals might be significantly affected by groundfish harvest levels. Although the northern sea lion population in Alaska has generally increased since the early 1900's and is now at a relatively high level, a 50% decline in sea lion population has been noted since the late 1950's in the eastern Aleutian Islands. The factors that may have caused this decline are not certain but probably include (1) a westward shift in distribution since population abundance to the western Aleutians appears to be high; (2) commercial fisheries interaction since groundfish (primarily pollock) forms a significant portion of their diet; (3) disease such as leptospirosis; and (4) other unknown population control factors. This decline in abundance is of concern and should be watched more closely. The proposed total groundfish OY for 1980 for the Aleutian region is below past catch levels and if the abundance of fish is limiting for sea lions in this region, this FMP should leave more fish for sea lion consumption.

The northern fur seal is the other species that may be significantly impacted by groundfish fisheries in that fur seals compete with Man for groundfish for their sustenance. Fishes are estimated to constitute about 80% of their diet and pollock is the only groundfish species covered by this FMP which forms a dominant portion of their diet. The average size of pollock observed in fur seal stomachs is 20 cm indicating that the pollock utilized by fur seals have not yet been subjected to the commercial fishery which take pollock larger than 25 cm. The actual impact of diet on the fur seal populations is, however, more intricate and has not yet been quantified. Based on population size trends which became stable during the period of highest fish harvest and the proposal that pollock catches remain below historical high levels, it appears that measures in this FMP should also leave more pollock for fur seal consumption. The ecosystem modelling studies have shown that the removal of larger sized pollock from the population may actually increase the abundance of juvenile pollock as effects of cannibalism is reduced.

The other five species of marine mammals do not seem to be adversely impacted by the groundfish fishery in that these mammals feed primarily on pelagic fish, cephalopods, benthos, and crustaceans. Four of these seal (bearded, ringed, harbor, and larga) populations are known to be high and stable. The ribbon seal population is believed to be relatively low, which has been attributed to commercial hunting by the Soviet sealing fleet. In recent years, this species has been afforded increased protection by Soviet sealing regulations and its numbers may be increasing again. Some groundfish are eaten by ribbon seals but little direct competition is known to exist between ribbon seals and Man for fishery resources.

Although direct competition for food fish is one of many factors that affect marine mammal populations, the other factors are not readily quantifiable. Some of these mammals may be sensitive to disturbances created by fishing activities and may leave the area under such harassments Harbor seals and ribbon seals are known to display such sensitivity, but it is difficult to quantify the effect of fishing on their behavior and abundance. It is noted that some harassments take place, such as the use of explosives to scare away mammals during fishing operations. It is also important to note that the groundfish fishery covered by this FMP account for some marine mammal mortality by the fishing gear. Preliminary estimates of marine mammal incidental mortality due to foreign fishing vessels in 1978 (Marine Mammal Division, George Harry, pers. comm.) were 8.57 animals per 10,000 metric tons of groundfish by the Japanese fishing fleet, 1.69 by the Soviet fleet, and 9.84 in the Korean fleet. Assuming an overall incidental mortality rate of 8.57 animals per 10,000 mt of groundfish, the total incidental mortality on marine mammals, most of which are expected to be northern (stellar) sea lions, is estimated to be 1,237 animals based on a total OY of 1,443,500 mt of groundfish proposed by this FMP.

Overall, the proposed groundfish FMP should reduce competition with marine mammals for fish when compared to the past decade. The proposed total groundfish OY is about 25 percent below the average catch of 1969-76, thereby leaving more fish for marine mammal consumption.

On the other hand, restrictions on killing or harassing seals and sea lions according to the Marine Mammal Protection Act results in an unknown but probably significant economic loss to the fishermen. First, in the setline fishery, some of these seals and sea lions mutilate or remove part of the catch before it can be taken aboard. Second, large numbers of the animals often gather around trawlers and attack halibut, salmon, and crabs which, as a conservation measure, are required to be returned to the sea. Third, and of greatest import, the maintenance of large populations of marine mammals--seals, sea lions, porpoises, and whales--has a profound impact on the abundance of commercial fish species. This impact is both direct, through predation on commercial species, and indirect, through grazing on the same food organisms utilized by commercial fish species.

The effect of such interaction is being studied by an ecosystem simulation model. In order to develop the model to encompass the ecosystem approach for managing the marine resources of the region, better information on the mammals and their interactions with other components of the ecosystem must be obtained. It will take time to refine and test this model for management purposes.

All fishermen, foreign and domestic, are required under the provisions of the Marine Mammal Protection Act of 1972 to obtain a marine mammal certificate of inclusion if any marine mammals might be taken incidental to the conduct of their fishing operation.

10.2.1 Endangered Species Act

The Federal action proposed in this fishery management plan is not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or modification of habitat critical to those species.

10.3 Offshore Petroleum Production

Large areas of the eastern Bering Sea Continental Shelf have been identified as proposed sites for the production of oil and gas (Figure 25). Once drilling and production begin, there will arise a potential for oil pollution and physical hazards to fishing, such as sea-floor well heads and tanker traffic.

10.4 Bio-economic Factors

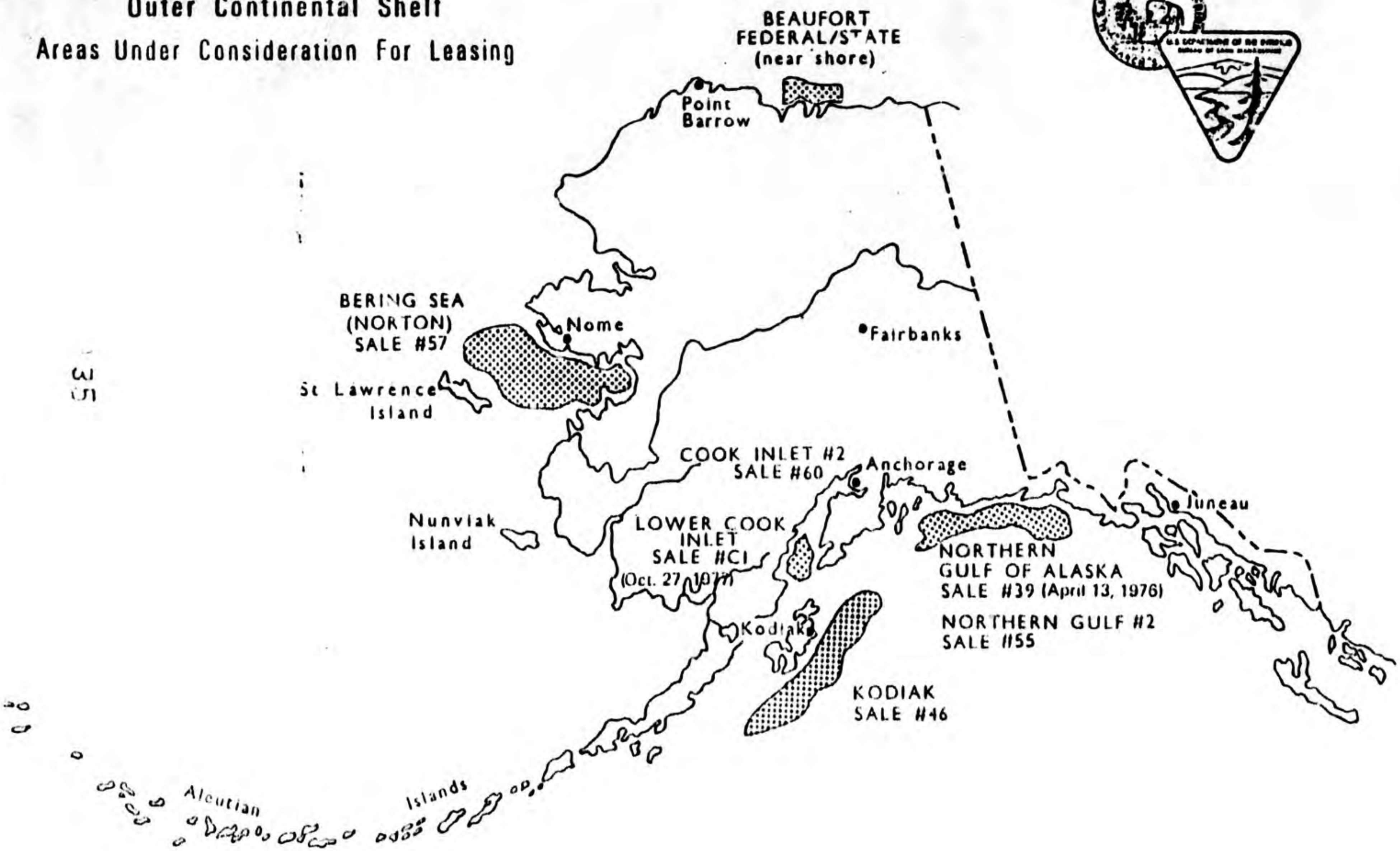
U.S. fishery interests have suggested that development of a domestic groundfish fishery in the Bering Sea will be based on the production of fillets and that the size of fish necessary to economically produce fillets is greater than that needed for such products as fish sausage and meal which form a large part of the output of the foreign fisheries.

The average size of pollock caught in the Bering Sea has decreased through the history of the fishery. During the early years (1964-69), the average size of fish taken by Japan varied between 42 and 44 cm (16.5 and 17.3 inches). Subsequently, average size decreased to 40 cm (15.7 inches) in 1972 and as low as 31 cm (12.2 inches) in 1975 before recovering to 33 cm (13 inches) in 1976. Current average size may be too small for efficient machine filleting.

ALASKA

Outer Continental Shelf

Areas Under Consideration For Leasing



The cohort analysis technique has been used to quantify the growth of a pollock year-class to is maximum biomass and subsequent decay as mortality overtakes growth. In theory, a year-class of pollock is subject to natural death (which reduces the number) and growth (which increases individual weight). The combined effect of these factors is that the cohort biomass will increase to a maximum and then decrease thereafter. Utilizing these concepts one can determine the age when a pollock cohort is maximized and what gain or loss in biomass from the theoretical maximum occurs from restructuring the population. In this analysis, species interactions are not taken into consideration; the analysis is concerned only with material change to the pollock population.

In order to explore the growth and decay phases of a pollock cohort, the equation (Alverson & Carney, 1975) is used:

$$P_t = (N_o e^{-Mt}) \; W_{oo} \; (1-e^{-Kt})b$$

where Pt is the population weight at any specific time,

N_{oo} is the beginning number of individuals, W_{oo} is the maximum weight at the maximum average theoretical size where $W_{oo} = aL_{oo}^b$ (a = constant, L_{oo} = maximum length, b = exponent),

M is the instantaneous natural mortality rate,

K is the Von Bertalan-y growth factor, and

t is time.

The sources of data used in the equation are as follows:

Von Bertalanffy growth parameters -- Yamaguchi and Takahashi (1972)

Male	$L_{oo} = 75.40$	$K = -0.165$	$t_o = 0.273$
Female	$L_{oo} = 76.20$	$K = -0.163$	$t_o = 0.291$

Length-weight relationship parameters --

Male	a = 0.00952	b = 2.916
Female	a = 0.00820	b = 2.958

Other input parameters

N_o = 10,000 (any assumed number)

M = 0.43 (best estimate of M) (M = 0.35, 0.375, 0.4, 0.45, 0.5, 0.6 were also investigated)

ratio of male to female = 1:1

Results of the cohort analysis (Appendix II) show that a pollock cohort (both sexes combined) maximizes its biomass at about age 4 (average size = 38 cm or 15 inches, average weight - 393 gm or 0.9 lbs) when M = 0.43. If that cohort is exploited at later ages, the exploitable biomass will decrease as follows:

Age	Biomass (% of maximum)	Average length (inches)	Average weight (lbs)
4	100	15.1	0.9
5	98	17.3	1.3
6	86	19.2	1.8
7	71	20.8	2.2
8	56	22.2	2.7
9	42	23.3	3.1
10	31	24.3	3.5

Exploitable biomass will, theoretically, decrease to about 50% of the maximum if average length is maintained at 22.2 inches (average age = 8; average weight = 2.7 pounds) instead of at 15 inches (the average length when yield is maximized).

Two other factors which appear to bear on this matter have been tentatively identified in a developing, numerical ecosystem model (Laevastu et al. 1976 1/). A major source of natural mortality within the pollock population is cannibalism. Therefore, maintanence of large numbers of large fish would result in a high rate of cannibalism of young which would, in turn, decrease recruitment and exploitable biomass, and ultimately lead to violent, self-generating cycles in total abundance and size structure of the population.

1/ Laevastu, T., F. Favorite and B. McAlister. 1976. A dynamic numberical marine ecosystem model for evaluation of marine resources in eastern Bering Sea. Northwest & Alaska Fisheries Center, Natl. Mar. Fish. Serv. Processed report, 69 p.

10.5 Crab-bait Trawl Fishery

The only domestic trawl fishery which occurs in the Bering Sea/Aleutian region at present is a relatively small effort for crab bait. This activity is pursued by a few crab vessels, using very small (as required by State of Alaska regulation) trawl nets and by 1-3 otter trawlers which sell their catches directly to crab vessels on the grounds. Total trawl catches for bait are estimated to have been about 450 mt in 1977 and 900 mt in 1978. Although a groundfish fishery, this trawl operation is more properly considered as an adjunct of the U.S. Bering Sea king and Tanner crab fishery. Because of this close relationship, the potential for gear conflicts--which is high when mobile (trawl) and fixed (crab pot) gear is used on the same grounds--is negligible in this unique situation.

11.0 OPTIMUM YIELD (OY)

With the expectation over the near term of only a modest domestic involvement in this fishery (see Section 12.0 below), and having identified no social or economic reasons for reducing the yield of stocks in this fishery below ABC, Optimum Yield for all species will be considered equal to ABC, as shown in Annex I.

It should be noted, especially by foreign participants in the fishery, that such economic factors as higher catch rates or greater average size than can be expected when production is at the level of ABC, or limited seasonal availability to this fishery by domestic fishing vessels could be introduced as OY considerations if they are considered necessary for U.S. fishery development and can be shown to not have an unreasonable impact on the U.S. consumer.

12.0 CATCH AND CAPACITY DESCRIPTORS

12.1 Domestic Annual Capacity

12.1.1 Domestic commercial processing characteristics

Since the domestic groundfish fishery in the Bering Sea and Aleutians consists of a part time trawl operation for king and Tanner crab bait, and a few weeks of longlining for halibut each year, there essentially is no industry to describe. The information presented is more of a description of the latent groundfish capacity of the current shellfish industry including some expansion plans.

A survey was made of the majority of the companies which process shellfish in the eastern Aleutian Islands (Unalaska and Akutan) and the western end of the Alaska Peninsula. The central and northeastern Alaska Peninsula and Bristol Bay plants, except as they might represent investment and contribute to gross sales of the parent companies with operations further west, were not considered because of their inability to be operated year round either because of ice or specialization for summer salmon processing.

Representatives of ten companies with 16 operations in the Aleutians and western Alaska Peninsula were contacted. Responses to all questions were not obtained due to the tentative nature and lack of completness of plans for groundfish operations in 1979, or because company policy precluded divulging certain information.

Seven of the companies with operations in the area indicate gross annual sales of a total of 192.5 million dollars. This amounts to 43% of the total first wholesale value of all fisheries products processed in Alaska in 1976, the latest year for which data are available.

Since several of Alaska's major processing companies are represented in the relatively small number of companies with operations in the area, an average gross expanded to include all operators is not included in this section because it would likely provide an inflated representation of the size of the marketing structure of the westward processors.

Of the fifteen companies known to have operations in the western Alaska Peninsula-Aleutian Islands, nine indicated current plant investments totalling 61.5 million dollars. As in the case of total sales, this is considered atypical since almost all the major companies operating in Alaska are represented in the sample.

It should be noted however, that the companies with operations in the area are heavily involved in the fish processing business in Alaska through plant investment, and account for a substantial portion of the resources processed in the state.

The processing industry in westward Alaska is highly dependent upon transient labor. The small villages of Unalaska and Akutan have inadequate workforces to handle the catches of the large, modern Bering Sea crab fleet. In the early period of the fishery, workers from the Pribilof Islands and the coastal Eskimo villages were recruited for processing work. While the industry still depends on Alaskan help to a considerable extent, the expansion of processing capacity as a reult of the growing Tanner crab fishery and the displacement of the Japanese and Russian king crab fisheries in the Bering Sea have necessitated increased recruitment from the other states.

One of the problems processors have had to cope with is processing the crabs, especially king crab, fast enough to get the catcher boats turned around and back to the fishing grounds. As the fleet grows in size and efficiency, the processor is faced with a shorter season in which to get enough product to make a profit, while keeping the "turn around" time for the vessels delivering crab short so that the skippers do not find it in their best interest to seek markets elsewhere.

The solution to these particular problems has been to create a large transient work force and the facilities to house it. Shoreside and shipboard bunkhouse facilities in the eastern Aleutians currently have the capacity to house approximately 2,400 workers.

To the extent that the current and planned capicity would be suitable for groundfish, the daily freezing and holding capacity has been used as an indication of the domestic processor's groundfish capacity.

Plans for 1979 include some processing capacity at Unalaska which will be dedicated entirely to groundfish. There are indications that such plans are being considered, by several companies, but target dates are indefinite. Several of the company representatives interviewed believed that groundfish and crab operations are not compatible, i.e., groundfish cannot be processed in a vacant corner of a crab plant, nor can crab processing lines be torn out or modified for short periods of time to convert a plant to finfish processing. The consensus seemed to be that if there were to be a serious attempt to process groundfish on a production basis, the plant would have to be planned and built from the ground up in order to provide for the efficiency necessary to profit from a high volume-low priced product. None of the shellfish processors indicated that groundfish could be handled while the crab season is open, for reasons discussed above.

Estimates of freezing and holding capacities, and the percentage of time a plant would be available for processing groundfish were obtained from seven companies involving eleven operators. Estimates of from 20% to 50% were made of the plants' annual capacity that would be available for diversification.

The seven companies represent a cumulative daily freezing capacity of 520 metric tons. This capacity would be available 37 percent of the year, on the average. Therefore, if it is assumed, as it was for the Gulf of Alaska groundfish fishery, that a processing plant can operate 250 days a year, then

$$520 \text{ mt} \times .37 \times 25 = 48,100 \text{ mt}$$

would represent the estimated annual capacity of the processors in the area during the crab off-season. Since there is some question as to the ability to process and freeze groundfish during crab seasons, no attempt has been made to estimate capacity during those periods of time.

In addition to the estimated off-season capacity in the shellfish fishery, there are plans to have 6,250 mt of capacity exclusively designed for groundfish. Total estimated capacity would then be 54,350 mt.

Nine processors indicated a cumulative holding capacity of 13,900 mt. This would hold about a twenty day run of the off-season freezing capacity in the area.

12.1.2 Commercial fishing fleet

A projection of domestic annual capacity for groundfish in the Bering Sea is limited by the fact that to date there has been virtually no effort directed at the harvesting of groundfish in the Bering Sea by U.S. fishermen. Since a domestic trawl fishery has yet to be developed, an estimate of domestic capacity must rely upon a determination of the types of existing vessels that are likely to succeed in the fishery and how much fishing time will be available to them.

NORFISH, a Sea Grant program at the University of Washington, has been involved in an analysis of the shellfish fleet in the state of Alaska, with reference to the future development of a domestic trawl fishery. A classification system was developed for characterizing shellfish vessels on the basis of such characteristics as length, horsepower, hull type and gear types employed 1/. Certain types of shellfish vessels are likely candidates for entry into a trawl fishery, based on their trawling capability and other features. In particular, combination crabber-trawler type vessels (classes 8.1 to 8.5) have the largest potential fishing power of the existing shellfish vessels for the harvesting of groundfish. Subsequent estimates of capacity are based on these vessel classes, since they are expected to provide most of the initial future capacity.

An initial estimate of domestic harvest capacity can be obtained by examining the hold capacity of the combination vessels, shown in Table 23. This estimate assumes a packing factor of 40 pounds of iced fish per cubic foot of space. Also included are the number of vessels in each class which have made shrimp landings and provide a minimum estimate of the number of combination vessels currently equipped to trawl. Table 24 indicates the change in number of combination vessels between 1975 and 1977. The net increase in number of combination vessels has resulted in an overall increase in total hold capacity of 10 per cent over the past two years.

1/ NORFISH Technical Report #61. The Classification, Enumeration, Characteristics and Economic Performance of Alaskan Fishing Vessels, NEPAC Progress Report II. 1976. 23 pp.

Table 23. Hold Capacity of Combination Crabber-Trawler Vessels.

NORFISH class	No. of registered vessels	Keel length (feet)	Ave. hold capacity (cu. ft.)[1]	Total capacity (40 lbs./cu.ft.)	Class total (lbs.)	Number to trawl shrimp
8.1	30	59.1-70.	2800	112,000	3,360,000	11
8.2	65	70.1-82.	3000	120,000	7,800,000	24
8.3	38	82.1-90.	3500	140,000	5,320,000	8
8.4	32	90.1-100.	5500	220,000	7,040,000	1
8.5	14	100.1-120.	7500	300,000	4,200,000	0
	179				27,720,000 (or 12,375 MT)	

[1]Revised figures provided from shellfish research group sessions held by Alaska Commercial Fisheries Entry Commission, 1977.

Table 24. Changes in Number of Registered Shellfish Vessels, Western Alaska, 1975-1977.

Class	No. registered 1975	No. boats gained	No. boats lost	Net gain	No. registered 1977	No. registered[1] SE Alaska 1977
8.1	25	5	1	4	29	1
8.2	65	9	10	-1	64	1
8.3	31	4	0	4	35	3
8.4	28	4	0	4	32	0
8.5	13	3	2	1	14	0

[1]Southeast Alaska vessels were tabulated separately since the 1975 survey did not include them.

Another factor affecting capacity is the amount of fishing time available. If it can be assumed that the domestic trawl fishery will begin primarily as an off-season fishery for shellfish fishermen, currently unused fishing time within the fleet would provide an estimate of time available for harvest of groundfish. To determine if there is unused capacity within the combination vessel classes, an analysis of the landing record of each vessel was performed 2/. The frequency distribution of interlanding times was used to derive an estimate of maximum trip length for each species fished. The maximum trip length was adjusted to take into consideration the limitation of holding time on board for various species. Allowing for a layup of 60 days per vessel, the number of additional fishing trips available by vessel class and trip length were calculated. Table 25 summarizes these results.

Given the current limitations in holding catches on board, particularly in the case of pollock, a 4 to 7 day trip length seems reasonable to expect. If 20 to 30 metric tons per day is a realistic catch rate in the Bering Sea, then the domestic annual capacity could be expected to be about 157 thousand metric tons, as indicated in Table M. This estimate was calculated by ignoring 1 to 3 day intervals and adding in the appropriate number of 4 to 7 day trips which could be made from within the longer time intervals listed in Table 26.

It should be noted that this estimate of domestic annual capacity assumes that all combination vessels are currently equipped to trawl. In fact, perhaps half of the fleet would require extensive modification beforehand. This figure is also high considering unused effort that might be directed towards Gulf of Alaska groundfish fisheries instead of the Bering Sea. Conversely, if trawling for groundfish in the Bering Sea proves to be more profitable than participating in alternative fisheries, the estimate of domestic annual capacity would need to be adjusted upward.

2/ Methods used are detailed in NORFISH Paper NPB3, Pragmatic Approaches to Fisheries Management for Optimum Yield -- Determination of Supply Curve for a Domestic Alaska Pollock Fishery , 1977, 7 pp; and in Technical Report #79 (In prep.).

Table 25. Number of Additional Fishing Trips Available by Combination Vessel Class and Trip Length for 1976.[1]

Potential Trip Length	Vessel Class 8.1	8.2	8.3	8.4	8.5
1-3 days	20	108	22	21	6
4-7 days	24	76	25	23	10
8-14 days	19	47	23	25	6
15-21 days	9	26	14	12	4
22-30 days	5	40	13	13	6
31-60 days	11	31	8	5	3
>60 days	23	74	38	40	11
No. of vessels[2]	21	65	31	28	10

[1] These figures allow for 60 days layup per vessel

[2] These totals vary from Tables 1 and 2 because they are based on the actual number of vessels which made landings.

Table 26. Harvest Capacity of Groundfish Based on Utilization of Unused Fishing Time, Estimated from 1976 Landing Times.

	Vessel Class				
	8.1	8.2	8.3	8.4	8.5
Number of 4-7 day trips available	302	1007	433	426	139
Number of vessels available	21	65	31	28	10
Number of trips per vessel	14	15	14	15	14
Number of days to fill boat at catch rate of 24MT/day	2	2.5	3	4.5	6
Annual Capacity in 10^6 pounds	33.8	120.8	60.6	93.7	41.7
			Total:	156,518 M.T.	

12.2 Expected Domestic Annual Harvest/Processing Capacity

U.S. groundfish processing capacity is currently estimated to be 54,350 mt annually (Section 12.1.1). U.S. commercial fishing fleet capacity is currently estimated to be 156,518 mt (Section 12.1.2). Neither of these estimates, however, allow a projection of the domestic intent to catch and process except to define physical maximums.

In order to estimate the expected U.S. harvest, all processors located in or adjacent to this region were surveyed to determine their specific plans for handling groundfish during the next year. This approach was taken because the desire of fishermen to enter the groundfish fishery, has been predicted by available markets (i.e. processors who will buy groundfish from them).

The results of this survey are given in Annex II.

If the Council determines that some amount of any DAH will not be taken by the domestic fishery, that amount will be transferred to Reserve unless such transfer is likely to have an adverse biological, economic, or social consequence.

13.0 ALLOCATIONS BETWEEN FOREIGN AND DOMESTIC FISHERMEN

13.1 Reserve

As mentioned in Section 12.2 and Annex II, U.S. participation in the fishery in the near future is expected to consist of a relatively modest catch for crab bait and limited pilot efforts for foodfish production.

In order to prevent OY's from being exceeded without preventing unexpected domestic fishery development; i.e. an unanticipated increase in U.S. catching capability and intent, 500 mt or 5 percent of the OY (whichever is the greater) of each species will be held in reserve for allocation late in the year on the basis of domestic need. Specific reserve amounts are shown in Annex III.

Unless specifically withheld by the NMFS Regional Director acting with the advice of the Council, up to 25 percent of the reserve of each species will be released to TALFF every two months, beginning with the end of the second month of the fishing year, with the intention that by the end of the eighth month of the fishing year, all of the reserve will either be made available to foreign fishermen or reserved for domestic use.

13.2 Total Allowable Level of Foreign Fishing (TALFF)

The initial TALFF for each species shall be determined by the equation:

$$TALFF = OY - DAH - Reserve$$

TALFF may increase during the year as reserves are apportioned between domestic and foreign fishermen. Initial TALFF's are shown in Annex III. The estimation of DAH is equal to DAP, (See Annex II).

14.0 PROPOSED MANAGEMENT REGIME

14.1 Specific Management Objectives

A. Continue rebuilding the halibut resource so that a viable halibut setline fishery is again available to American fishermen.

B. Rebuild depleted groundfish stocks to, and maintain healthy groundfish stocks at levels of abundance that will produce MSY.

C. Provide an opportunity for U.S. involvement in the Bering Sea/ Aleutian groundfish fishery, limited only by the OY of individual species and objectives A and B above.

D. Allow foreign participation in the fishery, consistent with objectives A, B, and C above.

Objective A will be accomplished by winter restrictions on fishing in areas where juvenile halibut are known to concentrate. Objective B, as it pertains to Pacific ocean perch and sablefish, will be accomplished by setting OY below current equilibrium yield (see Section 9.8.2 and Annex I) so that abundance can rebuild to the level necessary to produce MSY. Objectives C and D will be accomplished as provided for under Sections 12.2, 13.1, and 13.2.

14.2 Area, Fisheries, and Stocks Involved

This Fishery Management Plan and its Management Regime applies:

A. To the U.S. Fishery Conservation Zone of that portion of the North Pacific Ocean adjacent to the Aleutian Islands which is west of 170°W, and of the entire Bering Sea (see Figure 26).

B. To all foreign and domestic fishing vessels operating in the area described in A above, except:

1. U.S. and Canadian fishermen when they are operating under IPHC regulations;
2. Those U.S. vessels which are operating legally in any fishery for shellfish.

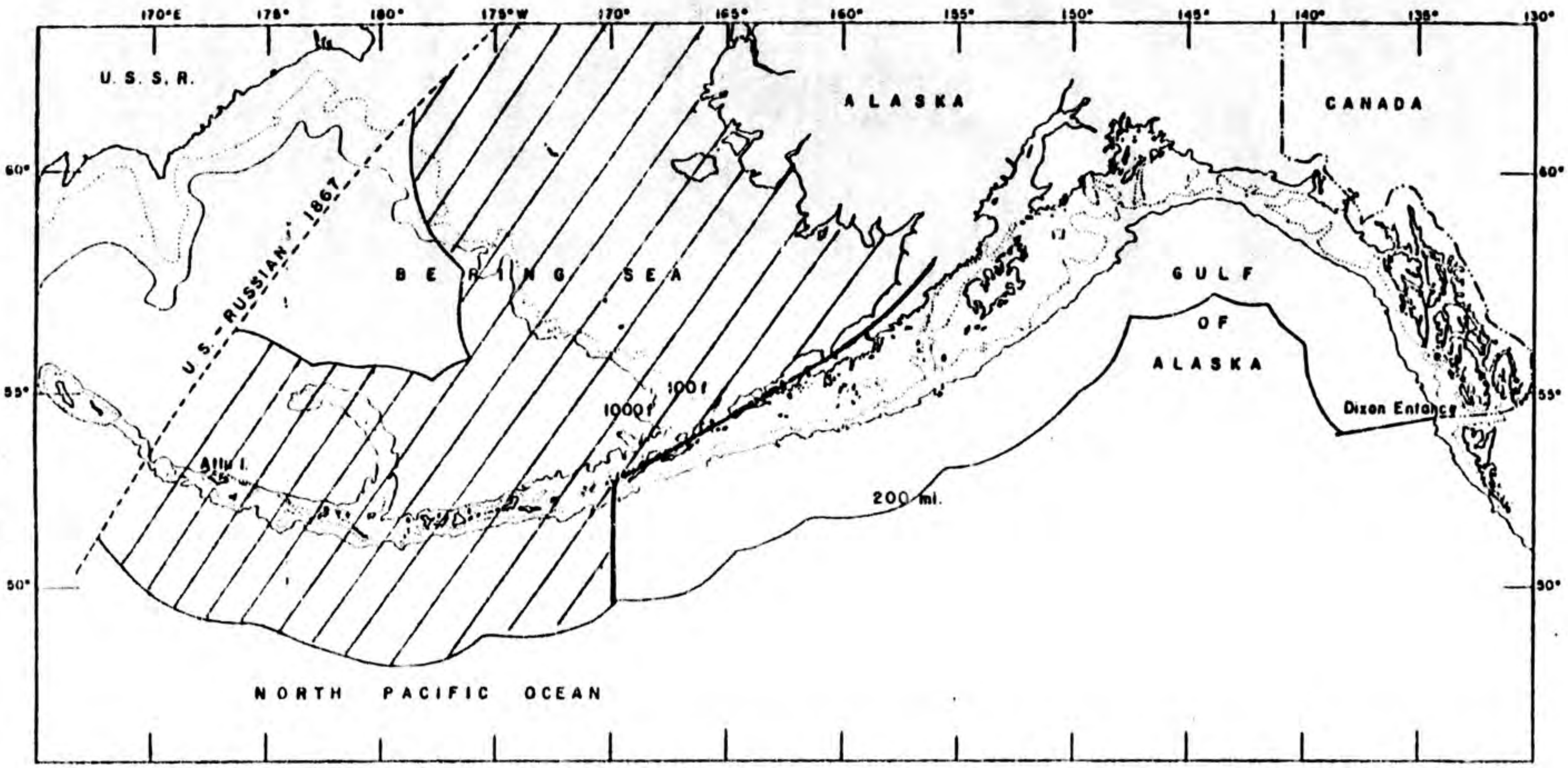


Figure 26.--Area (diagonal lines) over which this Fishery Management Plan applies.

C. To all stocks of finfish and squid except salmon, steelhead trout, Pacific halibut, and herring which are distributed or are exploited predominantly in the area described in A, above.

14.3 Management Measures and Their Rationale

14.3.1 Domestic

14.3.1.1 Permit requirements

All U.S. vessels operating in that part of the Bering Sea/Aleutian groundfish fishery which is under Council jurisdiction must have on board a current permit issued by the Secretary of Commerce or, if considered acceptable by the Secretary, a State of Alaska vessel license.

14.3.1.2 Prohibited species

In accordance with existing state and federal statutes.

14.3.1.3 Area closures

A. General

None

B. Trawl

1. "Bristol Bay Pot Sanctuary" (as described in Appendix III and Figure 27) -- domestic trawling will only be permitted during open seasons of the U.S. Bering Sea crab fisheries.
2. "Winter Halibut-savings Areas" (as described in Appendix III and Figure 27):
   (i) December 1 - May 31 -- domestic trawling will be permitted only until the total U.S. trawl catch from this area exceeds 2,000 mt;
   (ii) June 1 - November 30 -- no closures.
3. Other areas -- no closures

Rationale:

To prevent high incidental catches and mortality of juvenile halibut which are known to occur in winter concentrations in the "Bristol Bay Pot Sanctuary" and the "Winter Halibut-savings Areas" while allowing for some expansion in primarily the traditional crab-bait trawl fishery and the initial development of a human consumption fishery.

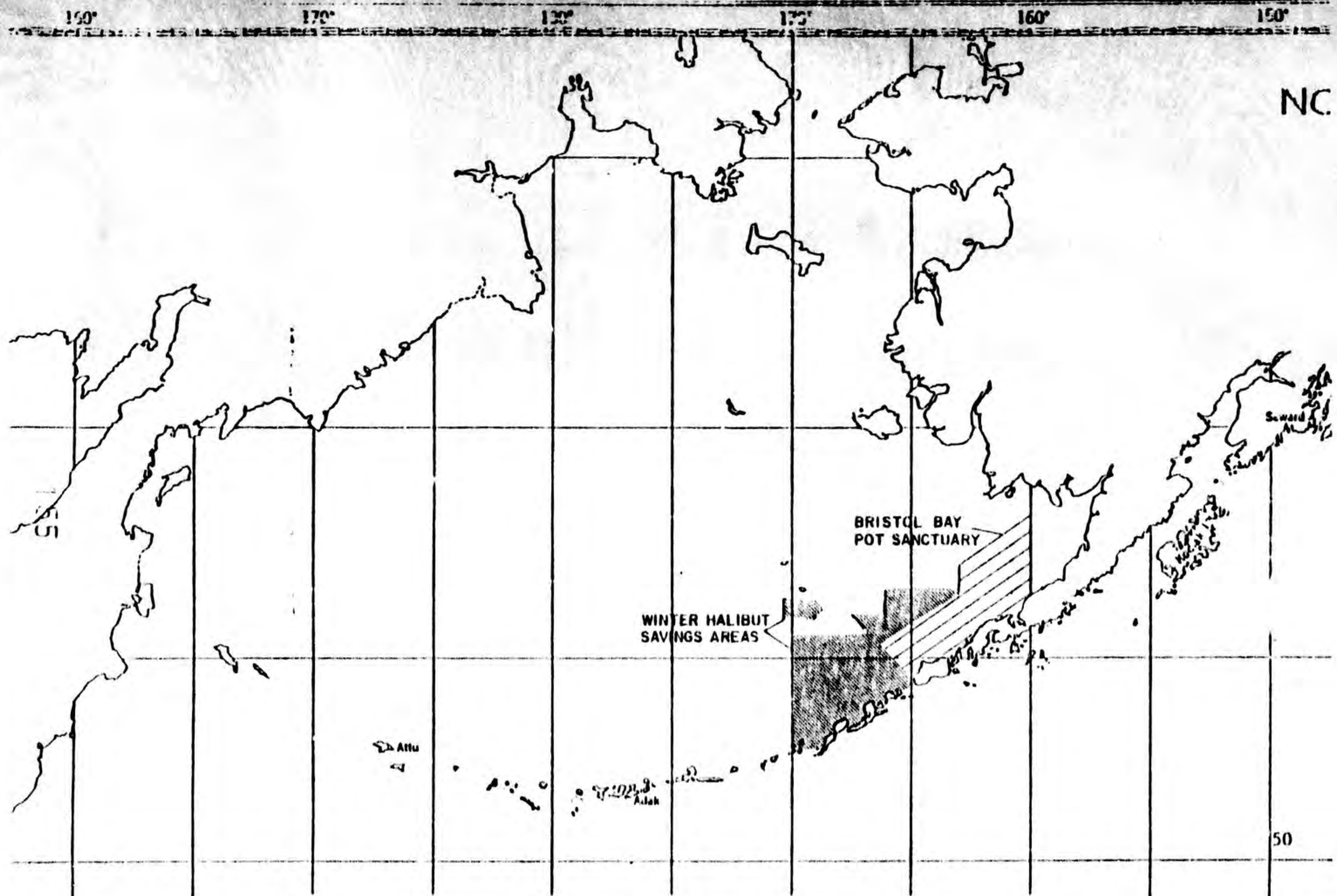


Figure 27.--Locations of "Winter Halibut-savings Areas" and the "Bristol Bay Pot Sanctuary" (See Appendix II for coordinates).

C. **Longline**

1. **"Winter Halibut-savings Areas" (as described in Appendix III and Figure 27):**

   (i) **December 1 - May 31 -- domestic longlining will be permitted landward of the 500 m isobath until the total U.S. longline catch (excluding halibut) from this area exceeds 2,000 mt.**

   (ii) **June 1 - November 30 -- no closures.**

2. **Other areas -- no closures.**

Rationale:

To prevent high incidental catch and mortality of juvenile halibut which are known to occur in winter concentrations in the "Winter Halibut-savings Areas" while allowing for some expansion in the domestic setline fishery for species other than halibut.

14.3.1.4 Gear restrictions

None.

14.3.1.5 Statistical Reporting Requirements

Fishery data compiled for the domestic groundfish fishery should be of the same general degree of precision as those required of foreign fishermen: catch by species, by ½° Lat. x 1° Long. areas, by gear type and vessel class, and by month; effort (e.g., hours towed, # hooks, # pots) by ½° Lat. x 1° Long. areas, by gear type and vessel class, and by month.

In order to compile such data sets, the performance of individual vessels must be made available. To do so will probably require, in addition to fish sales tickets made out for each delivery, one or a combination of the following: logbooks; port sampling; interviews with fishermen.

In addition to collecting this information from domestic vessels which land their catches at Alaskan ports, it must also be collected from those vessels which sell or use their catch for bait on the fishing grounds, from vessels which land their catches in other states, and from vessels which deliver their catches to foreign processing vessels.

Annual data compilations, in the above format, should be available to the Secretary by May 31 of the following year. In addition, preliminary catch data -- by species and by major statistical area (i.e. Areas I, II, III, IV) -- should be compiled by month and made available to the Secretary by the end of the following month.

Arrangements, including financing and schedule of implementation, for the collection, compilation, and summarization of these fishery data will be developed through consultations between officials of NMFS, State of Alaska, and other states in which landings of catch from this fishery are likely.

14.3.1.6 Limited Entry

Implementation of a limited entry program will not be necessary for this fishery during the first few years that it operates under this plan. However, a limited entry program should be designed by the Council during the early stages of domestic fishery development so that it can be implemented well before the time that the fishery becomes fully or over-capitalized.

14.3.2 Foreign

14.. .2.1 Permit requirements

All foreign vessels operating in this Management Unit must have on board a permit issued by the Secretary of Commerce. Required by FCMA.

14.3.2.2 Prohibited species

No retention of salmon, steelhead trout, halibut, or Continental Shelf Fishery Resources to prevent covert targetting on species of special importance to U.S. fishermen.

14.3.2.3 Area closures

A. General

(i) No fishing year-round within 12 miles of the baseline used to measure the Territorial Sea, except in the western Aleutian Islands as described in Appendix III to prevent conflicts with U.S. fixed gear and small, inshore fishery vessels; to prevent catch of localized inshore species important to U.S. fishermen and natives.

(ii) This management unit (or individual sub-area where specific quotas apply) will be closed to all fishermen of a nation for the remainder of the calendar year when that nation's allocation of any species or species group listed in Annex III is exceeded, except that such closures will affect longline fishing only if the national allocation of any of the following species is exceeded: sablefish; Pacific cod; Greenland turbot; and, "others" to discourage foreign fleets from covertly targetting on depleted species/stocks and to prevent damaging by-catches after the allowed catch has been taken; this provision places the burden of responsibility on the foreign fleets to avoid taking such species/stocks and to develop fishing gear and fishing practices which will minimize or eliminate their incidental capture.

B. Trawl

(i) No trawling year-round in the "Bristol Bay Pot Sanctuary", (as described in Appendix III and Figure 72) to prevent conflicts between foreign mobile gear and concentrations of U.S. crab pots; to prevent incidental catch of juvenile halibut which are known to concentrate in this area.

(ii) No trawling from December 1 to May 31 in the "Winter Halibut-savings Areas" (as described in Appendix II and Figure 27) to protect winter concentrations of juvenile halibut, to protect spawning concentrations of pollock and flounders.

(iii) No trawling year-round in that part of the FCZ adjacent to the Aleutian Islands between 172 degrees West longitude and 178 degrees 30 minutes West longitude south of a line drawn between the following coordinates:

53-14'N - 172-00'W

52-13'N - 176-00'W

52-00'N - 178-30'W

To provide a sanctuary for foreign and domestic longline fishing in recognition of the situation in which highly developed trawl fisheries in both the Bering Sea/Aleutian area and the Gulf of Alaska have tended to preempt fishing grounds from the traditional longline fishing method.

Prior to 1977, no Danish seiners, side trawlers or pair trawlers operated in this area, and less than one percent of the foreign stern trawl effort occurred in this area.

Because of the displacement of the Japanese land-based dragnet fleet from the Soviet 200-mile zone, that fleet has, since 1977, increased its utilization of th[illegible] [illegible]awl grounds surrounding the Aleutian archipelago. As a result, during the first seven months of 1978, of the total foreign stern trawl effort in the Bering Sea/Aleutian region, about three percent occurred in this longline sanctuary area.

(iv) No trawling January 1 - June 30 in the area known as Petrel Bank on the north side of the Aleutian Islands comprising those waters bounded by lines drawn to include the following coordinates:

52-51'N - 178-30'W
51-15'N - 178-30'W
51-15'N - 179-00'E
52-51'N - 179-00'E
52-51'N - 178-30'W

between 178-30'W and 179-00'E landward of 12 nautical miles. Trawling is permitted seaward of three nautical miles from July 1 - December 31.

To avoid gear conflicts during the conduct of the domestic king crab fishery and to avoid the incidental catch of king crab by trawling. Data available from the fishery in the Petrel Bank area indicates a substantial incidental trawl catch of red, blue and golden king crab. The crab savings effected by the trawl closure is a direct benefit to the domestic fleet in terms of potential catch and of long-range benefit in terms of conservation of crabs not subject to the rigors of a trawl effort during the softshell or moulting period.

(v) No trawling January 1 - April 30 in other areas west of 178-30'W EXCEPT trawling is permitted seaward of three nautical miles from May 1 - December 31.
To avoid gear conflicts during the conduct of the domestic king crab fishery and the development of the domestic bottomfish effort and to avoid the adverse effects of the incidental catch of king crabs by trawl.

C Longline

(1) "Winter Halibut-Savings Areas" (as described in Appendix III and Figure 27):

(i) December 1 - May 31 -- no longlining landward of the 500 m isobath.

(ii) June 1 - November 30 -- No closures.

To prevent high incidental catch and mortality of juvenile halibut which are known to occur in winter concentrations in the "Winter Halibut-Savings Areas."

(2) Other areas -- No closures.

(3) Throughout the area west of 172-00'W, longlining is permitted seaward of three nautical miles.

14.4 Operational Needs and Costs (1000's dollars)

114 man-months of foreign fishery observer coverage	370 1/
NWAFC allocation compliance analyses	10
NMFS computerized foreign fishery information system	36
NMFS Alaska Regional Office Management Division	435
NOAA/Justice administration of penalties	12
800 Coast Guard ship patrol days	2800
2500 Coast Guard aerial patrol hours	1900
State of Alaska fishery data collection	11
Total	5574

Costs of federal, state, and IPHC biological research are not included inasmuch as they would be financed in the absence of this management plan.

14.5 Effects of the Management Regime on Availability, Cost, and Quality of Fishery Products

Except where necessary to restore depleted stocks (Pacific ocean perch, Pacific halibut, and sablefish), optimum yields have been set equal to maximum biological production. The total OY for the Bering Sea/Aleutian groundfish fishery druing 1979 is 1,409,400 mt, some 34,000 mt greater than that allowed by the Preliminary Management Plan for 1978 -- hence, availability of fishery products will not be reduced.

Although any mangement measure is likely to add expense to a fishery, the fishery restrictions proposed by the FMP are the minimum necessary to assure healthy stocks of all species, and most are carry-overs from the past several years -- therefore, costs of fishery products should neither be unreasonably inflated nor significantly increased as a result of implementation of this FMP.

1/ Reimbursed by foreign governments to the U.S. Treasury

The management regime of this FMP is not expected to have any effect on the quality of commodities produced from Bering Sea/Aleutian groundfishes,

As has been discussed earlier in Section 8.1.3, it seems highly unlikely that management actions taken in the Bering Sea will have any significant effect on the availability, cost, or quality of groundfish products to U.S. consumers. Therefore, specific management actions including the determination of optimum yield, have not been taken for the express purpose of addressing consumer interests. However, in future years this situation may change. At that time it will be necessary to more explicitly take into account consumer interests. Several studies are currently under way to provide the information upon which such decisions can be based. The largest of these is a contract let by the U.S. Department of Commerce to examine both international and national opportunities for the development of underutilized species in the U.S. fisheries conservation zone. Although primarily focused on opportunities for domestic industry development, this study should provide a good deal of useful information on patterns of groundfish consumption and prices. Particularly, it will fill important gaps in our understanding of foreign groundfish markets.

Other studies funded by the National Marine Fisheries Service, Northwest and Alaska Fisheries Center, and the Pacific and North Pacific Councils will provide further useful information. The proper orientation of near term research efforts to reflect consumer interests is probably the most important thing that can be done at this stage. If accomplished, it will insure that the information is available upon which decisions representative of consumer interests can be made when they are required in future Bering Sea and Aleutian groundfish management plans.

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15.0 RELATIONSHIP OF RECOMMENDED MANAGEMENT MEASURES TO FCMA NATIONAL STANDARDS AND OTHER APPLICABLE LAWS

This management plan can be considered an extension of the Preliminary Fishery Management Plan (PFMP) for the Bering Sea and Aleutian Trawl Fishery and portions of the PFMP for the Sablefish Setline/Trap Fishery, both prepared and implemented by the Secretary of Commerce, and which are superceded by this plan.

The management regime described in Section 14.0 is considered to be in conformace with the seven national standards set forth in Section 301 of the FCMA.

The U.S. is party to the following international conventions which directly or indirectly address conservation and management needs of groundfish in the Bering Sea/Aleutian Region: the International Convention for the High Seas Fisheries of the North Pacific Ocean (INPFC), and the Convention Between the United State of American and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea (IPHC).

This plan has a most significant relationship to the management of the Pacific halibut fishery which continues to be vested in the International Pacific Halibut Commission. Many of the management measures contained herein are for the expressed purpose of mitigating a severe crisis in the domestic halibut fishery by recognizing a situation in which the trawl fishery (and possibly the sablefish setline fishery) could be a major contributor to declining halibut abundance.

There are no Indian treaty fishing rights for groundfish in the fishery conservation zone in the Bering Sea/Aleutian region.

The Constitution of the State of Alaska states the following in Article XIII:

Section 2. General Authority. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people.

Section 4. Sustained Yield. Fish, forest, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

Section 15, No Exclusive Right of Fishery, has been amended to provide the State the power "to limit entry into any fishery for purposes of resource conservation" and "to prevent economic distress among fishermen and those dependent upon them for a livelihood".

16.0 RESEARCH NEEDS

Research will be required to (1) find means of improving the accuracy of commercial catch statistics, (2) refine estimates of abundance and biological characteristics of stocks through research resource surveys, (3) improve the capability for predicting changes in resource abundance, composition, and availability, (4) develop means of reducing the incidental catch of non-target species, and (5) identify subpopulations.

Catches reported by the foreign fishing fleets provide a means of monitoring the progress of the fisheries towards catch quotas. Later these catch statistics are examined with associated fishing effort to compute CPUE, an index of stock abundance. Discrepancies have been found between reported catches by foreign vessel skippers and those estimated by U.S. observers aboard these vessels. Observer's estimates have been generally greater than those reported by the vessel's master, suggesting under-reporting of catches by the foreign fleets. This problem needs to be examined and steps taken to improve the accuracy of reported catch statistics.

Estimates of biomass of specific groundfish resources have been obtained through resource surveys using bottom trawls. For such semi-demersal species as pollock and cod, biomass estimates through research vessel trawl surveys have so far been underestimated because of the lack of knowledge of the portion of the stocks in the water column that lie above the stratum sampled by the trawl. Studies are required to determine the efficiency at which reserach trawls capture pollock, cod, and other semi-demersal forms in order to improve the accuracy of biomass estimates of these species.

Long-term fisheries management requires reliable forecasting of stock conditions. Until now forecasts have been based mainly on past events, such as trends in abundance indices (CPUE's) and size and age composition of specific resources without any consideration of the interactions of these resources with each other and the environment. Studies need to be continued to determine for predictive purposes those factors that have major influences on the abundance, composition, and distribution of resources, and there is a critical need for annual pre-recruit surveys (i.e., of young fish before they enter the fisheries) so that a measure of their abundance can be used to forecast later contributions to the exploitable stock.

For purposes of conservation and harvesting efficiency, fishing gear should be modified or developed which will reduce the by-catch of halibut, crabs, and other important species in the trawl fisheries. Although these species are immediately returned to the sea after capture, they still suffer an added source of mortality from their capture and handling.

Within the eastern Bering Sea-Aleutian region there undoubtedly exist subpopulations of species that, because of their unique biological features (e.g. growth and mortality) should be managed as separate stocks. Research, therefore, is required to provide a firm basis for the identification and delineation of specific stock units.

The paucity of specific information concerning sablefish, Pacific ocean perch, Atka mackerel, arrowtooth flounder, and Greenland turbot has required an empirical approach to management. Although some information on these species has recently been gathered by U.S. observers aboard foreign fishing vessels and from foreign fisheries statistics, direct assessment of abundance and stock condition has not been accomplished. In the past, surveys have essentially been restricted to the Continental Shelf of the eastern Bering Sea with very little effort directed to the Continental Slope where these and other species are know to concentrate. No assessment surveys have been conducted in the Aleutian region where important stocks of Pacific ocean perch, sablefish, and Atka mackerel occur. Geographic and bathymetric extensions of research surveys to these areas should be considered.

The several squids which are present in the region form another resource for which very little information is available. The squid fishery is presently of small magnitude but, because of intuitive indications of very large abundances, exploitation is expected to increase substantially. If the sustainable potential of this resource is to be realized, basic taxonomic, distributional, biological, and abundance studies will soon have to be initiated.

Finally, but in the long run most importantly, the complex ecosystem will have to be accurately modelled so that bio-environmental processes can be understood and inter-species -- including birds and marine mammals -- relationships can be quantified and relied upon in determining optimum yields.

17.0 STATEMENT OF COUNCIL INTENTIONS TO REVIEW THE PLAN AFTER APPROVAL BY THE SECRETARY OF COMMERCE

The North Pacific Fishery Management Council will, after approval and implementation of this plan by the Secretary, maintain a continuing review of the fisheries managed under this plan through the following methods:

1. Maintain close liaison with the management agencies involved, usually the Alaska Department of Fish and Game and the National Marine Fisheries Service, to monitor the development of the fisheries and the activity in the fisheries.

2. Promote research to increase their knowledge of the fishery and the resource, either through Council funding or by recommending research projects to other agencies.

3. Conduct public hearings at appropriate times and in appropriate locations, usually at the close of a fishing season and in those areas where a fishery is concentrated, to hear testimony on the effectiveness of the management plans and requests for changes.

4. Consideration of all information gained from the above activities and development if necessary, of amendments to the management plan. The Council will also hold public hearings on proposed amendments prior to forwarding them to the Secretary for possible adoption.

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19.0 APPENDICES

I -- Sample community profile

II -- Pollock cohort analyses

III -- Descriptions of closed areas

APPENDIX I. ALEUTIAN SUBREGION COMMUNITY PROFILE (Ref. Sec. 8.5)

Water

Settled areas in the subregion are accessible only by air or water transport. Even these modes are severely limited by weather conditions. Communities are small and far apart, making the feasibility of waterborne commercial transportation systems marginal.

Passenger service by water is limited. The Alaska Marine Highwasy does not serve this area. Residents wishing to travel by water depend primarily on unscheduled service provided by fishing boats. A Dutch Harbor resident provides scheduled passenger and freight service with the M/V ISLANDER between Amaknak and Unalaska Islands and is considering expanding to a ferry system serving Umnak, Unalaska, Amaknak, Akutan, and Akun Islands.

Deep water occurs along the south shores of the Aleutian Islands. Unimak Pass is the most frequently used passage between the North Pacific and Bering Sea. Although sheltered harbors and coves capable of handling deep-draft essels occur frequently throughout the Chain, improved harbor facilities are few.

Monthly waterborne freight service is provided from Seattle to Captains Bay on Unalaska Island, to Unalaska and to Adak, service to Sand Point and Dutch Harbor is twice monthly. The vessel carries containerized cargo, some of which comes from Anchorage. Atka has no airport but is served monthly by a tug from Adak Naval Station. Attu and Shemya receive the major portion of their supplies annually through a military-contracted private operation. The M/V PRIBILOF, operated by the Aleutian Pribilof Island Association, provides waterborne freight service to St. Paul and St. George, Privilof Islands, and the M/V North Star III, operated by the Bureau of Indian Affairs, services certain communities on an annual basis.

Air

The Cold Bay International Airport, constructed by the U.S. Army Corps of Engineers in the early 1940's, is a major transportation hub for the Aleutian Chain and a key refueling station for trans-Pacific flights between the Far East and the continental United States. Flight time through Cold Bay is an hour or more shorter to the San Francisco and Los Angeles area than by way of Anchorage, Sixteen major air carriers or charter airlines used this airport during the past two years.

Many smaller air taxi services and charter airlines use the Cold Bay Airport and, while the volume is not great, the service to the people in the area is most significant.

Local service is available by Reeve Aleutian Airways serving the Alaska Peninsula, the Aleutian Chain, and St. Paul in the Pribilof Islands. This airline provides access to all military sites and many of the smaller communities. Although St. George Island in the Pribilofs lacks facilities for handling large commercial aircraft, National Marine Fisheries has inaugurated a charter service from King Salmon and Dillingham to St. George approximately once a week.

Land

With the minor exception of a few local roads within the communities, no highway system exists in the Aleutian Subregion.

APPENDIX II. (Ref. Section 10.4)

Cohort analyses which show growth and decay of a pollock biomass under different instantaneous rates of natural mortality (Tables A - G).

TABLE A. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT
STARTING WITH 10000 INDIVIDUALS AND ASSUMING .350 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	344	15	5.6	.0	344	15	5.7	.0	344	15	5.7	.0
2	1047	47	9.3	.2	1051	46	9.3	.2	1049	46	9.3	.2
3	1711	77	12.4	.5	1731	76	12.5	.5	1721	76	12.4	.5
4	2114	95	15.0	.9	2154	94	15.1	.9	2134	94	15.1	.9
5	2231	100	17.2	1.3	2286	100	17.3	1.3	2258	100	17.3	1.3
6	2129	95	19.1	1.7	2193	96	19.2	1.8	2161	96	19.2	1.8
7	1897	85	20.7	2.2	1962	86	20.9	2.3	1930	85	20.8	2.2
8	1609	72	22.1	2.6	1670	73	22.2	2.7	1639	73	22.2	2.7
9	1315	59	23.3	3.1	1369	60	23.4	3.2	1342	59	23.3	3.1
10	1045	47	24.2	3.5	1091	49	24.4	3.6	1068	47	24.3	3.5
11	812	36	25.1	3.8	850	37	25.2	4.0	831	37	25.2	3.9
12	620	28	25.8	4.1	651	28	26.0	4.3	636	28	25.9	4.2
13	467	21	26.4	4.4	491	21	26.6	4.6	479	21	26.5	4.5
14	348	16	26.9	4.7	366	16	27.1	4.9	357	16	27.0	4.8
15	257	12	27.3	4.9	271	12	27.5	5.2	264	12	27.4	5.0
16	188	8	27.7	5.1	199	9	27.9	5.4	193	9	27.8	5.2

TABLE 8. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT STARTING WITH 10000 INDIVIDUALS AND ASSUMING .375 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	336	17	5.6	.0	336	17	5.7	.0	336	17	5.7	.0
2	996	51	9.3	.2	1000	50	9.3	.2	998	50	9.3	.2
3	1587	81	12.4	.5	1606	80	12.5	.5	1596	80	12.4	.5
4	1913	97	15.0	.9	1949	97	15.1	.9	1931	97	15.1	.9
5	1969	100	17.2	1.3	2017	100	17.3	1.3	1993	100	17.3	1.3
6	1833	93	19.1	1.7	1887	94	19.2	1.8	1860	93	19.2	1.8
7	1593	81	20.7	2.2	1647	82	20.9	2.3	1620	81	20.8	2.2
8	1317	67	22.1	2.6	1367	68	22.2	2.7	1342	67	22.2	2.7
9	1050	53	23.3	3.1	1093	54	23.4	3.2	1072	54	23.3	3.1
10	814	41	24.2	3.5	850	42	24.4	3.6	832	42	24.3	3.5
11	617	31	25.1	3.8	646	32	25.2	4.0	631	32	25.2	3.9
12	460	23	25.8	4.1	482	24	26.0	4.3	471	24	25.9	4.2
13	338	17	26.4	4.4	355	18	26.6	4.6	346	17	26.5	4.5
14	245	12	26.9	4.7	258	13	27.1	4.9	252	13	27.0	4.8
15	177	9	27.3	4.9	186	9	27.5	5.2	181	9	27.4	5.0
16	126	6	27.7	5.1	133	7	27.9	5.4	130	7	27.8	5.2

TABLE C. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT STARTING WITH 10000 INDIVIDUALS AND ASSUMING .400 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	328	19	5.6	.0	327	18	5.7	.0	327	19	5.7	.0
2	947	55	9.3	.2	951	53	9.3	.2	949	54	9.3	.2
3	1472	85	12.4	.5	1490	84	12.5	.5	1481	84	12.4	.5
4	1731	100	15.0	.9	1763	99	15.1	.9	1747	99	15.1	.9
5	1737	100	17.2	1.3	1780	100	17.3	1.3	1759	100	17.3	1.3
6	1577	91	19.1	1.7	1624	91	19.2	1.8	1601	91	19.2	1.8
7	1337	77	20.7	2.2	1383	78	20.9	2.3	1360	77	20.8	2.2
8	1079	62	22.1	2.6	1119	63	22.2	2.7	1099	62	22.2	2.7
9	839	48	23.3	3.1	873	49	23.4	3.2	856	49	23.3	3.1
10	634	36	24.2	3.5	662	37	24.4	3.6	648	37	24.3	3.5
11	469	27	25.1	3.8	490	28	25.2	4.0	480	27	25.2	3.9
12	341	20	25.8	4.1	357	20	26.0	4.3	349	20	25.9	4.2
13	244	14	26.4	4.4	256	14	26.6	4.6	250	14	26.5	4.5
14	173	10	26.9	4.7	182	10	27.1	4.9	177	10	27.0	4.8
15	121	7	27.3	4.9	128	7	27.5	5.2	125	7	27.4	5.0
16	85	5	27.7	5.1	89	5	27.9	5.4	87	5	27.8	5.2

TABLE D. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT STARTING WITH 10000 INDIVIDUALS AND ASSUMING .430 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	318	21	5.6	.0	318	20	5.7	.0	318	21	5.7	.0
2	892	58	9.3	.2	896	57	9.3	.2	894	58	9.3	.2
3	1346	88	12.4	.5	1362	87	12.5	.5	1354	87	12.4	.5
4	1535	100	15.0	.9	1564	100	15.1	.9	1549	100	15.1	.9
5	1495	97	17.2	1.3	1532	98	17.3	1.3	1514	98	17.3	1.3
6	1318	86	19.1	1.7	1357	87	19.2	1.8	1337	86	19.2	1.8
7	1084	71	20.7	2.2	1121	72	20.9	2.3	1102	71	20.8	2.2
8	848	55	22.1	2.6	881	56	22.2	2.7	864	56	22.2	2.7
9	640	42	23.3	3.1	666	43	23.4	3.2	653	42	23.3	3.1
10	470	31	24.2	3.5	490	31	24.4	3.6	480	31	24.3	3.5
11	337	22	25.1	3.8	353	23	25.2	4.0	345	22	25.2	3.9
12	238	15	25.8	4.1	249	16	26.0	4.3	243	16	25.9	4.2
13	165	11	26.4	4.4	174	11	26.6	4.6	169	11	26.5	4.5
14	114	7	26.9	4.7	120	8	27.1	4.9	117	8	27.0	4.8
15	77	5	27.3	4.9	82	5	27.5	5.2	79	5	27.4	5.0
16	52	3	27.7	5.1	55	4	27.9	5.4	54	3	27.8	5.2

TABLE E. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT
STARTING WITH 10000 INDIVIDUALS AND ASSUMING .450 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	312	22	5.6	.0	311	22	5.7	.0	311	22	5.7	.0
2	857	60	9.3	.2	861	60	9.3	.2	859	60	9.3	.2
3	1267	89	12.4	.5	1282	89	12.5	.5	1275	89	12.4	.5
4	1417	100	15.0	.9	1444	100	15.1	.9	1430	100	15.1	.9
5	1353	95	17.2	1.3	1386	96	17.3	1.3	1370	96	17.3	1.3
6	1169	82	19.1	1.7	1203	83	19.2	1.8	1186	83	19.2	1.8
7	942	66	20.7	2.2	974	67	20.9	2.3	958	67	20.8	2.2
8	723	51	22.1	2.6	750	52	22.2	2.7	737	52	22.2	2.7
9	535	38	23.3	3.1	557	39	23.4	3.2	546	38	23.3	3.1
10	384	27	24.2	3.5	401	28	24.4	3.6	393	27	24.3	3.5
11	270	19	25.1	3.8	283	20	25.2	4.0	277	19	25.2	3.9
12	187	13	25.8	4.1	196	14	26.0	4.3	191	13	25.9	4.2
13	127	9	26.4	4.4	134	9	26.6	4.6	131	9	26.5	4.5
14	86	6	26.9	4.7	90	6	27.1	4.9	88	6	27.0	4.8
15	57	4	27.3	4.9	60	4	27.5	5.2	59	4	27.4	5.0
16	38	3	27.7	5.1	40	3	27.9	5.4	39	3	27.8	5.2

TABLE F. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT STARTING WITH 10000 INDIVIDUALS AND ASSUMING .500 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	297	26	5.6	.0	296	25	5.7	.0	296	25	5.7	.0
2	776	67	9.3	.2	779	66	9.3	.2	777	66	9.3	.2
3	1091	94	12.4	.5	1104	93	12.5	.5	1097	94	12.4	.5
4	1160	100	15.0	.9	1182	100	15.1	.9	1171	100	15.1	.9
5	1054	91	17.2	1.3	1080	91	17.3	1.3	1067	91	17.3	1.3
6	866	75	19.1	1.7	891	75	19.2	1.8	879	75	19.2	1.8
7	664	57	20.7	2.2	687	58	20.9	2.3	675	58	20.8	2.2
8	485	42	22.1	2.6	503	43	22.2	2.7	494	42	22.2	2.7
9	341	29	23.3	3.1	355	30	23.4	3.2	348	30	23.3	3.1
10	233	20	24.2	3.5	243	21	24.4	3.6	238	20	24.3	3.5
11	156	13	25.1	3.8	163	14	25.2	4.0	160	14	25.2	3.9
12	103	9	25.8	4.1	108	9	26.0	4.3	105	9	25.9	4.2
13	66	6	26.4	4.4	70	6	26.6	4.6	68	6	26.5	4.5
14	43	4	26.9	4.7	45	4	27.1	4.9	44	4	27.0	4.8
15	27	2	27.3	4.9	29	2	27.5	5.2	28	2	27.4	5.0
16	17	1	27.7	5.1	18	2	27.9	5.4	18	1	27.8	5.2

TABLE G. COHORT ANALYSIS TO DETERMINE THE GROWTH AND DECAY OF A POLLOCK COHORT STARTING WITH 10000 INDIVIDUALS AND ASSUMING .600 NATURAL MORTALITY RATE

AGE	FEMALE POPULATION				MALE POPULATION				COMBINED SEXES			
	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)	BIOMASS (LB)	PERCENT OF MAX BIOMASS	LENGTH (IN)	WEIGHT (LB)
1	268	33	5.6	.0	268	33	5.7	.0	268	33	5.7	.0
2	635	79	9.3	.2	638	78	9.3	.2	636	78	9.3	.2
3	808	100	12.4	.5	818	100	12.5	.5	813	100	12.4	.5
4	778	96	15.0	.9	792	97	15.1	.9	785	97	15.1	.9
5	639	79	17.2	1.3	655	80	17.3	1.3	647	80	17.3	1.3
6	475	59	19.1	1.7	489	60	19.2	1.8	482	59	19.2	1.8
7	330	41	20.7	2.2	341	42	20.9	2.3	335	41	20.8	2.2
8	218	27	22.1	2.6	226	28	22.2	2.7	222	27	22.2	2.7
9	139	17	23.3	3.1	144	18	23.4	3.2	141	17	23.3	3.1
10	86	11	24.2	3.5	90	11	24.4	3.6	88	11	24.3	3.5
11	52	6	25.1	3.8	54	7	25.2	4.0	53	7	25.2	3.9
12	31	4	25.8	4.1	32	4	26.0	4.3	32	4	25.9	4.2
13	18	2	26.4	4.4	19	2	26.6	4.6	19	2	26.5	4.5
14	11	1	26.9	4.7	11	1	27.1	4.9	11	1	27.0	4.8
15	6	1	27.3	4.9	6	1	27.5	5.2	6	1	27.4	5.0
16	3	0	27.7	5.1	4	0	27.9	5.4	4	0	27.8	5.2

APPENDIX III (Ref. Sections 14.3.1 and 14.3.2)

"Bristol Bay Pot Sanctuary"

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

Cape Sarichef Light (54°36'N - 164°55'42"W)

55°16'N - 166°10'W

56°20'N - 163°00'W

57°10'N - 163°00'W

58°10'N - 160°00'W

Intersection of 160°00'W with the Alaska Peninsula

"Winter Halibut-savings Areas"

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

Cape Sarichef Light (54°36'N - 164°55'42"W)

52°40'N - 170°00'W

55°30'N - 170°00'W

55°30'N - 166°47'W

56°00'N - 167°45'W

56°00'N - 166°00'W

56°30'N - 166°00'W

56°30'N - 163°00'W

56°20'N - 163°00'W

55°16'N - 166°10'W

55°16'N - 166°10'W

Cape Sarichef Light (54°36'N - 164°55'42"W)

and

56°18'N - 170°24'W

56°20'N - 169°03'W

56°12'N - 168°46'W

55°56'N - 169°10'W

More than three hundred species of fish are found in these waters. The target species of the groundfish fishery are pollock, Pacific Ocean perch, Atka mackerel, blackcod, yellowfin sole, Greenland turbot and Pacific halibut. An additional five species are occasional target species for the commercial fishery and another fifteen or so species are of minor commercial interest.

The present participation in this fishery of Amer n and Canadian fishermen is confined almost exclusively to the relatively small longline fishery for halibut.

20.2 Relationship of the Proposed Action to Land Use Plans

To date the State of Alaska does not have an approved coastal zone management plan. At the earliest practicable time the State will be consulted tc determine whether the fishery management plan is consistent with the approved coastal zone management plan.

The fishery management plan under consideration presupposes an increase in the amount of effort in this fishery. Existing port and processing facilities, offseaon use of vessels currently engaged in other fisheries and available manpower will be sufficient for the foreseeable future.

There are no recommendations at this time for the identification of potential marine sanctuary sites under Title III of the Marine Protection Research and Sanctuaries ct of 1972 in the area under which this fishery management plan will be implemented. Future coordination between the North Pacific Fishery Management Council and the Director, Alaska Region, Office of Coastal Zone Management, will be necessary to integrate plans developed by both agencies.

Therefore, this fishery management plan is not anticipated to have any signficiant impact on current land use plans.

20.3 Probable Impact of Current Land Use Plans

20.3.1 Physical Environment

No change is expected on the physical environment as a consequence of this management plan. Estimates of the amount of discharge of sewage, solid wastes, waste heat and products of combustion into the ocean during fishing efforts are not availablebut their effects are judged minor in the open ocean environment. It is not possible to quantify hazard or nuisance effects from lost or discarded gear.

20.3.2 Biological Environment

The primary objective of this fishery management plan is to prevent overfishing and conserve the resource while providing the greatest amount of food. The removal of the various target and incidentally caught species in the amounts determined biologically safe is presumed to be beneficial to the fishery and poses no threat to the biological environment.

20 3.3 Socio-economic Environment

The impact of this plan on the domestic socio-economic climate is expected to be in direct proportion to the participation in the fishery. It is, for all intents and purposes, a new fishery for American fishermen. Presumably, there will be additional processing capabilities offered in the area. This will be a direct benefit in the form of job opportunities beyond those now available in the area. Thus, the impact of this plan on the domestic socio-economic climate will be highly beneficial. It will be in proportion to the growth of the fishery.

At the present time, the domestic industry does not have the fleet capacity facilities, capabilities nor man power to enter into substantial production of the region's groundfish species. It remains to be seen to what extent funds will be made available through various government and private sources for the exploitation of this new area. Certainly initial investments will be tentative and exploratory in nature. The capture of a share of the international market through a guaranteed portion of the total yield of the fishery will provide a great many answers toward how fast this fishery will develop. In the beginning the international market will be more than partially satisfied by foreign production. Perhaps to the extent that prices for some species will remain too low to support U.S. fishermen. Included among factors which inhibit the gorwth of any domestic fishery is the distance from U.S. markets, higher processing costs in Alaska and imported supplies from other areas.

The lack of information cncerning the world fish market and how it will respond to boundary expansions makes it necessary to rely upon limited knowledge of the domestic markets for species affected by the plan to determine its impact on consumers.

Theoretically, larger supplies of species available on the U.S. market would exert downward pressure on prices to the benefit of consumers. Historically, industry has resisted that effect on the market. Prices, once establsihed, tend to build from that point by the simple expedient of controlling supply.

20.3.4 Unavoidable Adverse Impacts

No unavoidable adverse impacts on the environment are anticipated as a result of implementing this fishery plan. A sizeable foreign fishery is conducted in the area and the displacement of that effort can occur only in direct proportion to the domestic effort mounted. No undesirable land use pattern is anticipated or damage to life system or water or air pollution.

20.3.5 Alternatives to the Proposed Action

The only alternative to this action that would be consistent with P.L. 94-265 would be to continue to manage the fishery by preliminary fishery management plan. Inasmuch as a PFMP can apply only to foreign fishermen there is a high potential for the domestic groundfish fishery to cause adverse impacts on halibut, the alternative of operating under a PFMP with no control of the domestic fishery is rejected.

20.3.6 Relationship Between Local Short-Term Use and Maintenance and Enhancement of Long-Term Productivity

The plan establishes catch quotas for all species which are no greater than the maximum sustainable yield; his factor a ne will maintain long-term resource productivity. Continued monitoring of the domestic and foreign fisheries and periodic reevaluation of the population dynamics of the stocks will also provide protection against the erosion of long-range productivity. Halibut savings measures and the quota for Pacific ocean perch proposed in the plan will enhance the producitivity of those populations and result in long-term benefits to both the resource and the resource users.

20.3.7 Irreversible and Irretrievable Commitments of Resources

None.

No permanent loss of aquatic floral or faunal resources have been identified. Periodic monitoring of the catch is required and the current management plan is flexible. No irreversible or irretrievable commitments of water or air or land resources have been ident.fied.

20.3.8 Consultation and Coordination with Others

20.3.8.1 Coordination in Development of the Fishery Management Plan

Development of this fishery management plan calls for close Federal/State cooperation in the management of adjacent fisheries and furthers the ideal of "joint basis management" by the various fishery Management Councils and the individual states as set forth in the legislative history of the Fishery Conservation and Management Act of 1976.

20.3.8.2 Coordination in the Review of the Fishery Management Plan and Environmental Impact Statement

The separate DEIS and DFMP were consolidated and edited to respond to comments received on the separate documents forwarded through NMFS, NOAA (CEQ). The CEQ notice of availability of the combined DEIS/DFMP appeared in the Federal Register on September 6, 1978. Nearly 300 copies were made and distributed to government agencies, organizations and individuals for comment.

These included:

<u>Federal Agencies</u>

U.S. Corps of Engineers
Bureau of Land Management
National Park Service
U.S. Coast Guard
Environmental Protection Agency
Department of the Interior
Department of State
Department of Transportation
U.S. Fish and Wildlife Service

State Agencies

State of Alaska, Office of the Governor

Alaska Department of Fish and Game

Alaska Commercial Fisheries Entry Commission

Individuals and Organizations

Alaska Native Corporations

Conservation Organizations

Fishermen's Groups

Seafood Industry

Industry Associations

Libraries

Press

Universities

Public meetings on the EIS/FMP were held in Seattle, Washington (October 7, 1978); Kodiak, Alaska (October 10, 1978); Unalaska, Alaska (October 12, 1978); Anchorage, Alaska (October 31, 1978); and again in Anchorage during the regular monthly meeting of the Council on November 31, 1978.

20.3.8.3 Comments Received Concerning the Fishery Management Plan and Environmental Impact Statement

Materials included in this section were received as comments during the course of the public comment and review period.

Public testimony on the Bering Sea/Aleutian Groundfish FMP was conducted concurrently with testimony on the proposed halibut management plan. A portion of that comment material has been put in summary form and included here to ensure that all who participated in the joint hearings are credited. Written materials submitted as comments on the BS/A management plan are included in their entirety.

Summarized general comment

PUBLIC HEARING RECORD

for the

GROUNDFISH FISHERY

in the

BERING SEA/ALEUTIAN ISLAND AREA

Listed below are the places in which public hearings were conducted and the names of those who appeared before the North Pacific Fishery Management Council to offer comment on the groundfish fishery for the BS/A.

KODIAK

Attendance at this hearing for the purpose of offering comment on the groun'fish fishery was predictably low. With the exception o a limited trawl effort directed to bait, and explorator trawling for stock abundance, no bottomfishery exists. The occasion was used for agency staff to comment on various aspects of other fisheries.

Jim Balsiger	(IPHC)
Phillip Rigby	(ADF&G)
Jim H. Branson	(NPFMC)
Marty Eaton	(ADF&G)
Dave Woodruff	(Spoke on trolling)
Al Burch	(Kodiak Shrimp Trawlers Assn.)

UNALASKA

David Clemons	(USF&WS engineer on RV ARCTIC TERN) Reported general observations on survey work west of Adak.
John Harris Jr.	Opposes limited entry for trawling. Claims trawling efforts will begin in State water areas.
Royal Davenney	Indicated bottomfishing effort is at least a year away. Indicated 1000 mt was maximum needed for bait in crab fishery.
Ben Paz	(Josephine Caroline trawler) Favors opening west of Cape Suckling to trawls. Proposed fish tickets aboard trawlers for reporting trawl catches for bait.

A.C Phillips	Poor timing on hearings.
Carl Wieberg	Plant Manager for Pan Alaska. He said that processing at sea makes the quality product. On-shore production is less desirable.

SEATTLE

Comment concerning Bering Sea/Aleutian groundfish was given incidentally as a portion of comments on halibut. The major concern of halibut fishermen is the effect trawl efforts have on the halibut resource. With the exception of Mr. Haugen, advocate for opening the halibut fishery for trawls, the consensus was that trawling for halibut should not be permitted.

A statement was submitted by the Fishing Vessel Owner's Assn., Robert Alverson, manager and is on file at the Council office. In summary, the FVOA cautioned against setting the OY equal to EY for two stocks, sablefish and Pacific ocean perch, thereby not allowing any rebuilding of those stocks, supported the proposal to prohibit trawling in the Bristol Bay pot sanctuary and supported general trawling restrictions now in effect for foreign fishing efforts.

The Seattle hearing was held concurrently with the hearing for halibut; the comment roster is identical with that for halibut.

Robert Alverson
Jake Bassi
Byron Baske
Arnie Einmo
Henry Haugen
Arne Lee
Sig Mathieson
Jack Newsome
Neil Sandvik
Glen Satero

ANCHORAGE

H.A. Larkins	PDT leader for the BS/A plan. Explained the basic development of the plan.
Robert Ely	The trawl plan should maximize opportunities for groundfish, not be designed primarily to protect halibut. The groundfish resource is worth more than the halibut fishery and the Council will eventually have to choose between the two.
Mr. Endo	Japanese representative (trawlers) objected to closed areas.
Mr. Nakamura	Japanese representative (long liners) objected to restrictions on longliners. Testimony pointed mainly to halibut.

Pan-Alaska Fisheries, Inc.
A SUBSIDIARY OF CASTLE & COOKE INC.
P.O. BOX 647 / MONROE, WASHINGTON 98272 / 206 743-1176
TELEX 32 9425 PAN AKFISH MNOR

Comment #1

(Information only)

DUTCH HARBOR/UNALASKA FACT SHEET

I. PROCESSING UNITS & COMPANIES IN THE DUTCH HARBOR/UNALASKA, AKUTAN, & PORT MOLLER AREAS.

Total number of processing units in the Dutch Harbor/Unalaska is 14; which are owned by the following companies:

1) Pan-Alaska Fisheries, Inc.
2) Pacific Pearl
3) Universal Seafoods, Inc.
4) Whitney Fidalgo
5) East Point Seafoods
6) Aleutian Products Corporation
7) Dutch Harbor Seafoods
8) Sea Alaska

Total number of processing units in the Akutan area are 7; which are owned by the following companies;

1) Deep Sea
2) Western Sea
3) Alaska Shell
4) Trident Seafoods
5) Clipperton Inc.
6) Pacific Pearl

Total number of processing units in the Port Moller area are 2; which are owned by the following companies:

1) Pan-Alaska Fisheries, Inc.
2) All Alaskan

The total number of processing units for the combined areas is 23; of which are owned by the above listed 14 companies.

II. DAILY PROCESSING CAPACITY (AGGREGATED) (For king crab - 30% less for Tanner)

1) Daily processing capacity for the Dutch Harbor/Unalaska, Akutan & Port Moller areas are 10 to 12 million pounds per week or approximately 1.5 million pounds per day. (Live weight)
   a) 7 to 8 million pounds per week for the Dutch Harbor/Unalaska area
   b) 2.2 to 2.5 million pounds per week for the Akutan area
   c) 1.4 million pounds per week for the Port Moller area

2) Of the 10 to 12 million pounds processed per week 90% of this product is processed into sections and the remaining 10% into meat. If for any reason the processors had no shell market or counld not reprocess sections into meat in another area, the capacity of all production in the combined areas would probably decrease in an excess of 50% or 4 to 5 million pounds per week.

Dutch Harbor/Unalaska Fact Sheet
Page 2

III. ESTIMATED HERRING BAIT USED

1) Approximately 4 to 5 million pounds of herring bait will be used by the 149 fishing vessels in the the Bering Sea this King Crab 1978 season.
2) Approximately 3 to 4 millicn pounds of herring bait will be used by the fishing vessels in the Tanner Crab 1979 season. The small reduction in the amount of herring bait used in the Tanner Crab season is due to the heavier use of hanging bait in the Tanner fishery.

IV. POPULATION OF AREA & NUMBER OF FISHING VESSELS FOR THE BERING SEA AREA

At the present time utch Harbor/Unalask is populated with 560 resident. During the King Crab and Tanner Crab seasons the processing companies and fishing vessels equal an influx of approximately 3,500 people.

As of 10-11-78 there are 149 vessels fishing the Bering Sea Area.

V. SHRIMP PROCESSING CAPACITY

Little emphazise has been put in the shrimp processing for the Dutch Harbor Unalaska area; only 2 companies are processing shrimp at this time. It is my opinion that only 250,000 pounds per day is the capacity for processing shrimp at this time.

VI. BOTTOM FISH CAPACITY & HALIBUT LANDINGS

1) At the present time I would guess that with no automated equipment and hand labor the daily capacity will not excede 400.000 pounds.
2) Halibut deliveries to this area are made only by local fishermen at this time. Halibut landed for the last 2 years has been between 50 to 100 thousand pounds per year.

It is my opinion that with an additional 30 to 40 vessels coming into the Bering Sea Fishery in 1979, the seasons will be shorter and all processors will be forced into 100% production of sections. This creates a major problem in the Market Place because of the larger buyers only wanting fresh crab packed rather than thawed out sections repacked.

Bottom fish will come to this area in the next 2 to 5 years but in my opinion little will be done by shoreplant operations. It will be done mostly by 155 to 185 foot class dragging and processing vessels at sea. The companies will use thier shoreplant operations mostly to d scharge cargo and hold supplies for these vessels.

Royal Davenney - Pan Alaska

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
P. O. BOX 1668 - JUNEAU, ALASKA 99802

Comment # 2

October 23, 1978

RECEIVED OCT 23 1978 2:30 pm

Mr. Jim Branson
Executive Director
North Pacific Fishery Management Council
P. O. Box 3136DT
Anchorage, Alaska 99501

Dear Jim:

We have been asked by the Central Office to forward to you the following comments by Mr. Sano, Director, Oceanic Fisheries Department, JFA. The comments pertain to the Groundfish and Tanner Crab Regulations and Allocations off Alaska for 1979.

1. Groundfish fishery

(1) Bering Sea and Aleutian Islands Area

(i) Allocations

a) To rescind the regulation "---500 mt or 5% of the OY (whichever is the greater) of each species will be held in reserve for allocation---", to allocate the total reserve of 73,000 mt to the TALFF initially and to increase the TALFF.

b) In case the above reserved quantity is maintained in the regulations, to reallocate it to foreign nations as soon as possible.

c) To decrease the DAH in each species to a more realistic level (24,600 mt of the total DAH seems to be over-estimated) and to reallocate promptly the uncaught domestic allocation.

d) To reassess the stocks of POP and other species (to increase ABC for these stocks).

e) Especially, to increase the Japanese allocations for pollock, sablefish, Pacific cod, flounders and Pacific herring.

(ii) Regulations

a) To remove the prohibition of longline fishery in the "Winter Halibut-savings Areas", landward of the 500m isobath in winter from December 1 to May 31.

b) To release a portion of the closure area (east of 168° W) for Pacific herring (above all, for the gillnet fishery).

c) To relax the closed area within 12 miles and the closed season in all Aleutian Islands area (especially for the landbased trawl fishery, i.e. Hokuten trawl fishery)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Washington, D.C. 20235

F36:CB

Comment # 3

TO: FAK - Regional Director

/S/ ROLAND F. SMITH

FROM: F3 - Roland F. Smith

SUBJECT: Comments on the Draft Fishery Management Plan for the Groundfish Fishery in the Bering Sea/Aleutian Island Area.

Attached are our comments on the subject plan. We have divided our comments into two categories - critical issues and substantive issues. Critical issues could lead to plan disapproval; substantive issues would strengthen the plan if the comments were accepted. Although we indentified a number of critical issues, I do not think the Council will have much difficulty accomodating the comments. Legal comments will be forthcoming. We are impressed with the quality of this plan.

Please contact Mr. Bribitzer, if you have any questions on these comments.

Attachment

cc: NWAFC-F11, F4, F6, F, F3, F36(3)

F36:NMFS:CBribitzer:634-7432:1/2/79:plj (ca FAK/CB)
Revised, Bribitzer:1/3/79:pb
Revised:Bribitzer:1/10/79:bv
Revised:Bribitzer:1/12/79:bv
Revised:Bribitzer:1/15/79:oia

CRITICAL ISSUES

1. DAH and Reserve Levels.

The draft plan establishes a DAH and a reserve to "prevent OY's from being exceeded without preventing unexpected domestic fishery development." The DAH levels are surprisingly high relative to historic landings. Although the survey methodology is unclear, apparently the level of production anticipated by the processors was accepted without analysis of the physical capacity to process, the fishermen's interest to harvest, or the availability of markets. It is reasonable to establish DAH on the high side to guard against uncertainties; however, a large reserve is available to handle unexpected U.S. harvest. The DAH should either be supported by a stronger justification (including detail on the methodology) or DAH should be reduced to levels consistant with recent domestic catches. We note that no reserve was established for the pollock OY in the Aleutians, which may be an oversight.

2. Relationship to the Marine Mammal Protection Act (MMPA)

a. Marine Mammal Permits:

The MMPA requirements for general permits to allow the incidental take of marine mammals by both foreign and domestic fishermen should be discussed, perhaps in an Annex or in Section 15.0.

b. Marine Mammal/Fishery Interactions:

Although the plan contains an excellent analysis of fish mortality caused by marine mammals, there is almost no discussion of marine mammal mortality caused by the fishery. The subject should be addressed, both in the plan and in the FEIS, indicating in detail how the plan provides for maintaining the status of the marine mammal stocks as a functional element of the marine ecosystem.

c. Optimum Sustainable Populations: There is a potential for conflict between the FCMA and the OSP requirements in the MMPA. Although this problem will not be resolved with this plan, the Council should be aware of the NMFS efforts to further define OSP (see attached memorandum on this subject), so that the plan can be modified accordingly if necessary. A more detailed discussion of the interface between the FCMA, MMPA and Endangered Species Act of 1973 (ESA) will be forthcoming.

3. <u>Endangered Species Considerations.</u>

Some species found in the Bering Sea, i.e. bowhead and gray whales, are on the endangered species list and the plan discusses these. In addition, some other species of animals, i.e., birds, may be on an endangered list maintained by FWS. The Council should, if it hasn't already, officially request from NMFS and FWS complete lists of endangered species in that area. An assessment of the impact of the plan on these endangered species should be made and if there is no expected impact then this fact should be stated. If there is an impact then formal consultations with NMFS or FWS are required.

4. <u>Other Species OY.</u>

The OY for other species in the plan is 55,500 metric tons (mt). In the 1979 PMP the total OY for other species is 93,600 mt. This sharp reduction in OY is made without strong biological justification and is being viewed by the Department of State as a lowering of TALFF in mid-season without a resource related justification. The OY of other species is [illegible]mined by the 4% average catch of the last five years. Therefore [illegible] necessary to document that (a) the species composition has not c[illegible] either naturally or (b) the reporting requirements of the FCMA [illegible] in the other species category being larger in the last two years. We note that the ABC for other species presumably needs to be adjusted for the increased pollock OY.

The reserve level for other species, if the 5% reserve applies, is either mistyped or miscalculated.

SUBSTANTIVE ISSUES

1. <u>Transition from PMP to FMP.</u>

We foresee potential problems in the transition from PMP to FMP. If catches are low in the first half of 1979, the implementation of a new fishing year July 1 may result in under-achieving OY and foreign nations will be adversely impacted. Alternatively, if catches in the first half of the year exceed 50% of OY, then the stock may be overfished. We have discussed these potential problems with DOS and decided that the plan could be appropriately adjusted by the Council after it is implemented. The necessity of prompt reassessment of OY's should be called to the Council's attention.

2. <u>Limited Entry</u>

The statement on limited entry precludes the Council from using a property right system to encourage fishery development. We also note that there could be situations where one fishery, i.e. sablefish, might be fully capitalized while there is still a TALFF for pollock. Limited entry in the sablefish fishery might be desirable in this situation even though there is foreign fishing for other species in the Bering Sea.

3. The Scope of OY.

It is not clear whether the OY estimates in the plan include the territorial sea. This point should be clarified so that appropriate mechanisms for enforcement of domestic quotas can be developed. This situation arose in the halibut plan and was resolved.

4. Reserves

The reserve provision could be strengthed by providing a rationale for the choice of 5%, or by stating that this is a judgemental decision. The Council should consider the dates of release of reserves, as well as procedures and criteria for release. This consideration does not have to be part of the plan but may be incorporated into the regulations if the Council wishes.

5. Section 14.3.1.3.B.2.

There is no rationale for choosing the level of 2,000 mt as the maximum amount of domestic trawl catch in the "Winter Halibut-Savings Areas." Does this 2,000 mt include territorial sea catches? The same comments are applicable to section 14.3.1.3.C.

6. Section 14.3.2.3.A (ii)

There is a proposed amendment to the Gulf of Alaska trawl plan to provide a longline exemption to the rule for closing an area when the OY for any species is reached. The Council's intention and rationale regarding a longline exemption in the Bering Sea should be elucidated.

7. Section 14.3,2,3,C

The rationale for the alternatives chosen should be given in the final plan.

8. Section 14.3.2.5.

The reference should be to 1979 not 1978 regulations.

9. Stock Units.

The Gulf of Alaska plan divided the Gulf into 5 fishing areas to prevent localized overfishing. This division was done even though the evidence regarding the "localization" of some stocks was scanty. The Bering Sea plan notes that there may be separate northern and southern yellowfin sole stocks, yet does not suggest separate quotas. Although we are not suggesting sub-areas for yellowfin sole, there may be an inconsistency in the approach to management between the Gulf of Alaska and the Bering Sea plan.

10. Appendix III - Aleutian Areas.

No rationale is presented for open or closed areas. A justification should be provided for whichever option is chosen. Both options refer to areas between 169° and 170° W. longitude off the Pacific Coast of the Aleutian islands. This area is part of the Gulf of Alaska groundfish plan.

11. Section 14.3.1.4

There are, according to the plan (p. 79), gear restrictions on the use of other trawls in Alaskan waters. What is the rationale for not requiring these same restrictions in the FCZ?

12. Markets and Economic Analyses

Several Central Office commenters provided remarks in these areas. Among the salient comments received were:

a. The U.S. Government role in fisheries development should be noted.

b. Our knowledge of international markets should be characterized (p. 105) as "not fully" rather than "poorly" understood.

c. The concept of controlling supply as briefly discussed (p. 105-107), if implemented, could raise monopoly and consumer issues.

d. The alternatives to the proposed action ("no action, regulation of foreign fishing only, and conservation of the present management regime") are rejected in the summary sheet and never referred to again.

e. The implication that increased supply of species available would not result in lower consumer prices (p. 222-223) was questioned by several commenters.

f. The stock rebuilding objective does not have a target level of stock growth and a delineation of benefits that would result.

United States Department of the Interior

OFFICE OF THE SECRETARY

P. O. Box 120
Anchorage, Alaska 99510

ER-78/917

November 3, 1978

Comment # 4

Mr. Jim H. Branson
Executive Director
North Pacific Fishery Management Council
P. O. Box 3136 DT
Anchorage, Alaska 99510

Dear Mr. Branson:

This is a follow up to our November 1, 1978, letter in which we indicated we had reviewed the draft environmental impact statement for the proposed fishery management plan for Groundfish Fishery in the Bering Sea/Aleutian Island Area, Alaska. It was also indicated in our earlier response that we had no suggestions for improvement of the draft statement; however, after further review we offer the following comments for your consideration.

1 - On pages 95 and 149, changes in environmental conditions are mentioned as restraints on fish population and growth. Nowhere in the documents are these changing conditions explained or defined. We believe this needs to be done for an accurate assessment of impacts.

2 - On page 105, it states that the fishing is not now economically viable but no effort is made to analyze how its economic viability will change with time. The rising costs of all things associated with fishing, from fuel to deck hands, should be considered in determining the economic viability of this fishing.

3 - Under Section 10, "Other Considerations Which May Affect the Fishing," on page 154, we believe a discussion of the effects of the Endangered Species Act should be included. In fact, endangered species are not considered at all in this document.

4 - We are including an updated map to be used to depict proposed lease areas for oil and gas development instead of the map on page 157.

5 - We suggest the description of changes to the physical environment (page 221) from the vessels and gear involved in carrying out this management plan be expanded. It would appear that over 200 large vessels fishing a relatively confined area

would abuse the air and water quality of that area. This is particularly true when these vessels are of foreign origin and are not bound by United States restrictions regarding pollution. To indicate that this is minor because of the open ocean environment is not in keeping with the regulations enforced upon other industries or those that will be required of American fishermen and processors. We also believe that discussion of the impact from the resuspension of bottom sediments caused by trawling should be included.

6 - We suggest that the first sentence of Section 22.3.2 on page 221 have these words, "while providing the greatest amount of food ... " added to its end to reflect the full objective of the plan.

Thank you for the opportunity to comment.

Sincerely,

Paul D. Gates
Regional Environmental Officer-Alaska

Enclosure

Comment # 5

THE REQUESTS OF THE HOKUTEN ASSOCIATION
WITH RELATION TO THE 1979 FISHERY MANAGEMENT
PLAN FOR THE BERING AND ALEUTIAN AREAS.

My name is Endo, chairman of the Hokuten (Medium Trawlers) Association. Mr. Chairman, and everyone, I would like to thank you for this oppurtunity which was given to me to speak. We have been working with the Japan Trawler Association and being of the same viewpoint, we hope you will understand our position.

As of 1979, the 200 mile limit has been in effect for two years. Within this time, the establishment of new usage areas and fishing regulations we believe will allow balanced and economical fishing operations for the future. We have a great interest in the discussion of the 1979 FMP which is going on at this meeting.

We were very suprised and have a great deal of concern regarding the proposal to close the Aleutian area (179°E long. to 172°W long yearround to trawler fishery. Our association feels the afore mentioned area is very important and has a much higher yield of 14% o total volume than is apparent in the FMP calculation of 1% of our total volume.

We are concerned even now regarding the closure of the area betwee 172°W long. to 176°W long. within the 12 mile limit which is in effect for 1978, 1979. We would hope that reconsideration of this regulation will be made and the area be opened at least for the period March 1st through October 31st.

We feel that preservation of the bottomfish resource in the Bering and Aleutian areas is very important. If research by both Japanese and American fishery biologists show us the definate need for increased preservation measures, the bottom fishery associations of Japan would participate in cooperation with these measures.

Before the establishment of the 200 mile limit our Hokuten association had a total of 154 ships. With the implimentation of the preservation measures enacted along with the 200 mile our 350 ton class trawlers have decreased to presently a total of 70 ships. These ships are operating yearround limited to the area west of 170°W long. due to Japanese government regulation which disallows operation within the Gulf of Alaska.

We would like you to understand that if the Aleutian area is closed as in the FMP proposal, the Hokuten ship owners have determined that continued fishing operations would not be economically feasible Most of the Hokuten ship operators have but one ship with a crew of 26 men each. Families included, this is about 10,000 people who derive their living from the bottom fisheries of the Bering and the Aleutian areas.

With regard to the volume yield percentage of the Aleutian area in question, descriptions with data will be presented at the regular meeting of PC on November 2nd. After this presentation and discussion we hope that the FMP proposal will be reconsidered.

JAPAN FISHERIES ASSOCIATION

Comment # 6

SANKAIDO BLDG.
9-13, AKASAKA 1, MINATO-KU,
TOKYO, JAPAN

CABLE: DAISUKAI TOKYO

TEL: TOKYO 582-7451

Comments by the Japan Fisheries Association to "Fishery Management Plan and Draft Environmental Impact Statement for the Groundfish Fishery in the Bering Sea/Aleutian Island Area" dated July 27, 1978.

The Japan Fisheries Association herewith submits its comments on "Draft Fishery Management Plan and Draft Environmental Impact Statement for the Groundfish Fishery in the Bering Sea/Aleutian Island Area" for consideration by the North Pacific Fisheries Management Council.

It also wishes to remind the Council that the Japan Deep-sea Trawlers Association and other organizations affiliated to this association have also submitted their own comments on same. This association, therefore, requests that full consideration be given to these comments as well in finalizing the draft.

I. DAH

The draft FMP proposes the following DAH in 1979:

	(DAH in 1979)
Pollock	10,000 mt
Pacific cod	7,000 mt
Rockfishes	1,100 mt (eastern Bering Sea)
	1,100 mt (Aleutian)
Yellowfin sole	1,000 mt
Turbots	1,000 mt
Other flounders	1,000 mt
Sablefish	500 mt (eastern Bering Sea)
	500 mt (Aleutian)
Others	1,400 mt
Total	24,600 mt

The above figures compare with U.S. commercial landings, by species, 1976 and 1977 in Fisheries of the United States, 1977.

To cite the example of Alaska pollack, total commercial landing in U.S. ports was 338,000 pounds (about 150 mt) in 1976 and 712,000 pounds (about 32 mt) in 1977. Nothing is reported from Bering Sea. Therefore, we deem it very unlikely that U.S. fishery will harvest 10,000 mt of Alaska pollock in the Bering Sea during the 1979 season, where there has been so far no U.S. trawl fishing activities.

Similar comparison with respect to other species indicates that U.S. fishing capacity is grossly overestimated with other species as listed in the draft. Therefore, the Japan Fisheries Association requests that excessive DAH be adjusted to realistic levels, if not nil.

II. Reserve

The paragraph "13.1 Reserve" in this draft FMP, states that "In order to prevent OY's from being exceeded without preventing unexpected domestic fishery development, 500 mt or 5 percent of the OY (whichever is the greater) of each species will be held in reserve for allocation late in the year on the basis of domestic need."

Such apprehension in the draft FMP cannot be substantiated unless DAH as proposed are rectified so as to match the real U.S. fishing capabilities. As they are, we propose that reserve provisions be removed. Should they be maintained, we see it essential that DAH be adjusted to realistic levels as proposed in Section I above, and that the mechanism for prompt release early in the season be established in the FMP.

III. Carrying-over of the unused portions of the quotas

We request that provisions be made in the draft FMP to allow unused portion of the quotas allocated in 1978 to be carried over into the 1979 season. Such provisions are indispensable for the optimum utilization of the resource particularly in view of the sequence of the events which led to the reallocation of the large amount of fish very late in the season.

We noted that such measure was taken in the Federal Register dated October 30, 1978, by which unused portions in 1977 quotas were added to the 1978 foreign allocation. We see no reson why same provisions should not be incorporated in the present draft FMP. Two major factors contributed to the need for reshuffling of foreign allocation in 1978, viz., 1) inadequate allocations which necessitated in large amount of fish being allocated to countries without capability of making full use of their allocations, 2) belated reallocations towards the end of season, which made it impossible for countries like Japan to harvest all of the quotas as additionally allocated.

In the light of the foregoing, we request that unharvested portions of the foreign allocations for 1978 be added to the TALFF for 1979.

IV. Alaska pollack

Japanese scientists estimate SY for Alaska pollack no smaller than 1.2 million mt. Furthermore, the survey by the Japanese research vessl Tomi Maru 52 along the Aleutian Islands located a sizable independent resource with the biomass of more than 1 million mt in Aleutian Island Area of which U.S. scientists estimated OY at 100,000 mt level (INPFC, Doc. 2130).

We find, therefore, reasonable to propose that OY for this species be set at 1.3 million at least in Bering Sea/ Aleutian Island Area. We have no objection to a separate OY being established for the Aleutian Island Area at a minimum of 100,000 mt.

(B) Pacific ocean perch

Draft FMP proposes OY for all rockfishes to be set as follows:

All rockfishes including POP

Bering Sea	:	6,500 mt
Aleutian	:	15,000 mt
	Total:	21,500 mt

We note that OY for all rockfishes are proposed to be set at the same level as OY for POP in 1978, although POP is treated as all rockfish group in the draft FMP.

There is no evidence to indicate that the POP stocks in the region have changed in either direction as compared with previous seasons. We also note that scientific information on the conditions of other rockfishes stocks are still inadequate to establish their OY at this time.

Therefore, it is more logical that OY for POP be maintained at 1978 level and that other rockfishes be treated as the part of other groundfish category.

Should the Council find it essential to establish OY for all rockfishes combined, then, it is reasonable to increase OY to 37,500 mt, since average catch by Japanese fleet of other rockfishes amounted to about 16,000 mt in recent years.

(C) Sablefish

Draft FMP sets OY of sablefish at 3,500 mt in Bering Sea and 1,500 mt in Aleutian Island Area. Japanese sceientists estimate that the productivity of this stock in these areas is substancially greater than estimated in the draft FMP. OY for the North Pacific Ocean is estimated by Japanese scientists to be around 70,000 mt on the basis of the standerdized CPUE. U.S. estimation, which is the basis for the OY in the draft FMP, does not make use of corrected CPUE, and hence needs substantial revision.

Hence, it is requested that the scientific panel of the Council review the points as raised by our scientists and that OY be set at around 7,300 mt, viz. 4,100 mt in Bering Sea and 3,200 mt in Aleutian. Apportionment of the OY by area is based on the relative magnitude of catches in 1976 by the Japanese fleet in the respective areas.

(D) Closed Area

(1) With respect to no trawling area along the Aleutian

Islands between 172°00'W and 179°00'E, we request that this traditionally very important fishing ground for the Japanese trawl fishery remain open throughout the year as in the previous years because there is no gear conflict between trawl and longline fisheries.

(2) **Regarding "Winter Halibut - saving Areas" for longline fishery, we find following modifications essential:**

i) The survival rate of halibut incidentally caught by the longline gear is very high, possibly around 90%. In view of this and the total amount of halibut to be incidentally caught by the Japanese longline fishery, we see no reason why this area should be closed to this fishing.

ii) The International Pacific Halibut Commission believes that the abundance of halibut has been increasing in recent years. This is another reason why we believe there is no need for additional restrictions to deprive small scale fishing such as longline fishery of important and essential part of their fishing ground.

V. Effective date of the draft FMP

Our fishing industry like others deploy their fishing vessels in accordance with carefully developed annual plans for each type of fishery and individual boats.

Hence, any drastic changes during the fishing season will never fail to lead to serious disruption of their fishing operations. Therefore, it is the sincere wish of the whole industry of Japan that FMP will not attempt to incorporate any drastic changes in the regulations of foreign fisheries.

Teruo Sasaki

For Tomoyoshi Kamenaga
President,
Japan Fisheries Association

Comment #7

I. Request to Abolish the Measure to Prohibit Trawling in the Area 172°W-179°E *in the Aleutians*

Previously, there were historical reasons for trawling operations within the Aleutian waters where under certain circumstances, permission has been given to carry out trawling operations in certain locations within 3 to 12 miles of the islands, directly outside the territorial waters.

The 1979 FMP draft (14.3.2.3.B(iii)) gives such reasons as ...to provide a sanctuary for longline fishing... to prohibit trawling operations through the year round, including these special areas. Also under the same clause, it is stated that the Japanese Stern Trawler effort in the 172°W-179°E is less than 1% of the Stern Trawler effort of the Bering Sea (US statistical area I, II, III)/ Aleutian Waters (Area IV). This figure cannot be said to be currently representive of the reality of these waters. Mother-Ship Fishery trawlers and SURIMI factory trawlers could not operate in the area 172°W-179°E since 1977, due to restrictions and controls enforced internally in Japan.

The only trawling operations permitted in this water (172°W-179°E) are of two types 1) HOKUTEN and 2) Frozen-Fish factory trawler. If we calculate the average yearly effort for Stern Trawlers in this area for the recent three years (1975-1977), then the effort is about 4%. If we look at the average yearly effort for the last three years:

Units : hours per year

Area of Operation / Type of Fishery	BERING SEA	ALEUTIAN 172W-179E	ALEUTIAN OTHER	ALEUTIAN SUBTOTAL	TOTAL
SURIMI MOTHERSHIP	82,656	0	0	0	82,656
FROZEN FISH MOTHERSHIP	19,867	1,135	6,263	7,398	27,265
SURIMI FACTORY TRAWLER	48,718	0	0	0	48,718
FROZEN FISH FACTORY TRAWLER & LAND BASED	124,990 (84%)	10,936 44% (7%)	13,822 56% (9%)	24,758 100%	149,748 (100%)
TOTAL	(90%) 276,231	(4%) 12,071	(6%) 20,085	32156	(100%) 308387

As seen in this graph, the effort in the 172°W-179°E is 4% in relation to the total effort of the total Bering and Aleutian waters, and in the case of the Frozen Trawler, 7%. Of the Japanese Frozen-Trawler operations in the Aleutian Area during 1975-1977, 44% was in the proposed sanctuary area.

Therefore, we request the abolishment of the prohibition of trawling operations in this area on the basis that these grounds have very high importance to the trawling vessels permitted to operate under the TAC determined for the Aleutian waters.

There have not been gear conflicts with the long-liners and we believe that in view of the resources and operation, long-liners and trawlers are able to coexist in this fishing ground.

II. Requests Concerning the Increase of All Rockfish Allocation.
— Bering Sea and Aleutian —

The initial TALFF for POP in the Bering Sea and Aleutian Islands [redacted] in the years 1977 & 1978 was 21,500 M/T. In the FMP, POP and other rockfishes are considered as one category. The ABC for this combined category 'ALL ROCKFISHES' is set at 21,500 M/T, and the TALFF is set at 18,225 M/T. We feel that the OY for this category should be set at 40,500 M/T due to the following reasons:

A. Between the years 1977 & 1978, no new points have surfaced concerning the stocks of POP and other rockfishes. We have heard of plans to have future joint US-JAPAN (resource assessment abundance) survey plans but until new information is found, we would like to have an assessment similar to the years 1977-1978.

That is, we would like to see the adoption and utilization of 21,500 M/T for the ABC of POP.

B. The catch for the category OTHER ROCKFISHES in the year 1977 was 11,746 M/T, according to the Japanese fishing vessels. This 11,746 M/T constitutes 23.4% of the total catch of the OTHER SPECIES category. If the foreign nations operating within the UNITED STATES 200 mile zone, had a catch similar to Japan for the catch of OTHER ROCKFISHES, then the total will be 18,789 M/T, and should be applied as the OY for OTHER Rockfishes.

C. In line with the above thoughts, the sum of (A) plus (B) should be approximately 40,500 M/T and is thought to be appropriate for the OY for ALL ROCKFISHES.

III. Request for Re-Evaluation of 1,000,000 M/T for ABC of Pollock.

— Bering Sea and Aleutians —

We, at the July [redacted] NPFMC meeting, requested that you will consider the figure of 1,200,000 M/T for the ABC of Pollock, as deduced by Japanese Government Scientists, in arriving at the final ABC figure.

A report prepared by the Japanese Scientists which also included the data which formed the foundation in reaching this figure, was submitted to the SSC at the August meeting. We believe that Mr. Chairman and the Council members have reviewed and understood the materials submitted.

We have become aware that a cooperative JAPAN-US research cruise has found a large body of adult pollock beyond the Continental Shelf of the Bering Sea. We believe it would be appropriate for the OY for this species to be re-evaluated in the light of this finding.

We again request that you will fully incorporate our presented request in determing the OY for Pollock in the 1979 FMP.

IV. Release of Reserve.

We understand Reserve has been established for various fish categories in the Gulf of Alaska as well as the Bering Sea, to act as a safety valve in trying to manage the fish species so that the catch does not exceed the OY of each. It also allows for the possibility of the development of unforeseen new fisheries.

If there is not efficient management of these Reserve species, then a large amount of waste, that is, unharvested fish, will result. This will be against the ethics of the provision in the 200-Mile law concerning the optimum utilization of resources. Under such cases of inefficient management, it will be impossible to save the foreign nations requesting and requiring an increase in the TALFF.

We, therefore, would like to see the following ideas carried out:

1) Re-evaluate every two months all the fish species held in reserve in the Bering Sea and the Gulf of Alaska and establish a means in which 25% of the first established reserve amount will be allocated within the following month of each of these re-evaluation periods if it becomes clear that the reserved amount will not be fully utilized, in the period following the commencement of the fishing year.

2) The reserve for POLLOCK for 1979 (Gulf of Alaska) has been determined at 130,000 M/T. The TALFF for 1979 is 24,600 M/T, which is less than 1/5 that of 1978. This as a result means the throwing out of the Japanese trawlers and therefore, has had a devastating effect on the trawlers.

It has been determined in the July and August Regional Conference that the joint ventures for 1978 has not yet started and yet there is no news of a release of the reserve. This we fail to understand. We would like to see more strict screening of the 1979 joint venture plans and ask that a correction be made of 130,000 M/T, to be added to the TALFF.

3) Concerning the Domestic Annual Harvest. When it becomes obvious that the DAH amount set aside will not be fully utilized, then a measure, as for the Reserve, be establsihed so that an allocation will be released to the foreign countries immediately.

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(206) 784-5344

Comment # 8

January 10, 1979

Jim Branson, Executive Director
North Pacific Regional Fishery Management Council
P.O. Box 3136 DT
Anchorage, Alaska 99510

Dear Jim:

Our office represents the Alaska Longline Fishermen's Association (ALFA) and the International Longline Association (ILA). The enclosed Position Paper constitutes their comments in support of the sanctuary area proposed by section 14.3.2.3 B(iii) of the Fishery Management Plan for the Bering Sea/Aleutian Island Area (FMP). In addition it should be noted that similar supportive comments were presented to the North Pacific Council by Mr. Robert Alverson on behalf of the Seattle Vessel Owners Association in a letter dated October 7, 1978.

Very truly yours,

Scott E. Stafne

SES/sa

cc: North Pacific Council Members
Dr. Loh Lee Low

FISHING VESSEL OWNERS' ASSOCIATION
INCORPORATED
ROOM 232, C-3 BUILDING
FISHERMEN'S TERMINAL
SEATTLE, WASHINGTON 98119

(206) 284-4720

Comment # 9

October 7, 1978

North Pacific Fishery Management Council
P.O. Box 3136 D.T.
Anchorage, Alaska 99510

STATEMENT ON

FISHERY MANAGEMENT PLAN FOR THE

GROUNDFISH FISHERY IN THE

BERING/SEA ALEUTIAN ISLAND AREA

I am Robert D. Alverson, manager of the Fishing Vessel Owners Association of Seattle, Washington. Our vessels operate in the waters from Southern California to those adjacent to the Soviet Union in the Bering Sea. We fish for halibut, blackcod, and albacore tuna. We would like to express some concerns that we have with the management plan for the groundfish fishery in the Bering/Sea Aleutian area.

1. The Bering Sea management plan for 1979 does not provide for rebuilding of the various commercial species. On page I-2 table I-1 the equilibrium yeild, allowable biological catch and optimum yeild levels for all species have been all set equal, hence for those species which are substantially below MSY levels the plan does not provide for rebuilding of the stocks. This seems to be somewhat confusing as the supporting data indicates a need for a rebuilding of several stocks. There are two species catagories which should receive some relief, Sablefish and Pacific Ocean Pearch. On page 70 the plan states,

> "Maximum harvest of sablefish occured in 1961 and 1962 when 26,000 and 28,500 mt where taken. Catches were relatively stable at a lower level of 9,500 - 16,000 MT from 1966 to 1972 but declined thereafter to 2,700 MT in 1976."

The proposed EY, ABC and OY levels for blackcod are all set at 3.5 MT, almost 1,000 MT more than the foreign fleet was able to take in 1976. With the stock of sablefish in such poor condition we request the council to take action to meaningfully rebuild this fishery. There a couple of alternatives which the council can take. The council may set the OY below the EY level or reduce the OY level of other species to reduce the incidental catch of blackcod.

On page 97 of the plan it makes the statement,

> "For species such as Pacific Ocean Perch and Sablefish there has been as yet no evidence that catch restrictions have improved the poor condition of these stocks."

The plan further states on page 97,

> "In the case of long-lived and slow growing species like POP and Sablefish several years will be required before evidence is available to judge the effectiveness of current management policies."

The F.V.O.A. can tell you today what the effectiveness of the current management policies will be if the OY is set equal to EY. There can be no rebuilding of either of these stocks.

On page 163 the plan attempts to justify the proposed OY levels. The plan states,

> "With the expectation over the near term of only a modest domestic involvement in this fishery and having identified no social or economic reasons for reducing the yield of stocks in this fishery below ABC, OY for all species will be considered equal to ABC, as shown in Annex I."

This is interpreted by the F.V.O.A. to say if domestic participation is not sufficient then there is no reason to rebuild the stocks that are depressed, however when U.S. participants start to operate in the Bering Sea groundfish fishery efforts to rebuild the POP and Sablefish or other depressed species will then be considered. The F.V.O.A. request that the Council consider the proposal to set all OY levels equal to the ABC. We do not believe that this is justified considering the negative statements made in the plan concerning the status of some of these stocks.

2. Under the management measures for domestic fishermen the F.V.O.A. supports the proposal which provides no trawling in the Bristol Bay pot santuary and halibut nursery grounds area and also supports the restriction on domestic trawling efforts to 2000 m.t. between December 1st to May 31st in the proposed halibut savings areas. The suggested restrictions for domestic longline effort in the halibut savings areas we do not agree with. Except when directing a fishery on halibut as provided in the Halibut Management Plan or through IPHC domestic longline efforts should be the same as those imposed on foreign fishermen for conservation purposes. Hence, there should be a closure to domestic longline fishermen from Dec. 1 to May 31st in the proposed area except when fishing is provided in the Halibut Management Plan, or when fishing is conducted in depths greater than 500 meters isobath.

These domestic proposals will help prevent high incidental catches of and mortality of juvenile halibut which are known to occur in concentrations in the Winter Halibut savings areas, while allowing for some expansion in the domestic trawl fishery.

3. With respect to the foreign restrictions the F.V.O.A. supports continued no trawling in the Bristol Bay Pot Sanctuary and also supports the trawl closure from December 1st to May 31st in the winter halibut savings areas. In consideration of foreign longline efforts we support the restriction from fishing from December 1st to May 31st landward of 500 meters islbath. We support the 500 meter isobath depth as it represents a depth that halibut catches can be kept to a minimum and still provides a sufficient proportion of the sablefish stock to be fished by the foreign fishermen. As can be seen on the attached document from NMFS, about 63% of the sablefish population occurs in depths greater than 500 meters. (From Sablefish of the NE Pacific Ocean & B.S.) We also support this depth restriction based on the two observer reports that were made earlier this year in the proposed halibut savings areas. Those reports showed that when the Japanese longline effort was inside 500 meters for the purpose of taking pacific cod the incidental catch of halibut was 18.2% to23.5% of the target species. This is also the reason why we have asked that this same rstriction apply to U.S. longline vessels.

4. The area from 172 W to 179 E has been proposed as an area where no foreign trawling should take place. Very little trawl effort is conducted in this area by any of the participating countries in the Bering Sea. The Japanese Longline fishermen have requested this closure as they have incurred distruction of their gear and preemption of the grounds by the few foreign trawlers that operate in this area. The F.V.O.A. supports this requested foreign trawl closure.

The restrictions supported by the F.V.O.A. on domestic trawl and longline efforts and foreign trawl and longline efforts in the halibut savings area are supported by historical concentrations of halibut in this area. Halibut stocks are showing strong signs of improvement in both the Bering Sea and Gulf of Alaska and if we are to avoid the distruction that occured in previous years these restrictions will be necessary.

Very truly yours,

FISHING VESSEL OWNERS ASS'N

Robert D. Alverson, Manager

Comment # 10

ADDRESS BY JOE DEMANTLE JR. AND JESSIE FOSTER TO NORTH PACIFIC FISHERIES MANAGEMENT COUNCIL

There are two things we would like to talk about. The first is the Bering Sea bottomfish plan, and the second is the FMP for the High Seas Salmon Fishery Off the Coast of Alaska East of 175° East Longitude. Although we have in the past presented information to the Council concerning difficiencies in these plans, we notice that these difficiencies have not been corrected.

In regard to the Bering Sea Groundfish plan, International North Pacific Fisheries Commission Documents 2067, 2120, and 2121 reveal that approximately 45,000 chinook salmon are taken in the Bering Sea by the foreign trawl fleet, principally Russia and Japan. Our reading of the documents reveal that high seas mortality, and interruption of migratory cycles have not been investigated in this "incidental" catch of our kings. We have learned from our scientist that high seas mortality and interruption of migratory cycles are important factors in judging the impact of a high seas interception fishery. The figure being taken in the Bering Sea is certainly not "incidental", and immediate efforts should be taken through the observer program and time area closures to reduce this take of our kings. It is very important for the Council to take these steps now for we in Western Alaska do not want to have to watch American flag trawlers harvested our salmon in future years. The effort to protect our in-shore fishery will only get messier as Americans move into this fishery. We feel that a specific section in the FMP for the Bering Sea Groundfish Plan is required to treat this chinook interception.

Joe DeMantle Jr. _______________

Jessie Foster _______________

Statement by

Comment # 11

Mr. H. Nakamura, Vice Chairman
of
North Pacific Longline Gillnet Ass.
(Japan)
Oct. 31, 1978
at
Public Hearing, on the Proposed
Bering Sea/Aleutian Groundfish FMP

Mr. Chairman, Ladies and Gentlemen, I am grateful for this opportunity to speak briefly concerning the proposed option inserted in the FMP with respect to 500M depth restriction for longliners during winter months in "the Winter Halibut Saving Area" in Bering Sea.

We are very much concerned that when this restriction is implemented "as is" our Pacific cod longlining will b(virtually precluded from catching the quota of Pacific cod you so kindly agreed to make available to us. Therefore, it is our earnest wish that this newly proposed restriction during winter months landward of 500M isobath be dropped or relaxed to the extent by which we would be able to catch the quota.

While we pledge we would do our utmost to minimize iincidntal catch of halibut, including exploring ways and means to modify our present method of releasing halibut and having good talks with both U.S. halibut fishermen and International Pacific Halibut Commission,

we refrain from going into detail at this time, however, wish to be given further opportunity to submit comments on this question before January 10, 1979, which we understand is the deadline for the comment on the Bering/Aleutian FMP.

I do hope then our comments will receive fair and kind consideration of the Council and AP and SSC.

Thank you,

H. Nakamura

H. Nakamur
Vice Chairman
NPLG Ass.
(Japan)

MUNDT, MacGREGOR, HAPPEL, FALCONER & ZULAUF
ATTORNEYS AT LAW

Comment # 12

JAY H. ZULAUF
JAMES C. FALCONER
HENRY HOWARD HAPPEL, III
WM. PAUL MacGREGOR
J. CARL MUNDT

BANK OF CALIFORNIA CENTER
SUITE 1230
SEATTLE, WASHINGTON 98164
206-624-6880

January 8, 1979

Mr. Jim H. Branson
Executive Director
North Pacific Fishery
Management Council
Post Office Box 3136DT
Anchorage, Alaska 99510

JAN 10, 1979

Re: Fishery Management Plan for the Groundfish Fishery in the Bering Sea/Aleutian Islands Area

Dear Mr. Branson:

This letter is submitted on behalf of our client, the North Pacific Longline-Gillnet Association (the "Association"), in response to the request for comments on the proposed Fishery Management Plan and Draft Environmental Impact Statement for the Groundfish Fishery in the Bering Sea/Aleutian Islands Area ("BS/A FMP") contained in your letter of July 27, 1978. We wish to raise six points and discuss each in turn.

1. DAH and Reserve Levels for Pacific Cod and Sablefish

The Association believes that the DAH for sablefish and Pacific cod in the BS/A FMP has been set unreasonably high and that the reserves are correspondingly too low. DAH levels in the BS/A FMP were determined by surveying all processors located in or adjacent to the region to determine their specific plans for handling groundfish during 1979. This same method of arriving at DAH was employed for sablefish and Pacific cod in the Gulf of Alaska FMP for 1978. The result in the Gulf of Alaska FMP has been a very substantial overestimation of actual domestic catch, as indicated by the following table concerning the Gulf of Alaska:

	Sablefish	Pacific Cod
FMP's Estimated 1978 DAH 1/	4,000 mt.	15,500 mt.
Domestic Catch 1/1/78-11/30/78 2/	1,411.4 mt.	145 mt.

It is incumbent on the Council to estimate DAH as accurately as possible. The Fishery Conservation and Management Act of 1976 ("FCMA") requires the preparation of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield ("OY") from each fishery, 16 U.S.C. §1801(b)(4). It is impossible, practically speaking, to obtain or even approach OY when DAH is greatly overstated. Altering DAH during the season to make more fish available to foreign fisheries requires formal amendment of the FMP, a time-consuming and cumbersome task. The delays and difficulties inherent in this amendment process mean that amounts in DAH which are not taken by U.S. fishermen will not be taken at all.

The Association proposes that DAH be set at more reasonable levels and the excess be allocated to reserves. Amounts in reserves are automatically allocable to the domestic fishery as need be. Therefore, lowering DAH and raising reserves would not adversely affect the ability of domestic fisherme to take as much of the resources as they can. Such a readjustment of DAH would, however, practically permit the release of reserves to foreign fishermen so that an amount approaching OY could be harvested, as is required by law.

DAH, Reserves, TALFF, and Optimum Yield for Pacific cod and sablefish as proposed in the BS/A FMP are as follows:

	DAH	Reserves	TALFF	OY
Pacific cod	7,000 mt.	2,935 mt.	48,765 mt.	58,700 mt.
Sablefish - Bering Sea	500 mt.	350 mt.	2,650 mt.	3,500 mt.
Sablefish - Aleutians	500 mt.	150 mt.	850 mt.	1,500 mt.

1/ Fishery Management Plan for the Gulf of Alaska Groundfish Fishery During 1978, Federal Register, April 21, 1978, p. 17243.

2/ From statistics supplied by Alaska State Department of Fish and Game.

The Preliminary Fishery Management Plan for sablefish of the Bering Sea and Northeastern Pacific Ocean described the U.S. fishery for sablefish in the region as nonexistent and stated that all of the allowable catch for 1977 could be allocated to foreign fishing.3/ The actual domestic catch of both sablefish and Pacific cod in the Bering Sea/Aleutian region has been very low in past years:

Catch By U.S. Fishermen in Metric Tons4/

	1976	1977	1978 (thru 11/31)
Sablefish	0	2.0	0.4
Pacific Cod	167.7	225.5	541.1

The Association recommends that DAH and reserves for sablefish and Pacific cod be set as follows:

	DAH	Reserve
Pacific Cod	2,000 mt.	7,900 mt.
Sablefish (Bering Sea)	50 mt.	800 mt.
Sablefish (Aleutians)	50 mt.	600 mt.

This proposal is based on past catches by U.S. fishermen adjusted upward to reflect the probable magnitude of increase in domestic fishing effort during 1979. Setting DAH and reserves at these recommended levels would enable the Council, through the reallocation of reserves to DAH and TALFF during the course of the year, to manage these resources for OY as required by the FCMA.

2. Specification of Quotas for Foreign Longliners.

The BS/A FMP allocates the total OY for sablefish, Pacific cod, and other species between DAH, reserves, and TALFF. The Association believes that TALFF should, in turn, be divided by the Council into two components--foreign setline fisheries and foreign trawl fisheries. The Council has been expressly authorized to make such an allocation. 16 U.S.C. §1853(b)(4) states that:

3/ §2.4.1.1.1 and §2.4.1.2.1 of the PMP.

4/ From statistics supplied by the Alaska State Department of Fish and Game for their statistical region "Western Alaska".

"Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, may--

* * *

prohibit, limit, condition, or require the use of specified types and quantities of fishing gear, fishing vessels, or equipment for such vessels, including devices which may be required to facilitate enforcement of the provisions of this Act."

The Secretary of Commerce has used this allocation authority before. In §2.4.1.1.3 of the Sablefish PMP for the Bering Sea and Northeastern Pacific Ocean, for example, the Secretary provided an allocation between foreign trawl and set-line gear.

The Association favors division of TALFF between trawl and set-line fisheries as a matter of resource conservation. The set-line fisheries fish in a highly selective manner for a very few target species. By comparison, their incidental catch of non-targeted species is low. In addition, the set-line fisheries take a smaller percentage of juveniles of the target species than other fisheries. Furthermore, general damage to the marine environment is substantially less for the set-line fisheries than some other fisheries. With respect to the target species--Pacific cod, sablefish, flounders and herring--a generous allocation to the set-line fisheries makes good sense. In addition, the allocations for incidentally caught species should be set at reasonable levels.

3. Exemption From All-Species Closure.

Subsection 14.3.2.3.A.(ii) of the FMP would close the entire area to all fishing by a nation when that nation's allocation of any single species is exceeded. The stated purpose of this provision is to discourage foreign fleets from covertly targeting on depleted stocks and to prevent damaging by-catches in multi-species fisheries. A similar closure provision is contained in the Gulf of Alaska FMP. The Association sought and has obtained approval from the North Pacific Council of an amendment which would exempt foreign longliners from that provision.

The Association asks that the BS/A FMP be amended to specifically exclude them from the area closure provision in §14.3.2.3.A.(ii). The Association believes that the closure provision should not apply to them for two reasons. First, the activities the provision seeks to prevent are not ones in which the Association has ever engaged. The Association does not have a history of covertly targeting on non-target species, depleted or otherwise. The incidental catch of non-targeted species by the Japanese longliners has always been exceptionally low. There is no evidence whatsoever that a closure provision of the sort contemplated is necessary to obtain the Association's full compliance with the regulations affecting its members' activities. Second, the operation of the closure provision could work a substantial hardship on the Association in circumstances where its own activities are in strict compliance with U.S. law.

4. Access to Winter Halibut-Savings Areas.

The Association supports Option 2 of §14.3.2.3.C. of the BS/A FMP which concerns longline access to the Winter Halibut-savings Areas. The Association believes that no portion of the Winter Halibut-savings Areas should be closed to them during any part of the year.

The proposal to prohibit foreign longlining within those portions of the Winter Halibut-savings Areas inside the 500 meter isobath would appear to be based not on the best scientific information available but rather on past history. As Dr. Lee Alverson pointed out in a letter to the Council on October 6, 1978 concerning the Bering Sea/Aleutian FMP:

> "There is, in addition, a depth closure and at least one area closure which seem to be 'carry-over' regulations which were negotiated during the bilateral era of the early 70's... The depth closure is perhaps the most classic example of a regulation for which there is little technical data to support the conclusion that the U.S. fishery is enhanced by maintaining foreign long-lining seaward of the 500 meter isopleth. Hence, in this situation we have, for all practical purposes, incorporated tradition rather than decision based on the best scientific data available."

Longline fishing within the Winter Halibut-savings Area was not prohibited by the Preliminary Management Plan for the Sablefish Fishery of the Bering Sea. The scientific data that is available indicate that fishing by the Association within the region which comprises the Savings Area has resulted in the past in the incidental mortality of a very small number of halibut. Reports have been gathered from U.S. observers aboard Association vessels fishing in the Bering Sea. Reports are available for four cruises where the average depth fished was less than 500 meters in the INPFC Bering Sea Area I, an area which includes the proposed Savings Area, between January 1 and May 31, 1978. The statistical summaries of these cruises are attached as Exhibit A. These four reports indicate that on the average, .047 metric tons of halibut were taken per metric ton of total catch.5/

Since the Japanese longliners are required to release all halibut taken, in order to determine the impact of this incidental catch on the halibut stocks it is necessary to determine what percentage of the halibut that are caught die as a result. There is scientific evidence that strongly suggests that the survival of halibut taken by Japanese longline gear and released is very high. On Pages 8-10 of our letter of October 31, 1978 to Mr. Tillion and Mr. Pennoyer of the Council, a copy of which is attached as Exhibit B, we summarized this evidence. Based on this, the Association believes that .20 would be a reasonable estimate of the overall mortality rate for incidentally taken halibut in the Winter Halibut-savings Areas. Applying this mortality rate to the estimated winter season incidental catch of halibut in the Savings Areas yields a loss of .0094 metric tons of halibut for each metric ton of total catch by Japanese longlining vessels. This loss rate is quite low.

In order to determine the total mortality of halibut as a result of Japanese longline winter fishing within the proposed Savings Area, it would be necessary to estimate the total longliner catch of all species. Based on past history and given the TALFFs and Reserves in this FMP, a reasonable estimate of total catch by Association vessels in the Savings Area during the winter season would be 1,500-2,000 metric tons. Using this estimate, the total mortality of halibut would be 14.1-18.8 metric tons. This small incidental take of halibut which can be anticipated as a result of foreign longline fishing from December through May in the Winter Halibut-Savings Area does not justify closing the area to this fishery.

5/ This average was calculated by taking for each cruise the mean kilograms of halibut incidentally taken per each ton of total catch weighted by the total tonnage of catch for each cruise.

5. Creation of Longline Sanctuary.

The Association wishes to comment favorably upon the longline sanctuary established by Section 14.3.2.3.B.(iii) of the proposed FMP.

Gear conflicts between set-line fisheries and trawl fisheries have been an increasing problem in the Bering Sea and Aleutians. This problem is international inasmuch as it involves the conflicting fisheries of several nations. It has therefore been unresolvable by any foreign nation acting alone. It is, however, a problem which can be resolved within the Fishery Conservation Zone by the Council's judicious exercise of its management authority. The Association believes that creation of a longline sanctuary as contemplated in the FMP is a step towards a reasonable overall resolution of the gear conflict problem.

Statistics from the INPFC indicate that from November, 1975 through October, 1976, 41% of the foreign longline effort in the Bering Sea/Aleutian area was expended in the proposed longline sanctuary while 4/10 of 1% of the primary foreign stern trawl effort was expended there. (See Exhibit C containing figures reproduced from the Proceedings of the 24th Annual Meeting of the International North Pacific Fisheries Commission, 1977.)

6. Relaxation of Twelve Mile Area Closure.

The proposed FMP contains a general prohibition on foreign fishing within twelve miles of the baseline used to measure the Territorial Sea. The stated purpose of this prohibition is "to prevent conflicts with U.S. fixed gear and small, inshore fishery vessels; to prevent catch of localized inshore species important to U.S. fishermen and natives."

The FMP proposes two alternative relaxations of this general prohibition with regard to certain foreign fisheries in designated regions of the western Aleutians as provided in Appendix III to the FMP. The Association supports the exemptions for longline fishing contained in Subparagraphs A.(1), A.(2), A.(4), B.(1) and B.(4) of Option 1, and Subparagraphs A.(1), A.(2), A.(4), B.(1) and B.(3) of Option 2. The Association urges that between 172° West Longitude and 179° East Longitude, the demarcation lines for the Longline Sanctuary, foreign longlining be permitted up to the Territorial Sea year-round. This would be consistent with establishment of the proposed Longline Sanctuary. No significant U.S. fisheries are likely to occur in this area during 1979.

In addition, the Association believes that other exemptions from the general 12 mile prohibition should be granted to foreign longliners. There are other areas within the proposed 12 mile prohibition where no significant U.S. fixed gear or small inshore fisheries have occurred or are likely to occur during 1979, and where no significant harm to inshore species important to U.S. fishermen and natives is likely as a result of foreign longlining. The Association therefore proposes that the exemptions for foreign longlining contained in Appendix III be expanded to include those areas in the waters off the Bering Sea coast of the Aleutian Islands between 169° and 165° West Longitude.

Finally, the Association notes that there is an inconsistency between establishment of a Longline Sanctuary and some or all of the exemptions for foreign trawl fishing contained in subsections A.(4), B.(3), and B.(4) of Option 1 and A.(4) of Option 2. The Association assumes that with the establishment of the Sanctuary, inconsistent exemptions will be eliminated.

We ask that you give these comments and suggestions your careful consideration. Our clients have asked us to thank you for the opportunity to comment on the FMP. We have also been requested to continue the spirit of cooperation which has characterized the Association's approach to the development and implementation of the various FMPs, and to offer any assistance or information which you may need in connection with the points discussed in this letter.

If you have any questions or comments concerning any of the issues discussed herein, please give us a call.

Sincerely yours,

MUNDT, MacGREGOR, HAPPEL,
FALCONER & ZULAUF

Henry H. Happel, III

HHH:dlr
Enclosures

COMMENT RESPONSE SECTION

Comment #1		**Information only**

Comment #2-Response

Agency or individual -		**Mr. Sano, Director, Oceanic Fisheries Department, Japan Fisheries Agency**
	FMP Reference	
(1) (i) (a)	**page 151, Sec. 13.0**	**500 mt or 5% of the OY (whichever is greater, is held in the reserve. Reallocation of this reserve amount depends upon the reassessment of the domestic effort on a continuing basis and appropriate assignment to TALFF.**
(b)	**page 151, Sec. 13.0**	**(see above)**
(c)	**page 143, Sec. 12.1.1**	**The stated DAH is based on the best information available from processors and was computed by the formula as presented on page 143.**
(d)	**Annex I I-6-1 page A-35**	**ABC for POP (and other species) has been assigned based on the best information available.**
(e)	Annex III - page A-60	The derivation of TALFF for all species is based on the formula derived from the best information available. TALFF may be increased as a result of assignments from reserve amounts.
(ii) (a)	page 161-162, Sec. 14.3.2.3 (c((1)	Closure retained to prevent high incidental catch of juvenile halibut during winter months.
(b)		Comment is not applicable in the format of this FMP. The question will be addressed in the Herring FMP and opportunity to re-submit the comment is available at that time.
(c)	page 161-162, Sec. 14.2.3	Determination of specific closed areas in the Aleutians has been reserved at the request of the Japanese.

Comment #3 Response

Agency or individual -		Roland F. Smith, acting director, Office of Resource Conservation and Management, NOAA
(1)	page 141, Sec. 12.1	Estimation of DAH was the result of surveys of processors, fishermen and potential market sources. Historic catches are but one measure of an anticipated harvest and do not take

			into account the variables present in this developing fishery. The reserve mechanism is the buffer on DAH estimates if they are shown to be unrealistically high.
(2)	**(a)**	**Annex V, 10.2 p A-71**	**Annex material provided.**
	(b)	**" "**	**" "**
	(c)	**" "**	**" "**
(3)		p 134, Sec. 10.2.1	Section added.
(4)		Annex I - Annex III	Sec. I.10.3 presents the derivation of OY for "Other Species". As stated, virtually nothing is known of the population structure, biological attributes or potential yield of the individual components of this category. The pragmatic assumption is that the category can sustain removals equal to 4% of the total catch of specified species so long as that catch does not exceed the 1972 total of 2,234,500mt.

Substantive Issues section of
Comment #3

(1)		No action. The generic aspect of the plan allows for adjustments if necessary in the OY levels of all species. The appropriate adjustments can be made by the Council at any time if OY is threatened.
(2)	p 157-158, Sec. 14.3.1.6	The limited entry section has been changed to reflect the possibility of limiting the entry into any fishery ahead of a total lack of foreign effort due to the ability of U.S. fishermen to take the OY.
(3)	Annex III, p A-60	Statement added to reflect inclusion of stocks in the teritorial sea.
(4)	p 151, Sec. 13.1	Explanation of the release mechanism has been incorporated into the plan.
(5)	p 154-156, Sec. 14.3.1.3	The domestic trawl catch level in the halibut savings areas is predicated on bait requirements for the crab fleet. It is felt this level of effort is biologically safe within the conservatic measures for halibut and the fishery will provide information not available otherwise.
(6)	p 159-160, Sec. 14.3.2.3	Explanation is provided.
(7)	p 159-160	Final plan reflects explanation for choice of options.
(8)	Sec. 14.3.2.5	Reference deleted in final plan.
(9)		No action. No inconsistency noted.
(10)		Reserved - rationale will be presented.
(11)	p 79	No rationale presented.

Comment 2

12 (a-b-c-d-e-f) · Comments noted.

Comment #4 Response

Agency or individual - Paul D. Gates, Regional Environmental Officer, Alaska

(1) Neither long nor short-term changes in the basic ocean environment is understood well enough to postulate an explanation for those effects on components of the ecosystem which may or may not suffer/benefit. Certain conditions i.e., change in temperature, abnormal long-term ice cover, cataclysmi bottom displacements, could affect fish populations, and act as constraints on numbers and growth.

(2) Predicting the economy of a developing fishery is difficult. Estimates of those involved in the industry range from "a significant number of fishermen and boats participating immediately" to "any development is at least five years away."

(3) Section provided for Endangered Species

(4) Map used.

(5) Not possible to predict. The EIS states that the effect of combustion, exhaust and waste is judged to be minor in the open ocean environment. We do not judge the Bering Sea/Aleutian Island area of the North Pacific to be a confir area.

(6) Change made as suggested.

Comment #5 Response

Agency or individual - Mr. Endo, Chairman, Hokuten (medium trawlers) Association

All comments - The subject addressed is directly related to decisions which are yet to be made and have been classified as reserved.

Comment #6 Response

Agency or individual T. Kamanaga, President, Japan Fisheries Association

(I)	p 141, Sec. 12.1.1 p 143	The stated DAH is based on the best information available from processors and was computed by the formula as presented on page 143.
(II)	p 151, Sec. 13.2	500 mt or 5% of the OY (whichever is greater), is held in the reserve. Reallocation of this reserve amount depends upon the reassessment of the domestic effort on a continuing basis and appropriate assignment to TALFF.
(III)		Quota allocation ("carryover") mechanism offered is not accepted.
(IV)		Not adopted. Pollock OY is set at 1,000,000 with a separate OY of 100,00 for the Aleutian area.
	(b)	Not adopted
	(c)	Not adopted
	(d) (1)	Reserved
	(2)	Not adopted
(V)		N/A

<u>Comment #7 Response</u>

Agency or individual -		H. K[illegible]moto, Chief of Delegation, Japan Deep Sea Trawlers Association
(I)		Reserved
(II)		Proposal to increase TALFF of all rockfish not adopted.
(III)		Proposal for reevaluation of pollock OY not accepted.
(IV)	p 151, Sec. 13.1	The reserve release mechanism has been added to the plan.

<u>Comment #8 Response</u>

Agency or individual -	Scott Stafne, counsel, Alaska Longline Fishermen's Association
	Support noted. Proposal adopted.

<u>Comment #9 Response</u>

Agency or individual -	Robert Alverson, Manager, Fishing Vessel Owners Association, Seattle
(1)	OY equals ABC for all stocks based on the best information available.

(2)	Adopted
(3)	Adopted
(4)	Reserved

Comment #10 Response

Agency or individual -	Jessie Foster Joe DeMantle, Jr.
p 101, Sec. 8.6.3	The comment addresses the problem of high seas interceptions of salmon. This section will be expanded on the basis of information being collected and added to the plan in amendment form.

Comment #11 Response

Agency or individual -	H. Nakamura, Vice Chairman, North Pacific Longline-Gillnet Association.
	Not adopted. Winter-month restrictions on longliners in the halibut savings area are based on concervation measures designed to protect concentrations of juvenile halibut.

Comment #12 Response

Agency or individual -		Mundt, et al for the North Pacific Longline-Gillnet Association
(1)		Proposal for DAH levels for Pacific cod and sablefish not adopted.
(2)		Allocations of species between gear types, i.e., setline-trawl, most properly is a function of the nation involved. Although the Council has addressed this matter in the Gulf of Alaska bottomfishery, not enough information has been developed at present to justify directed fisheries in the BS/A area.
(3)	Sec. 14.3.2.3	Proposal adopted exception granted.
(4)		Not adopted. Winter-month restrictions on fishing effort in the halibut saving area have been retained.
(5)		Support for proposal noted (longline sanctuary). Reserved.
(6)		Reserved.

In addition to the foregoing comments, comment has been received from the Marine Mammal Commission concerning the interaction of the conduct of the fishery and those effects on marine mammal populations present within the management area.

That comment is addressed separately and is included with Annex V (Information on Marine Mammal Populations), pp A-71-80.

In Addition, Sec. 10.2 (Marine Mammal Protection Act of 1972), pp 129-134 was revised upon receipt of the comment from the Marine Mammal Commission. The revision has been made within the parameters of information presently available concerning the number, distribution and interaction within the ecosystem between groundfish species and marine mammals.

The response to the Marine Mammal Commission comments includes Annex V, all of Sec. 10.2 and the Marine Mammal Commission Comment Response found appended to Annex V.

ANNEX I

DERIVATION OF ACCEPTABLE BIOLOGICAL CATCH

Stock assessment studies leading to determinations of acceptable biological catch (ABC) are reported in this Annex for the following Bering Sea/Aleutian groundfish species categories:

- I.1 Alaska pollock
- I.2 Yellowfin sole
- I.3 Turbots (Arrowtooth flounder and Greenland turbot)
- I.4 Other flatfishes
- I.5 Pacific cod
- I.6 Pacific ocean perch and other rockfishes
- I.7 Sablefish (Blackcod)
- I.8 Atka mackerel
- I.9 Squid
- I.10 Pacific hali
- I.11 Other included species

A summary of those determination is given in Table I.1 on the following page.

I.1 Pollock

I.1.1 Maximum Sustainable Yield

The fishery for pollock began in earnest after 1964, and took eight years to reach a peak catch of almost 1.9 million metric tons in 1972 (Table I.2). The decline in catch thereafter was due partially to fishery restrictions on the amount of catch and on declining stock abundance. Although there may be more than one stock of pollock in the Bering Sea, the estimation of maximum sustainable yield is made for the entire resource customarily fished by Japan, the U.S.S.R., and other nations in the eastern Bering Sea.

Table I.1--MSY, EY, and ABC Values for Groundfish in the Bering Sea/Aleutian Region during 1979 (1000's mt)

Species	Sub-area1/	MSY	EY	ABC=OY	(1978 OY)	(1978-79 change)
Pollock	BS	1,100-1,600	1,000	1,000	(950)	(+50)
	AL	?	?	100		
Yellowfin sole	--	169-260	117	117	(106)	(+11)
Turbots	--	100	90-95	90	(139)	(+12)
Other flatfishes	--	44.3-76.8	=MSY	61		
Cod	--	58.7	=MSY	58.7	(58)	(+0.7)
Pacific Ocean perch	BS	32	6.5	3.25	(6.5)	
	AL	75	15	7.5	(15)	
Other rockfish	--	?	?	7.7		4/
Sablefish	BS	11.35	3.5	3.5	(5)	(-1.5)
	AL	1.85	1.5	1.5	(1.5)	(0)
Atka mackerel	--	33	Unknown	24.8	(24.8)	(0)
Squid	--	≥ 10	≥ 10	10	(10)	(0)
Pacific halibut	--	5	0.3	2/	--	--
Other included species	--	67	67	55.5	(93.6)	(-38.1)
Total3/	--	1,702.2-2,325.7	1,446.5-1,484.0	1,540.45	(1,409.4)	(+131.05)

1/ BS = Eastern Bering Sea Area (Statistical Areas I, II, III combined).
AL = Aleutian Area (Statistical Area IV).

2/ Under management by the International Halibut Commission.

3/ Excluding Pacific halibut.

4/ Included under "others" in 1978.

Based on fisheries statistics that indicated declining stock abundance, it is believed that catch levels, which ranged from 1.58 to 1.87 million mt between 1971 and 1974, cannot be sustained. Maximum sustainable yield has been estimated by two methods: the general production model of Pella and Tomlinson (1967) and the method of Alverson and Pereyra (1967) for obtaining first approximations of yield per exploitable biomass. Estimates thus derived, from data available prior to 1974, ranged from 1.11 to 1.58 million mt (Low 1974). Incorporation of 1974-76 data and using the procedure of Rivard and Bledsoe (1977) results in an MSY estimate of 1.5 million mt, within the 1.1-1.6 million mt range determined by Low (1974).

I.1.2 Equilibrium Yield

Overall Abundance

The relative abundance of the exploitable portion of the stock is generally measured by catch-per-unit-of-effort (CPUE) indices. Since the Bering Sea groundfish fishery is multi-nation, multi-vessel class, multi-gear and multi-species, there is considerable uncertainty as to the best use of CPUE data to measure pollock abundance. For some time, it has been felt that the CPUE of Japanese pair trawlers is more indicative of stock abundance than that of other vessel types because those vessels seek out pollock as the primary target species and consistently account for a large proportion of the pollock harvest. There is also considerable uncertainty as to which way the data should be organized and statistically analyzed. Factors such as time, area, and fishing power can influence CPUE and must be account for when computing CPUE. After years of considerable debate and refinement of CPUE procedures among scientists at International North Pacific Fisheries Commission (INPFC) meetings, the following DPUE indices have come to be relied upon.

Procedures by U.S. Scientists

(A) Catch per horsepower-hour of trawling by Japanese pair trawlers as described by Low et al. (1977). Effort, in this case has been adjusted for horse-power changes and CPUE's are weighted by caught of all vessels and area.

Table I.2.--Annual catch (metric tons) of pollock in the eastern Bering Sea, 1964-77 (INPFC proceedings, 1977).

Year	Nation			Total
	Japan[a/]	USSR[b/]	ROK[c/]	
1964	174,792			174,792
1965	230,551			230,551
1966	261,678			261,678
1967	550,362			550,362
1968	700,981		1,200	702,181
1969	830,494	27,295	5,000	862,789
1970	1,231,145	20,420	5,000	1,256,555
1971	1,513,923	219,840	10,000	1,743,763
1972	1,651,438	213,896	9,200	1,874,534
1973	1,475,814	280,005	3,100	1,758,919
1974	1,252,777	309,613	26,000	1,588,390
1975	1,136,731	216,567	3,438	1,356,736
1976	989,670	179,212	85,331	1,254,213
1977	868,732	63,467	45,227	997,426

a/ From Japan Fisheries Agency (Conservation areas A, B, C, D_e, D_w, & E).

b/ USSR trawl fishery east of 180° longitude in the Bering Sea.

c/ Estimates based on U.S. surveillance of ROK fishing activities.

(B) Catch per hour of trawling by research vessels used by the U.S. National Marine Fisheries Service in annual surveys of the Bering Sea as described by Alton and Bakkala (1976). Standard survey pattern, area, and gear type are used in the surveys and changes in fishing power of different vessels used are adjusted for.

Procedure by Japanese Scientists

(C) Catch per hour of trawling of different tonnage classes of fishing vessels and gear types which are eventually standardized to catch per standard pair trawling hour (Ikeda et al. 1977).

Procedure Developed by INPFC Working Group

(D) Catch per standardized pair trawl effort as described in a special INPFC working group document[1]. In this procedure, CPUE's of selected tonnage categories of fishing vessels and gear types within four standard area-time periods are standardized to pair trawl CPUE.

Using the above mentioned procedures the following CPUE values are derived:

Year	Procedure A[1]	Procedure B[2]	Procedure C[3]	Procedure D[4]
1964	9.5	--	--	--
1965	18.3	--	--	--
1966	23.6	--	--	--
1967	21.3	--	--	--
1968	23.8	--	--	194
1969	31.5	--	--	154
1970	18.7	--	--	175
1971	14.2	--	--	172
1972	14.2	--	--	189
1973	8.6	46.5	12.4	166
1974	10.4	34.2	10.9	118
1975	9.3	21.5	9.5	100
1976	9.4	56.4	9.3	103
1977	--	--	9.3	--

[1] mt per hour (pair trawl)

[2] kg per km trawled in comparative area standardized to catch rates by R/V Oregon.

[3] mt per hour (pair trawl)

[4] expressed as percentage of 1975 pair trawl CPUE

[1] Report of the working group on average density index computation for pollock in the eastern Bering Sea to the INPFC Biology and Research Committee. June 30, 1977. 31 p.

By assuming CPUE to be proportional in abundance, one may infer that the exploitable biomass of pollock declined from the late 1960's to an historic low in 1975, then increased slgithly in 1976 and 1977. Additional information on year class strength (see later section) however, indicates that the exploitable biomass will probably increase slightly in 1978.

Age Structure and Year Class Strength

Although this species may live longer than 12 years, the fishery is generally dependent on three age groups. Without the buffering effect of an accumulation of year-classes distributed over a wide range of age groups, productivity of the stock can be expected to respond very rapidly to variations in recruitment.

Trawl survey information by NMFS shows that in 1971, age 2 to 8 fish were rather abundant in the stock (Figure I.1). Since then, the fishery has taken most of the older, larger fish and by 1976 the dominant age groups were 2, 3, and 4 year olds. The information also indicates that the fishery in 1975, 1976, and possibly 1977, depended heavily on the strong 1972 year class (age 3 fish in 1975, age 4 fish in 1976, and age 5 fish in 1977); analyses of commercial fishery data, by size groups, tend to confirm that indication (Table I.3). Age 3 fish correspond to sizes below 28 cm, age 3 fish are from 28-34 cm, and age 4 fish from 34-40 cm. Japanese scientists (Anon. 1978) have presented preliminary size composition data from the 1976 and 1977 fisheries which show that two groups of pollock, 22-34 cm and 42-50 cm, were of higher relative abundance in the catch during 1977 than in 1976 (Figure I.2). This has been interpreted as a reflection of stronger than normal 1972 and 1975 year classes. If the 1975 year class is strong, it will persist as age 3 in 1978 and age 4 in 1979.

Although nothing is yet known about the 1976 year class, if it is of average strength the exploitable biomass of pollock should continue to increase from the low level in 1975 as the 1975 year class becomes fully recruited to the fishery. Japanese scientists, relying on projected CPUE calculations by age group, believe that pollock abundance will

EASTERN BERING SEA POLLOCK
(SURVEY DATA)

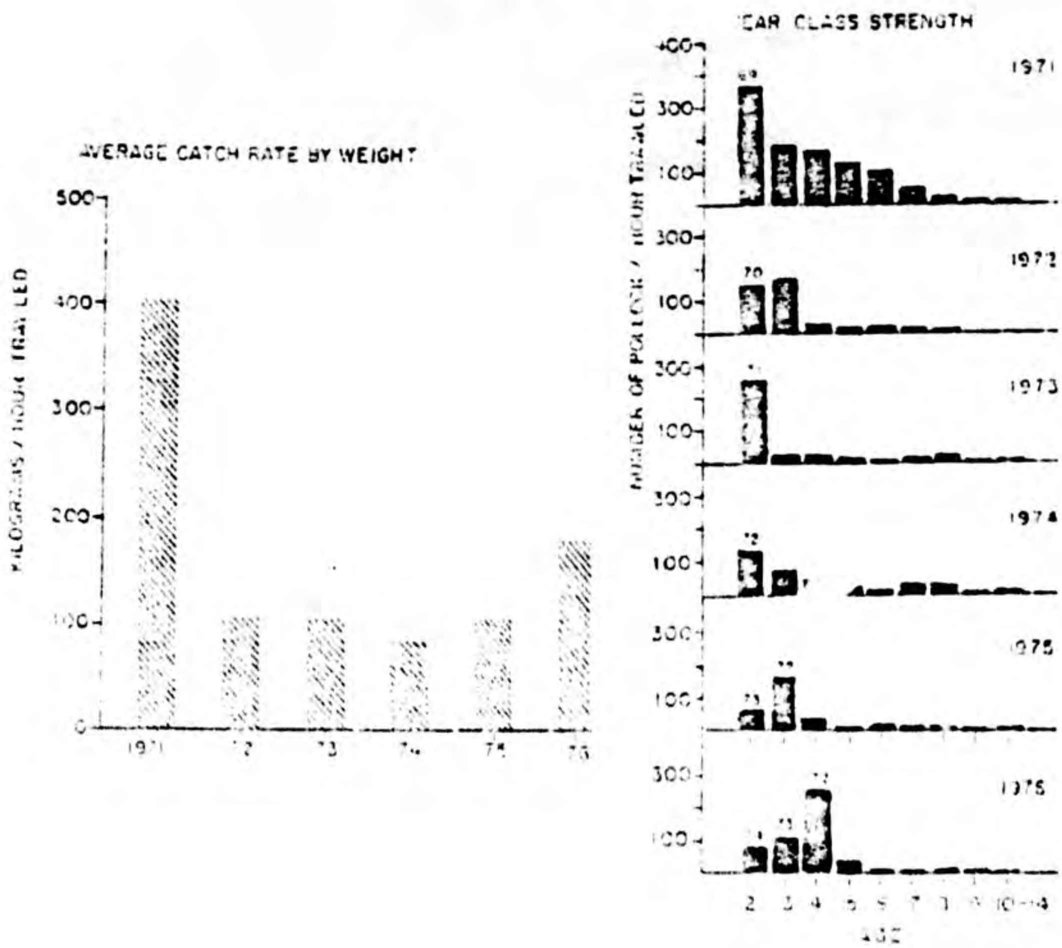

Figure I.1.--Catch rates and age composition depicting year class strength of pollock determined by NMFS research surveys, 1971-1976.

Table I.3--Contribution of various size groups of pollock to the total catch of pollock in numbers and weight taken in the Japanese eastern Bering Sea pollock fisheries, 1964-76.

	Numbers (%) (cm)				Weight (%) (cm)			
Year	<28	28-<34	34-<40	≥40	<28	28-<34	34-<40	≥40
1964	0.3	5.8	21.7	72.2	0.2	1.9	13.0	84.9
1965	0.3	1.8	13.6	84.3	0.0	0.6	7.6	91.8
1966	0.8	10.1	23.4	65.7	0.2	3.7	13.1	83.0
1967	0.1	2.7	21.8	75.4	0.0	0.9	13.2	85.9
1968	0.3	5.6	24.0	70.1	0.1	2.1	13.6	84.2
1969	0.4	3.0	21.3	75.4	0.1	1.0	13.0	85.9
1970	1.2	6.9	30.3	61.6	0.2	2.9	20.6	76.3
1971	1.9	11.9	26.9	59.3	0.4	5.0	17.8	76.7
1972	2.4	18.0	27.0	52.5	0.5	7.6	18.4	73.5
1973	5.8	15.6	39.3	39.4	1.5	7.7	32.2	58.5
1974	9.6	28.4	15.0	47.0	4.0	25.4	23.7	46.9
1975	8.1	47.5	29.7	14.7	2.6	25.3	35.7	36.4
1976	8.2	32.9	39.3	19.6	2.0	20.2	41.9	35.9

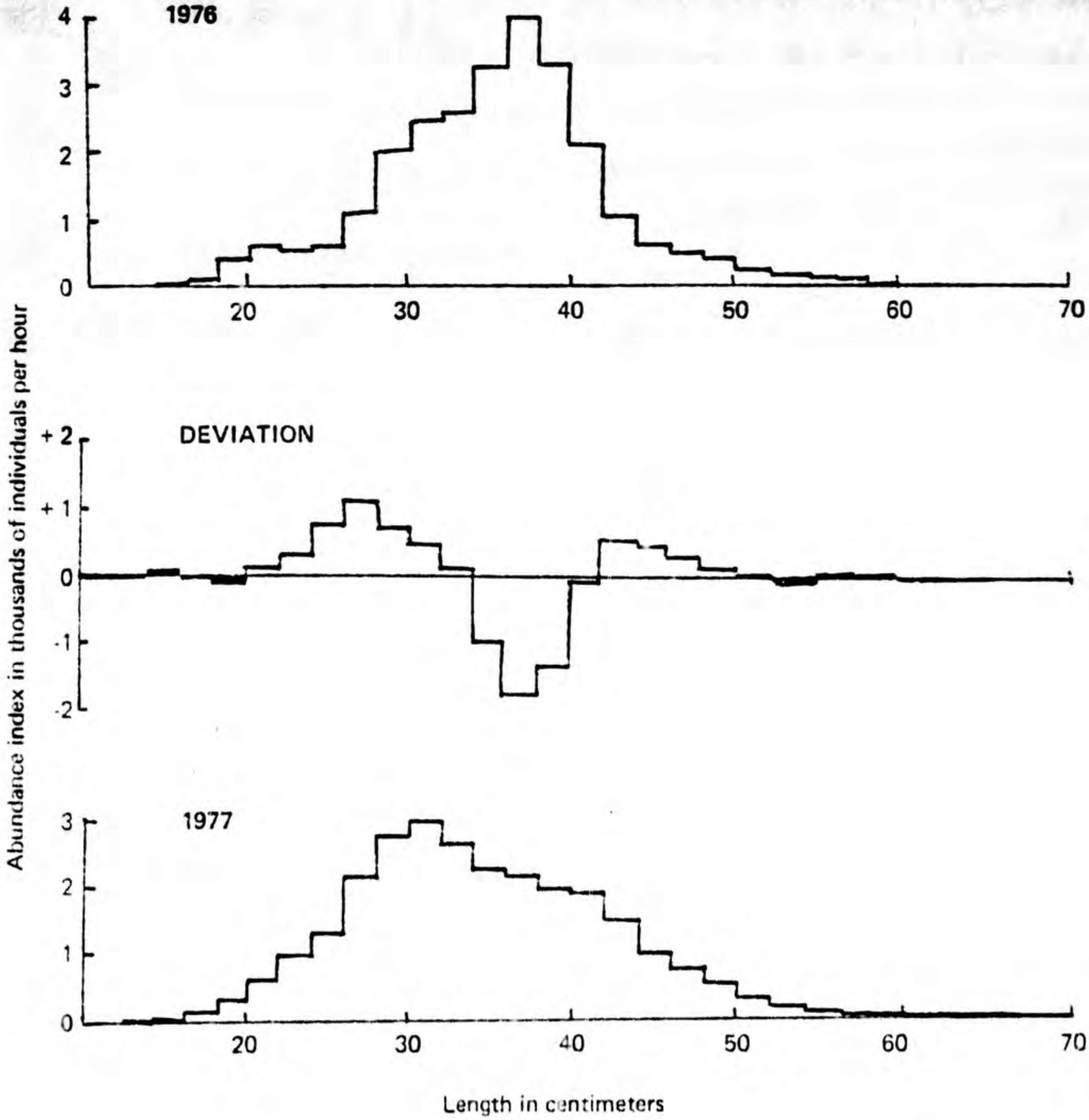

Figure I.2.--Size frequency distribution of pollock in the eastern Bering Sea determined by Fishery Agency of Japan, 1975-1976.

continue to increase through 1980 (Anon. 1978). In relation to 1976, their calculations show that exploitable abundance in 1977 dropped to 84 percent but will increase to 118 percent in 1978, 137 percent by 1979 and 133 percent by 1980.

Given annual removals averaging 1.3 million mt during 1975-76, the fact that 1975-77 CPUE trends were stable or slightly upward and average size of pollock in the commercial catch increased (Table I.4; in 1976, average size was near that where yield per recruit is maximized--see Section 10.4), it appears that the catch was very close to EY. The strong 1972 year class was an important contributor to the catch during that period.

In 1977-78, the 1972 year class would have been of declining but still significant improtance to the exploitable stock. That decline, however, should have been more than balanced by a reduced average annual catch of no more than 965,000 mt (978.300 mt catch in 1977; OY of 950,000 mt in 1978). Therefore, during this period, catch would probably have been somewhat less than EY.

In 1979, the 1972 year class will not longer be a significant factor in the pollock fishery. Except for a weak 1974 year class, other succeeding year classes (1973, 9175, 1976) appear to be of at least average strength but none show signs of being as abundance as that of 1972. The 1977-78 catches are likely to be slightly below the EY for that period resulting in some carry-over to 1979 that, in turn, should balance the final phase-out of the 1972 year class. EY in 1979 is expected to be close to that of 1977-78, or about 1,000,000 mt.

I.1.3 Acceptable Biological Catch

The exploitable pollock biomass has been demonstrably subject to wide fluctuations in abundance caused by naturally induced variations in recruitment. As long as catch is maintained near EY--i.e. not permitted to aggrevate a natural decline in abundance leading to an adverse spawner-recruit effect--significant changes in standing stock will be determined by environmental and ecosystem factors rather than fishing. Even though EY is currently below MSY, "rebuilding" to the level of abundance that can

Table I.4--Average size of pollock taken in the Japanese eastern Bering Sea pollock fisheries (1964-1976).

Year	Average size (cm)		
	Fisheries Agency of Japan a/	U.S. observers aboard Japanese vessels b/	U.S. observers aboard Soviet vessels b/
1964	42.7		
1965	44.3		
1966	42.8		
1967	43.2		
1968	42.7		
1969	42.3		
1970	40.8		
1971	40.3		
1972	39.8		
1973	37.7	36.8	
1974	35.3	32.0	
1975		31.7	30.0
1976		33.4	37.0

a/ Mean size based on size and catch data provided by the Fisheries Agency of Japan through INPFC.

b/ Mean size based on size composition data collected by U.S. observers aboard foreign vessels.

produce MSY will have to await natural increases in recruitment. Setting OY 50,000 or 100,000 mt below EY will have little rebuilding effect because: (1) the high rate of natural mortality exhibited by this species will result in only part of that surplus accruing to the standing stock; and (2) at reasonably healthy levels of adult abundance, more spawners will probably not result in any significant enhancement of recruitment three or four years later.

Inasmuch as the decline in abundance noted during the late 1960's and 1970's has been arrested and current recruitment appears to be at least of average strength, ABC is considered equivalent to EY--1,000,000 mt.

The Occurrence of Pollock in Deep Water

During June-July 1978, the Japanese R/V Tomi Maru 52 conducted a hydroacoustic-midwater trawl-handline survey of that portion of the Bering Sea which is beyond the Continental Shelf to investigate the occurrence of a deep-water component of the pollock population. The survey track is shown in Figure 1. Mr. E. Nunnallee of the NWAFC participated in part of the cruise.

A total trackline distance of approximately 6000 mm was surveyed hydroacoustically. Sampling was conducted at 78 midwater trawl and 16 handline stations; 76 of the hauls were 1 hour in duration and 2 were approximately 1/2 hour.

Pollock Distribution/Behavior and Abundance

The most notable feature of the survey was that it revealed pollock were present in essentially all parts of the survey area; pollock echo sign was detected almost continuously. Although what could be considered commercially important concentrations were found at only a few locations, it was clearly evident that the aggregate biomass was significant. Pollock occurred in 72 of the 78 hauls; most catches were less than 200 fish (100 kg).

In general, the highest abundance, as indicated by both echogram records and trawl sampling, was within 50-150 miles of the Aleutian

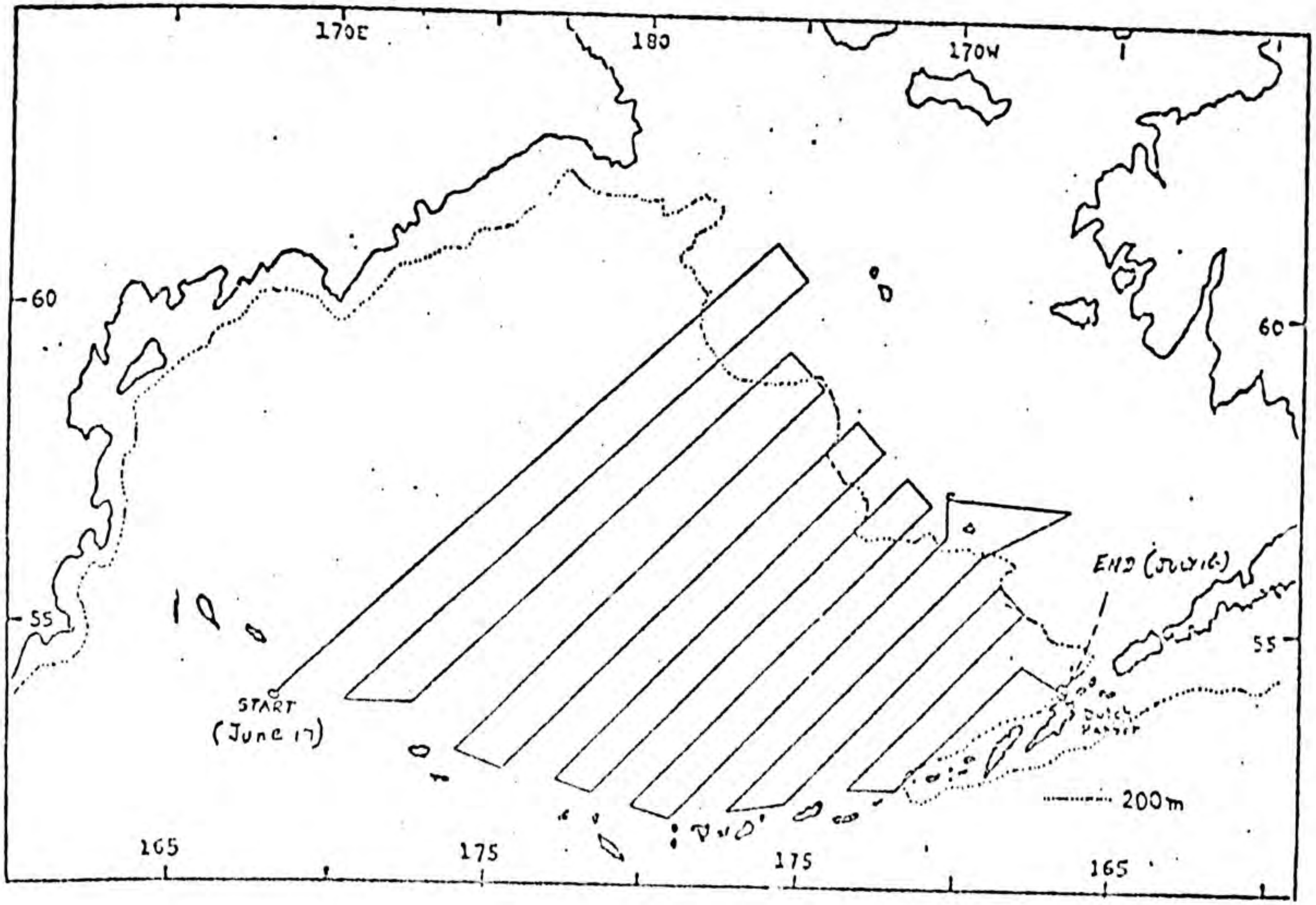

Figure 1. Trackline covered by the R/V Tomi Maru 52 during June-July, 1978 pollock survey.

Chain in waters deeper than 1000 meters. Abundance was relatively low adjacent to the shelf areas; the lowest densities appeared to be in the northwestern part of the survey region from the shelf edge to about 75-100 miles south. In the eastern part of the region, moderate densities were observed to within about 50 miles of the shelf.

There was little evidence of significant quantities of fish at depths greater than 200 meters and the occurrence of echo sign normally dropped off rapidly at depths greater than about 125-150 m. During the day fish were generally concentrated between 50 and 150 m. At night this "band" of fish became more dispersed and rose in the water column. There was a difference between day and night trawl catch rates, with the average day catch rate being significantly higher. This can be attributed mainly to the less dense night time aggregations.

A very rough, and probably conservative, estimate of the biomass of the off-shelf component of the pollock population was made using the mean catch per 1 hour haul to calculate an average density, assuming the trawl caught all fish in its path. Other assumptions were:

Trawl mouth opening	900 m2 (30 x 30 m)
Ave. thickness of pollock layer	100 m
Mean weight per fish	0.5 kg

The mean fish density estimate was 1.06×10^{-5} kg/m3 and the resulting biomass estimate was 840,000 metric tons.

Pollock size Composition

A total of approximately 16,000 trawl caught pollock were measured from off-shelf trawl stations. The mean length was 46.9 cm. There was an unusually symmetric and narrow distribution of lengths, and a pronounced lack of young fish. Over 99% of the fish were from 39 to 55 cm; 82% were between 44 and 50 cm. As shown in Figure 2, the size distribution of this deep-water component of the pollock population differs significantly from that typically found in commercial catches taken over the shelf.

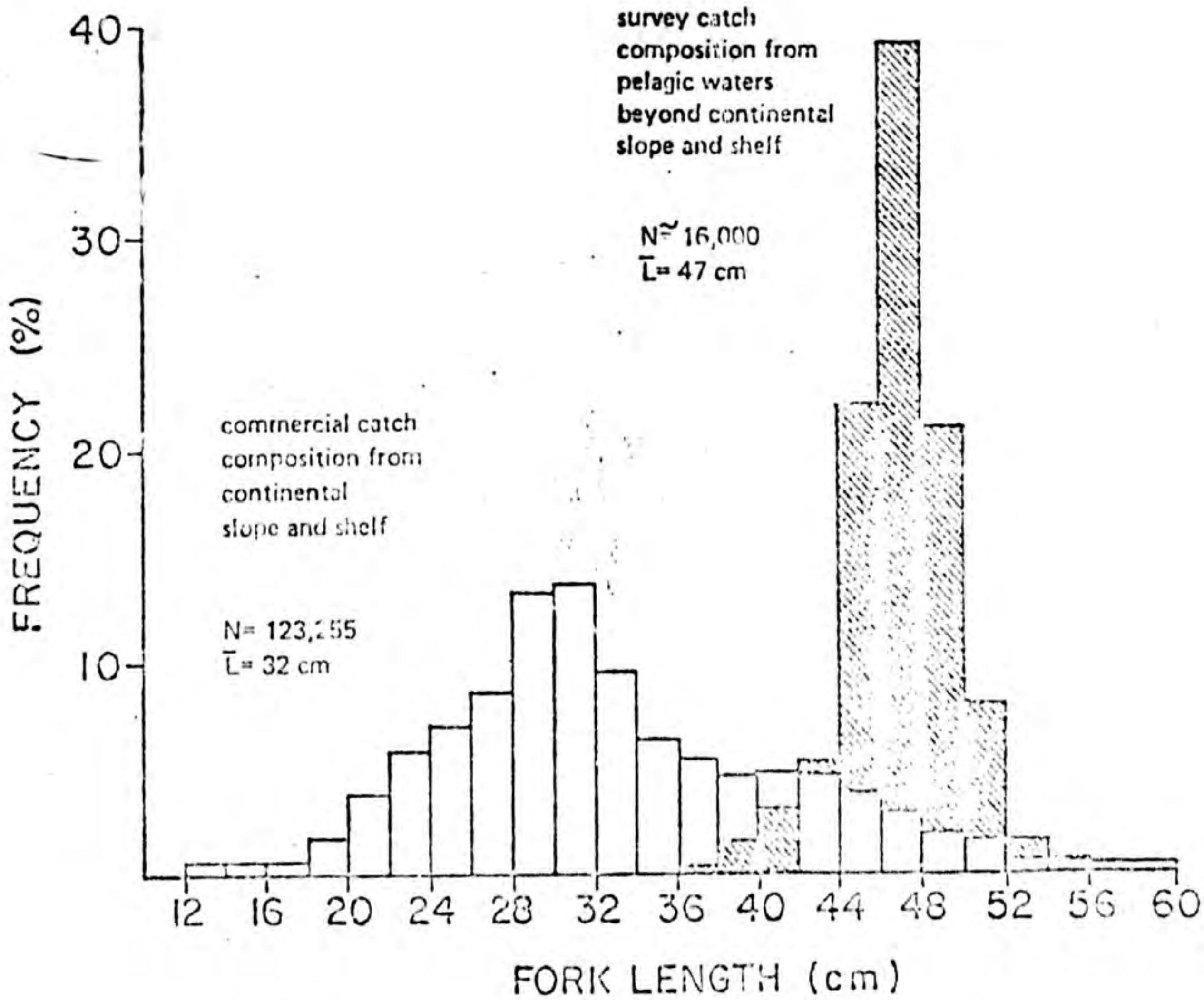

Figure 2.

Composition of length frequency distribution of pollock caught by midwater trawl by the Tomi Maru 52 during the 1978 deep water survey of the Bering Sea and those caught by commercial fishing operations during 1977. Commercial catch data were collected by U.S. observers aboard Japanese, Soviet and South Korean vessels and weighted by nation.

Catches of Non-Target Species

Species other than pollock were usually a small fraction of the catch from each trawl haul. "Lumpfish" (smooth lumpsucker, *Aptocyclus ventricosus*) were by far the most frequently occurring non-target species. It occurred in 45 (58%) of the hauls and the average catch/haul for these hauls was 11 fish.

Squid were the second most frequently occurring incidental "species" but they were taken in only 10 hauls. The squid catches included several large specimens which were probably *Moroteuthis robusta*.

Relatively dense scattering layers were sometimes observed and occasionally sampled with the trawl when it appeared pollock were present in them. However, hauls made in the layers were not productive and they accounted for most of the catches with no pollock.

The degree to which the composition of the nontarget species (and possibly the size composition of the pollock) was influenced by the codend mesh size of the trawl is unknown. The codend consisted of inner and outer bags, each of which had approximately 2 inch mesh (stretched measure), and chafing gear (further information on the mesh size of the codend is being requested).

Hook and Line Catches

At most hook and line stations, fishing took place for approximately 1/2 hour and about 100-200 pollock were usually captured for tagging. Since the tagging is being done only to obtain information on movements and migrations, the fish would be released even if their physical condition was marginal.

Research by the Japan Fishery Agency during the summer of 1978 identified a widely dispersed but substantial body of pollock in midwater beyond the continental shelf of the central Bering Sea (Nunnallee, 1978). Midwater trawl samples from that deep-water area produced a conservative biomass estimate of 840,000 mt (swept-area technique, q = 1.0) and a size composition which is much different from that of the commercial fishery which operates over the continental shelf and slope (figure I.2.a).

This difference in size composition leads to the speculation that pollock distribution changes with size, with the larger individuals tending to a pelagic existence beyond the continental slope and beyond the commercial fisheries as they currently operate.

The discovery of this deep-water component of the Bering Sea pollock population raises questions about the size of the exploitable biomass and estimates of MSY, EY and ABC/OY of the population as a whole.

Assuming that the deep-water and shallow-water i.e., those available to the commercial fishery) pollock are both components of the same spawning population and that recruitment to the deep-water component is via the exploited, shallow-water component, three interrelated considerations are germane:

(1) Once recruited to the deep-water component, pollock will no longer be subjected to exploitation by the slope/shelf fishery. Therefore, in any one year abundance of the deep-water component has no direct bearing on the ABC/OY of the exploitable portion of the population. If, however, the commercial fishery develops techniques for harvesting the deep-water component, a separate ABC/OY for that component might be appropriate (subject to consideration 3, below).

(2) If, prior to their recruitment to the deep-water component, individual pollock passed through the exploitable portion of the population, a higher fishing rate on the exploitable component might be considered in order to reduce the number of fish which would otherwise survive, move offshore, and be lost of further exploitation (subject to consideration 3, below).

(3) Although no longer available to the fishery, the deep-water component presumably represents a substantial spawning potential for the population as a whole (especially in light of the exponential increase in fecundity which accompanies increases in length). Maintenance of a deep-water component (by not permitting all of the exploitable component to be taken and by limiting the development of fishing directly on the deep-water component) would seem desirable to assure adequate spawning potential regardless of fluctuations in the abundance of the exploitable component of the population. Such a reproductive "buffer" should allow

utilization of the exploitable component without undue concern about the possibility of an adverse spawner-recruit relationship being caused or aggravated by the shelf/slope fishery.

Until: (1) it has been determined that the deep-water pollock are, in fact, a component of the same population which is exploited (at younger ages) over the continental shelf and slope; (2) it is clear that the deep-water component is made up only of older fish that are no longer available to the slope/shelf fishery; and (3) **an empirically-derived model has been developed** 1/ **in which the relation between slope/shelf exploitation and abundance of the deep-water component can be demonstrated, the only change that will be considered in the Bering Sea pollock ABC/OY because of the discovery of the deep-water component is that of a separate ABC/OY for fishing in deep water.**

During 1979, in addition to the 1,000,000 mt ABC/OY for pollock in the traditional fishing areas (i.e., statistical areas I, II, and III), a separate ABC/OY of 100,000 mt is designated for statistical Area IV (see Figure I.2a). This special ABC/OY should be more than sufficient to support exploratory or experimental fishing operations in this new fishing area, will provide a substantial but controlled opportunity to expand the pollock fishery to an apparently unused segment of the population, and, if utilized, will produce further information about the deep-water component that can be used for future population evaluations and management decisions. 2/

1/ The construction of such a model was begun by the NMFS Northwest and Alaska Fisheries Center, Seattle.

2/ Records of the Japanese research survey which identified the deep-water component of the pollock population showed highest concentrations within 50-150 miles of the Aleutian chain in water depths greater than 1,000 m. Most of that described region lies within statistical Area IV.

I.2 Yellowfin sole

I.2.1 Maximum Sustainable Yield

The history of exploitation of yellowfin sole in the eastern Bering Sea (Table I.5) can be summarized as follows:

Period	Number of Years	Total Catch	Average Annual Catch
1954-58	5	120,247	24,049
1959-62	4	1,615,869	403,967
1963-68	6	599,567	99,928
1969-71	3	460,612	153,537
1972-75	5	300,453	60,091

Prior to 1963 virgin (or near virgin) biomass was estimated to be about 1.3 to 3 million mt (Wakabayashi 1976). The results of cohort analyses (Table I.6) indicate that exploitable biomass reached a historic low in 1969 but then rose to 910,000 mt by 1975.

Applying the Alverson-Pereyra yield equation (MSY 0.5 MBo, where Bo = virgin biomass and M = natural mortality) to the pre-1963 biomass estimate results in the folowing approximation: MSY = 0.5 x 0.26 x 1,300,000 to 2,000,000 = 169,000 - 260,000 mt.

I.2.2 Equilibrium Yield

The above determination of MSY was based on the assumption that a single stock of yellowfin sole occupies the eastern Bering Sea. There may, however, be separate northern and southern stocks. If so, the larger of the two is the southern stock that winters south and east of the Pribilof Islands. U.S. research vessel surveys in May 1976, a season when intermixing of fish from the area areas is minimal, indicate that about 93% of the fish were located in the southern stock area.

Catch, effort and CPUE values since the beginning of the Japanese winter flounder fishery are given in Table I.7. If two stocks exist, these data are indicative of only the southern (larger) one. There are two CPUE trends shown: that of pair trawlers and of stern trawlers.

Table I.5.—Annual catch (metric tons) of yellowfin sole in the eastern Bering Sea (east of 180° and north of 54°N). (INPFC proceedings, 1977).

Year	Japan	U.S.S.R.	Total
1954	12,562	0	12,562
1955	14,690	0	14,690
1956	24,697	0	24,697
1957	24,145	0	24,145
1958	39,153	5,000	44,153
1959	123,121	62,200	185,321
1960	360,103	96,000	456,103
1961	399,542	154,200	553,742
1962	281,103	139,600	420,703
1963	20,504	65,306	85,810
1964	48,880	62,297	111,177
1965	26,039	27,771	53,810
1966	45,423	56,930	102,353
1967	60,429	101,799	162,228
1968	40,834	43,355	84,189
1969	81,449	85,685	167,134
1970	59,851	73,228	133,079
1971	82,179	78,220	160,399
1972	34,846	13,010	47,856
1973	75,724	2,516	78,240
1974	37,947	4,288	42,235
1975	59,715[b]	6,060[a][c]	65,775[a]
1976	61,082	5,133	66,347[a]

[a] Preliminary data.

[b] Fishing year data from mothership, North Pacific longline-gillnet, and North Pacific trawl fisheries. Calendar year data for landbased dragnet fishery.

[c] Includes catches of all small flounders.

Table I.6.--Biomass of age 6 and older yellowfin sole and numbers of age 6 fish (as an index of recruitment) in the eastern Bering Sea as estimated by cohort analysis. (INPFC proceeding, 1977).

Year	Biomass ($x 10^3$ mt) Southern stock area	Northern stock area	Total of estimates by stock area	Estimate for data combined over stock areas	Number age 6 fish ($x10^6$)	Year class of age 6 fish
1963					2,941	1957
1964	840.3	132.0	972.3	912.5	2,276	1958
1965	868.0	144.2	1,012.2	960.7	1,765	1959
1966	867.8	145.0	1,012.8	969.0	1,307	1960
1967	774.9	140.2	915.1	879.0	921	1961
1968	567.5	102.9	670.4	635.4	1,266	1962
1969	508.3	108.8	617.1	604.0	1,026	1963
1970	593.2	135.0	728.2	720.8	928	1964
1971	551.6	102.8	654.4	648.2	950	1965
1972	[illegible]	93.9	[illegible]	660.0	[illegible]	1966
1973	739.0	112.7	851.7	849.1	2,407	1967
1974	654.6	108.4	763.0	[illegible]	2,345	1968
1975	779.9	131.8	911.7	910.2	2,169	1969

Table I.7.—Catch, effort, and CPUE for yellowfin sole by the Japanese trawl fisheries in the southern stock area for 1/2° by 1° statistical blocks and months in which yellowfin sole made up 50% or more of total catch of groundfish.

Gear type	Fishing year	Catch (mt)	Hours	Average HP	Thousands of HP hours	CPUE (mt per thousand HP-hours)
Pair trawl	1969-70	14,250	1,925	1,200	2,310	6.17
	1970-71	26,766	1,762	1,200	2,114	12.66
	1971-72	25,873	2,937	1,400	4,112	6.29
	1972-73	32,354	2,788	1,400	3,903	8.29
	1973-74	27,234	1,853	1,400	2,594	10.50
	1974-75	32,456	833	1,400	1,166	27.84
	1975-76	41,206	1,002	1,400	1,403	29.37
Stern trawl	1969-70	6,559	1,997	1,650	3,295	1.99
	1970-71	2,266	558	1,400	781	2.90
	1971-72	8,479	2,176	1,325	2,883	2.94
	1972-73	11,319	5,030	1,400	7,042	1.61
	1973-74	3,765	2,814	1,400	3,940	0.96
	1974-75	3,078	3,515	1,250	4,394	0.70
	1975-76	12,331	2,109	1,250	2,636	4.68

Table I.8.—Catch rates from comparative area sampled by the United States National Marine Fisheries Service since 1973 in the eastern Bering Sea. Catch rates (metric tons per km trawled) have been standardized to that of the research vessel *Oregon*.

Species	1973	1974	1975	1976
Pollock	46.54	34.22	21.54	56.36
Yellowfin sole	54.05	86.65	80.49	80.35
Pacific cod	4.60	4.20	8.68	4.47
Rock sole	9.99	12.94	14.74	22.72
Flathead sole	4.94	9.94	7.02	9.75
Alaska plaice	3.88	3.38	9.67	12.81
Greenland turbot	1.17	2.17	1.47	1.94
Arrowtooth flounder	1.09	1.12	1.42	2.98
Pacific halibut	0.27	0.51	1.11	0.88

There are differences in trends in the two gear types, but since stern trawlers are usually employed as scout vessels to locate concentrations of yellowfin sole, their CPUE may not reflect relative abundance as well as do CPUE trends of pair trawlers. Pair trawl CPUE cannot be directly compared for the period before and after the 1974-75 season because of changes in fishing strategy (from 24 hours operation prior to the 1974-75 winter season to daylight hour fishing after that) and gear improvements (anchored reflectors have recently been used by the vessels to stay on fish concentrations). Therefore the large increase between 1973-74 and 1974-75 is partially an artifact of increased fishing power. Standardized CPUE data from NMFS trawl surveys in a comparative area fished each year since 1973 also indicate a substantial increase in yellowfin sole abundance between 1973 and 1974 (Table I.8). Two of the NMFS surveys (one in late summer 1975 and the other in spring 1976) covered an expanded survey area which is believed to encompass the major part of the distribution of yellowfin sole. Using the area-swept technique of Alverson and Pereyra (1969), standing stock estimates for age groups available to the commercial fishery (age 6 and older) were as follows:

Year	Month(s)	Biomass estimate (mt)	95% Confidence Interval
1975	August-October	991,917	831,226 - 1,152,608
1976	June	1,099,731	610,131 - 1,589,331

Based on the 1975 research survey, equilibrium yield was calculated by Bakkala and Hirschhorn (1976) to be 126,000 mt with a confidence interval of 106,000 to 147,000 mt. Wakabayashi (1976) estimated that equilibrium yield in the same period was 117,000 mt. On the basis of data through 1975 Wakabayashi, Bakkala, and Low (1977) inferred that a conservative approximation of equilibrium yield would be the low end of the above range--106,000 mt.

A cohort analysis was conducted to determine population age structure and abundance. The procedure used was developed by Pope (1972) and specific details of the calculations are given by Wakabayashi et al. (1977).

Results of the cohort analysis (Table I.6) indicate that the biomass of age 6 and older fish increased from 1971 to 1975. Although details of the analysis demonstrated variations in year class strength (Figure I.3 and I.4), it is evident that the many year classes included in the population buffered much of the variation in recruitment. Projected estimates of biomass from cohort analysis also suggest that the improvement of yellowfin sole resource, which started in 1973 or earlier, continued at least through 1976 and into 1977. Preliminary information from both the 1977 NMFS trawl survey and from observers sampling the 1977-78 Japanese fishery indicates that abundance is remaining high. Moreover, because of operational factors (not reduced availability), the total allowable catch was not taken in 1977 and may not be achieved in 1978.

Considering the conservative nature of the estimate of EY based on data through 1975 and the positive trends indicates since then, EY is believed to have increased by perhaps 10 percent, to 117,000 mt.

1.2.3 Acceptable Biological Catch

This resource has rebounded surprisingly well from a state of depletion in mid-1960's. Current abundance is high (55-85% of the estimated virgin biomass) and all fishery and biological indicators are positive. Furthermore, the average catch in 1977-78 was well below the conservative estimate of EY which, considering the law natural mortality of the species, should provide additional enhancement to the population in 1979. Accordingly, ABC is considered equivilent to current EY--117,000 mt.

1.3 Turbots (arrowtooth flounder and Greenland turbot)

Under the Preliminary Fishery Management Plans for 1977 and 1978, the management of all flatfishes, other than Pacific halibut and yellowfin sole, was grouped under an "other flounders" category consisting of arrowtooth flounder, Greenland turbot, flathead sole, rock sole, Alaska plaice, and a few other minor species. However, the species within this category may be separated into two main complexes by virtue of their biology and bathymetric distribution.

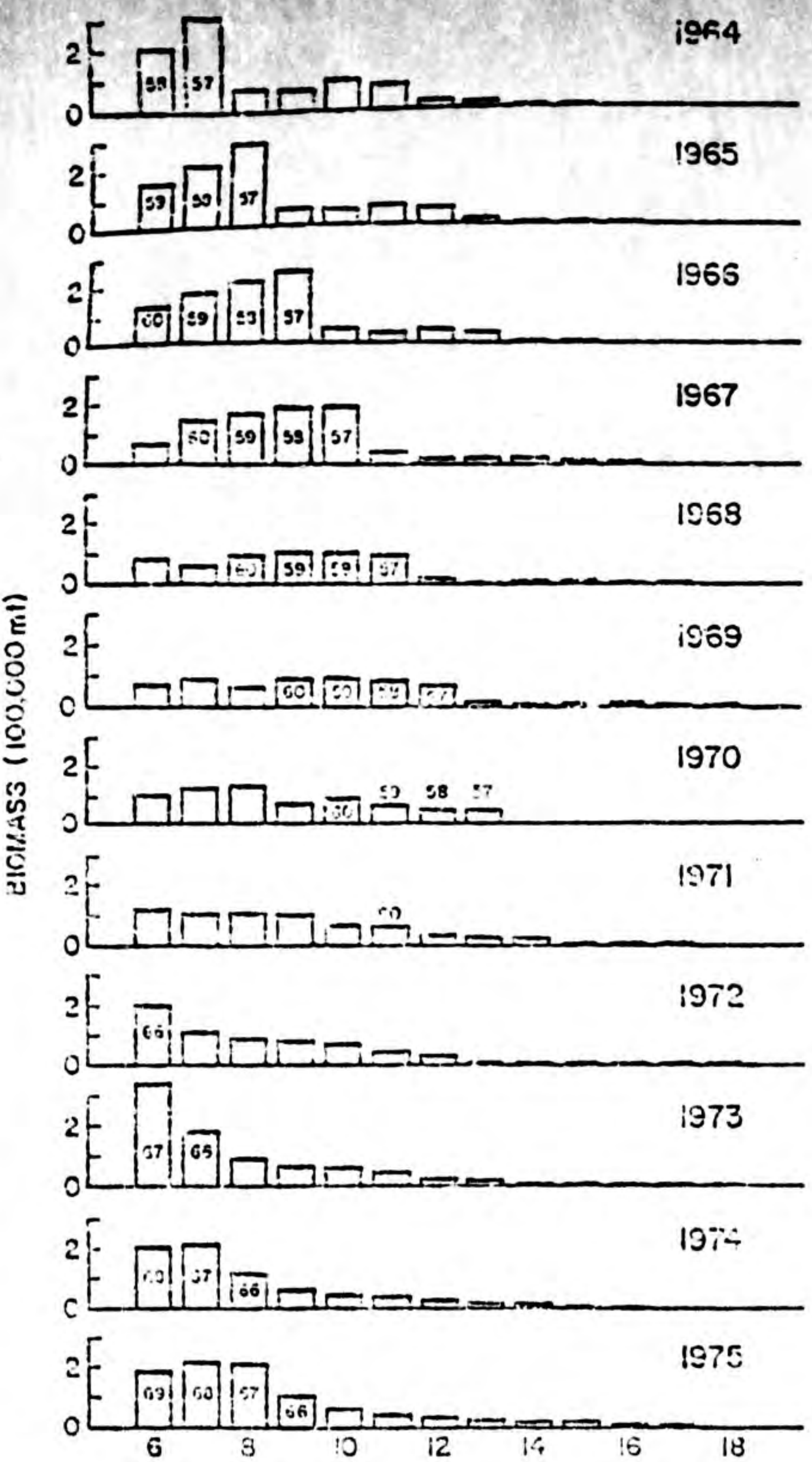

Figure I.3.--Estimated biomass of yellowfin sole from cohort analysis for age groups available to the fishery.

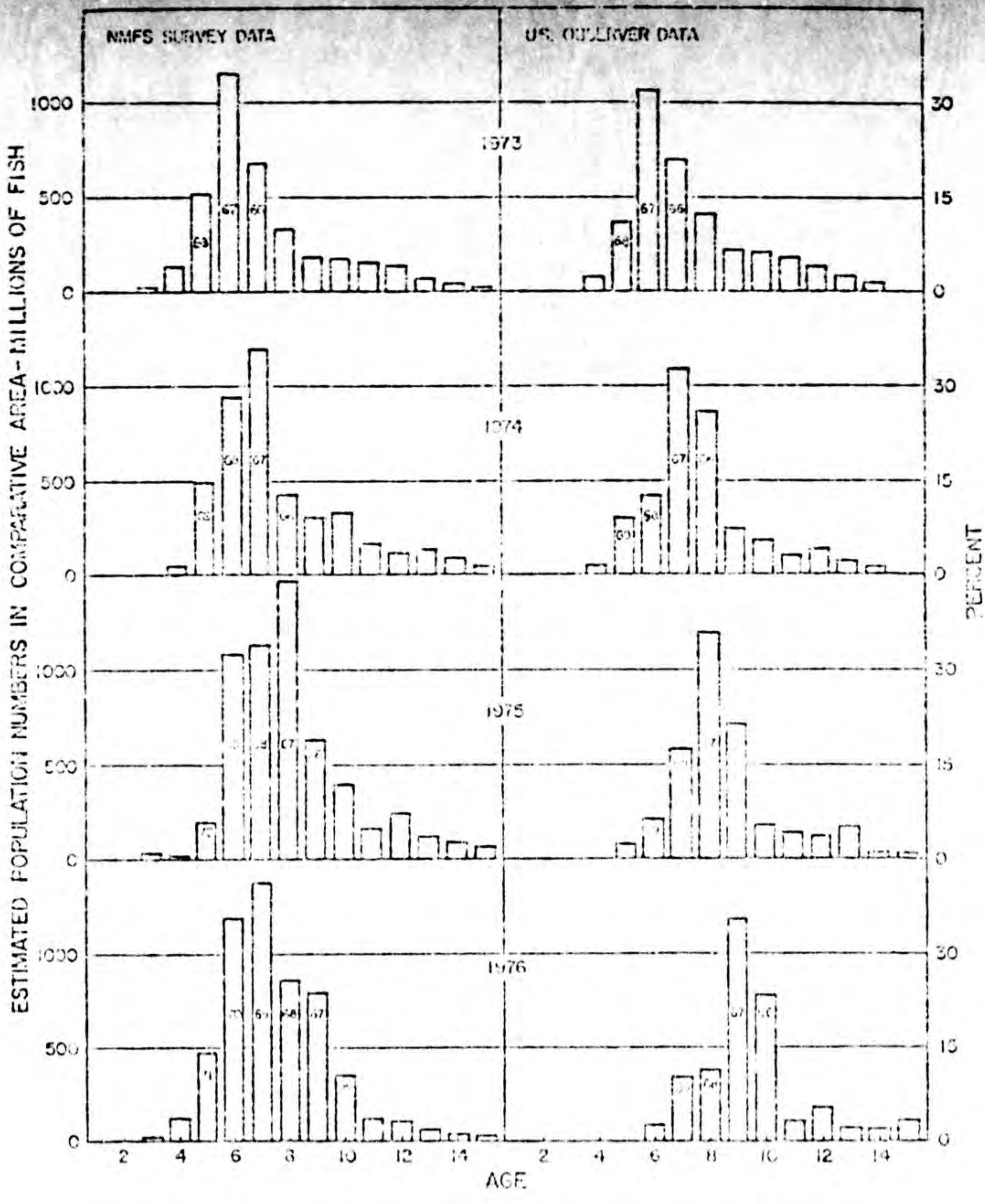

Figure I.4.--Age composition of yellowfin sole as shown by data from U.S. research vessel surveys in June-August and by U.S. observer samples from the Japanese flounder fishery in October-November. Year classes for certain age groups are shown in appropriate bars.

The turbots (arrowtooth flounder and Greenland turbot) are large flatfishes which are distributed along the continental slope in deep water; the "other flatfishes" are small in size and are generally found well up on the continental shelf in shallow water. Furthermore, the fisheries for these two flounder complexes are quite distinct.

I.3.1 Maximum Sustainable Yield

After a long period of relatively small catches, turbot porduction increased substantially in the early 1970's and continues at a high level (Table I.9). Of the two species in this complex Greenland turbot has accounted for 80 percent of the catch.

Since turbots are secondary or only occasional target species taken in the fisheries for pollock, sablefish, and yellowfin sole, it is difficult to estimate the MSY of this complex with standard production models which rely on commercial catch-effort statistics.

Although catches averaging 105,000 mt have been sustained during the period 1972-76, catch rates of Greenland turbot in one foreign fleet have decreased substantially during the same period (see section I.3.2, following). Accordingly, MSY for the turbot complex is believed to be in the order of 100,000 mt.

I.3.2 Equilibrium Yield

Commercial catch-effort statistics are of little use for stock assessment of turbots because they are not primary target species. In the case of such secondary species, it is extremely difficult to determine data points that are indicative of stock abundance. Catch rates for these species tend to vary more in rsponse to fishing strategy for primary target species than to turbot abundance. The problem is compounded because data from individual vessels that do target on turbot are often merged and summarized with data of all other vessels.

Given the difficulty in using commercial CPUE data for non-target species and the lack of research survey coverage of the depth strata where adult turbot reside, the only quantitative information bearing on current stock condition is that for juveniles which occur in shallow water and were sampled by research vessels. In one area sampled since

Table I.9.--Annual catch of Greenland turbot and arrowtooth flounders in the eastern Bering Sea in metric tons (INPFC proceedings, 1977).

Year	Japan MS-LG-NPT[b]	Japan LBD[c]	Japan Total	U.S.S.R.	ROK	Total all nations
Turbots (Greenland turbot and arrowtooth flounder)						
1960	36,843	0	36,843	-	0	36,843
1961	57,348	2	57,350	-	0	57,350
1962	58,226	84	58,310	-	0	58,310
1963	31,565	69	31,634	-	0	31,634
1964	34,493	49	34,542	-	0	34,542
1965	7,970	307	8,277	1,800	0	10,077
1966	10,938	97	11,035	2,200	0	13,235
1967	20,741	1,733	22,474	2,639	0	25,113
1968	17,808	4,789	22,597	15,252	-	37,849
1969	13,582	9,674	23,256	16,798	-	40,054
1970	14,509	16,003	30,512	8,220	-	38,732
1971	30,690	20,801	51,491	17,460	-	68,951
1972	27,038	59,823	86,861	24,265	-	111,126
1973	33,485	39,568	73,053	16,576	-	89,629
1974	42,096	43,170	85,266	29,509	-	114,775
1975	38,386	37,364	75,750	31,928	-	107,678
1976	43,162[d]	35,620[e]	78,782[e]	25,111	-	103,893[e]
Greenland turbot						
1970	5,188	15,696	20,884	4,976	-	25,860
1971	24,409	12,561	36,970	10,271	-	47,241
1972	25,583	54,898	80,481	14,858	-	95,339
1973	30,778	31,924	62,702	12,265	-	74,967
1974	39,334	37,549	76,883	10,860	-	87,743
1975	37,941	34,890	72,831	12,194	-	85,025
1976	42,885[d]	27,904[e]	70,789[e]	8,979	-	79,768[e]
Arrowtooth flounder						
1970	9,321	307	9,628	3,244	-	12,872
1971	6,281	8,240	14,521	7,189	-	21,710
1972	1,407	4,925	6,330	9,407	-	15,787
1973	2,707	7,644	10,351	4,311	-	14,662
1974	3,762	5,621	8,383	18,650	-	27,033
1975	445	2,474	2,919	19,734	-	22,653
1976	277[d]	[illegible][e]	[illegible][e]	16,1[illegible]	-	[illegible][e]

[a]Catches are from data on file with the Japanese and U.S. National Sections.

[b]Mothership, North Pacific longline-gillnet and North Pacific trawl fisheries.

[c]Landbased dragnet fishery.

[d]Catch [illegible]

[e]Preliminary.

[f][illegible]

1973, catch rates for young arrowtooth flounder increased from 1.1 kg per km trawled to 3 kg per km trawling in 1976 (Table I.8); the preliminary value for 1977 was almost indentical to that for 1976. Therefore, the current catch level of about 21,000 metric tons (Table I.9) does not appear to be detrimental to recruitment.

Catch rates of juvenile Greenland turbot have been relatively stable since 1974 also indicating that fishery removals have not impacted Greenland turbot recruitment in recent years.

As mentioned above, it is difficult to evaluate the condition of individual species using catch rates of mixed species fisheries. Nonetheless, it may be significant that during the period 1972-76 when the total annual Greenland turbot catch decreased about 16 percent (from 95,300 to 79,800 mt), the catch rate of that species in the Japanese landbased dragnet fishery decreased from 32 percent (from 40 to 27 mt/100 hours). This fleet accounted for 44 percent of the total Greenland turbot catch.

In summary, recognizing the lack of adequate stock assessment information, but considering the downward trend in catch and CPUE for Greenland turbot, the equilibrium yield for this complex is believed to be about 5-10 percent below MSY, or 90,000-95,000 mt.

I.3.3 Acceptable Biological Catch

The inadequate data base available for evaluating stock condition and the downward trend in CPUE for one of the species in one fleet are cause for slight concern. Accordingly, ABC for the turbot complex is considered equivalent to the low end of the EY range--90,000 mt.

I.4 Other Flatfishes

This species complex is made up of the following smaller shallow water species; flathead sole, rock sole, Alaska plaice, and trace amounts of rex sole, Dover sole, starry flounder, longhead dab, butter sole, and lefteye flounders.

I.4.1 The catch history for this species complex shows a general increase of catches up to a peak of 95,000 mt in 1971 followed by a drastic decline through 1975 (Table I.10). It is difficult to discern whether that decline was due to declining abundance or to changing

Table I.10.--All nation catches of other flatfishes in the Bering Sea in metric tons.

Year	East of 180° (INPFC area 1 + 2) Rock sole	Flathead sole	Alaska Plaice	Total	West of 180° (INPFC area 3 + 4) Rock sole	Flathead sole	Alaska Plaice	Total	Aleutians (INPFC area 5) Rock sole	Flathead sole	Alaska Plaice	Total	Total - all areas Rock sole	Flathead sole	Alaska Plaice	Total
1963	5,002	29,625	975	35,602	1,640	74	4	1,718	27	14	-	41	6,669	29,713	979	37,361
1964	3,238	25,288	1,838	30,364	1,306	1,287	10	2,603	152	43	45	240	4,696	26,618	1,893	33,207
1965	3,678	6,713	979	11,370	36	26	-	62	147	128	41	316	3,861	6,867	1,020	11,748
1966	9,104	11,020	4,633	24,757	-	63	-	63	82	25	-	107	9,186	11,108	4,633	24,927
1967	4,762	23,437	3,853	32,052	154	594	-	748	25	32	-	57	4,941	24,063	3,853	32,857
1968	5,250	21,575	2,619	29,444	261	586	-	847	17	186	-	203	5,528	22,347	2,619	30,494
1969	9,240	18,563	6,942	34,745	774	435	-	1,209	2	2	-	4	10,016	19,000	6,942	35,958
1970	20,123	41,152	3,402	64,677	900	932	79	1,911	2	11	-	13	21,025	42,095	3,481	66,601
1971	40,419	51,024	992	92,435	1,962	540	31	2,533	1	16	-	17	42,382	51,580	1,023	94,985
1972	60,824	15,690	290	76,804	1,714	511	40	2,265	5	4	-	9	62,543	16,205	330	79,078
1973	23,835	18,141	1,917	43,893	1,862	472	59	2,393	2	24	-	26	25,699	18,637	1,976	46,312
1974	19,975	14,917	2,388	37,280	655	234	-	889	36	41	-	77	20,666	15,192	2,388	38,246
1975	11,145	5,545	2,614	19,304	507	112	1	620	3	1	-	4	11,655	5,658	2,615	19,928

Source: Wakabayashi, K. and R. Bakkala. 1977. Estimated Catches of Flounders by species in the Bering Sea. U.S. Natl. Mar. Fish. Serv., Northwest Fish. Center. Document submitted to Intl. North Pac. Fish. Comm. 27 p. (Document 1964).

patterns of fishing activities. Commercial catch rates are not necessarily indicative of stock abundance and together with a lack of biological information on these species, MSY is difficult to determine. Because declines in catches in 1973 and 1975 are believed to be due, at least in part, to operational changes in the Soviet fishery and to winter area closures in the southeastern Bering Sea, the recent average catch level may have little bearing on MSY.

By assuming that the complex had been fully utilized prior to 1975, the average catch (1963-74) of 44,300 mt should approximate MSY. Furthermore, if the complex had been fully utilized prior to 1975, the Schaefer model indicates that by 1975 biomass would be about half of its virgin level. A NMFS trawl survey in 1975 (swept area technique) indicated a standing stock of 232,000-334,100 mt of flathead and rock sole (Table I.11) implying a virgin biomass of 462,000-668,200 mt. Inasmuch as plaice and dab are virtually unutilzed by the fisheries, they are excluded from the following computations. If m = 0.23 for this complex (Section 9.1; flathead sole 0.2, roc, sole 0.26), the Alverson-Pereyra yield equation produces an estimate of MSY of 53,200-76,800 mt (0.5 x 0.23 x 462,400 - 668,200).

Therefore, estimates of MSY range from a low of 44,300 mt (as described on page I-27) to 76,800 mt (the high end of the above range).

I.4.2 Equilibrium Yield

There is no evidence to suggest that the MSY for this species complex is unattainable.

I.4.3 Acceptable Biological Catch

This species complex appears healthy and a significant portion of it (plaice and longhead dab) are yet to come under exploitation. Therefore, ABC is considered equivalent to the mid-point of the MSY range--61,000 mt.

I.5 Pacific Cod

I.5.1 Maximum Sustainable Yield

Pacific cod are distributed widely over the Bering Sea continental shelf and slope and have a distributional pattern similar to that of

Table I.11.--Estimated biomass of the "other flatfish" complex in the eastern Bering Sea by the U.S. National Marine Fisheries Service in 1975.

Species	Mean CPUE[1/]	Estimated biomass[2/]	Percent frequency of occurrence
Rock sole	5.73	138,300 - 202,000	66
Alaska plaice	4.11	101,800 - 152,800	41
Flathead sole	3.89	93,900 - 132,100	69
Longhead dab	0.37	8,000 - 14,200	19

[1/] Mean catch per unit effort, kg/kg trawled

[2/] 95% confidence limits in metric tons

Source: Pereyra et. al. (1976). Table IX-26.

pollock. During the early 1960's, when a fairly large Japanese longline fishery operated on the continental slope, cod were harvested by longliners for the frozen fish market. Beginning in 1964, the Japanese North Pacific trawl fishery for pollock expanded and cod became an important incidental catch in the pollock fishery. At present, cod are believed to be an occasional target species wher high concentrations are detected during pollock fishing operations.

The annual catch of Pacific cod by Japan increased from 19,100 mt in 1974 to about 74,600 mt in 1970; since then, catches have varied between 40,000 and 50,400 mt (Table I.12). Catches by the USSR have only been reported since 1971 and have increased from 4,000 mt in 1971 to 18,500 mt in 1975. Since 1973, the total cod catch has varied between 55,000-67,000 mt.

Few biological data concerning cod are available, and their incidental occurance in the trawl catch makes questionable the use of CPUE trends for evaluating stock condition. Considering that the cod catch grew very quickly in the mid-1960's and then became rather stable thereafter, the average catch since 1968 should reflect at least a minimal estimate of MSY. That average is 58,700 mt.

I.5.2 Equilibrium Yield

The MSY of 58,700 mt is believed to be achievable.

I.5.3 Acceptable Biological Catch

The above estimate of MSY is considered to be minimal. Therefore, ABC is considered equivalent to MSY--58,700 mt.

I.6 Pacific Ocean Perch and Other Rockfishes

I.6.1 Maximum Sustainable Yield

Pacific ocean perch is the most abundant rockfish species in the North Pacific. Chikuni (1975) identified two main stocks in the Bering Sea: an Eastern Slope stock along the southern part of the eastern Bering Sea continental slope and an Aleutian stock along both sides of the Aleutian Islands.

Of these two, commercial catch records (Table I.13) indicate that the Aleutian stock is much larger than that of the Eastern Slope.

Table I.12.--Pacific cod catches by nation in the Bering Sea[a/] 1964-76 (Source: INPFC proceedings 1977).

Year	Japan MS-LG-NPT[b]	Japan LBD[c]	Japan Total	U.S.S.R.	ROK	Total all nations
1964	19,078	-[f]	19,078	-[f]	0	19,078
1965	15,710	1,638	17,348	-	0	17,348
1966	17,347	1,693	19,040	-	0	19,040
1967	30,728	2,780	33,508	-	0	33,508
1968	52,309	11,426	63,735	-	-[f]	63,735
1969	45,078	8,221	53,299	-	-	53,299
1970	61,335	13,278	74,613	-	-	74,613
1971	33,076	13,281	46,357	4,139	-	50,496
1972	34,776	5,158	39,934	7,028	-	46,962
1973	39,489	6,099	45,588	12,980	-	58,568
1974	44,364	6,058	50,422	16,592	-	67,014
1975	33,089[d]	3,448	36,537	18,486	49	55,072[e]
1976	34,976[d]	4,754	39,730	18,912	306	58,948[e]

[a] Catches are from data on file with the Japanese and U.S. National Sections.

[b] Mothership, North Pacific longline-gillnet, & North Pacific trawl fisheries.

[c] Landbased dragnet fishery.

[d] Catch for fishing year, November of previous year to October.

[e] Preliminary.

[f] Dash denotes fishing but no reported catch.

Table A.13.--Annual catch of Pacific ocean perch in the Bering Sea in metric tons.

Year	Japan[a/]			U.S.S.R.[b/]			Total		
	Eastern Slope	Aleutian	Total	Eastern Slope	Aleutian	Total	Eastern Slope	Aleutian	Total
1960	1.1	----	1.1	5.0	----	5.0	6.1	----	6.1
1961	13.0	----	13.0	34.0	----	34.0	47.0	----	47.0
1962	12.9	0.2	13.1	7.0	----	7.0	19.9	0.2	20.1
1963	17.5	0.8	18.3	7.0	20.0	27.0	24.5	20.8	45.3
1964	14.4	29.3	43.7	11.5	61.0	72.5	25.9	90.3	116.2
1965	7.8	38.1	45.9	9.0	71.0	80.0	16.8	109.1	125.9
1966	17.5	28.2	45.7	2.7	57.7	60.4	20.2	85.9	106.1
1967	19.6	9.3	28.9	----	46.6	46.6	19.6	55.9	75.5
1968	28.4	18.3	46.7	3.1	26.6	29.7	31.5	44.9	76.4
1969	14.5	15.6	30.1	0.0	23.2	23.2	14.5	38.8	53.3
1970	9.9	13.6	23.5	0.0	53.3	53.3	9.9	66.9	76.8
1971	9.8	14.6	24.4	0.0	7.2	7.2	9.8	21.8	31.6
1972	5.5	8.6	14.1	0.2	24.6	24.8	5.7	33.2	38.9
1973	2.7	9.3	12.0	1.0	2.5	3.5	3.7	11.8	15.5
1974	6.6	21.7	28.3	7.4	0.8	8.2	14.0	22.4	36.5
1975	3.2	8.5	11.7	5.4	8.1	13.5	8.6	16.6	25.2
1976	2.8	10.3	13.1						

a/ Figures are compiled from both statistics for the mothership-longline North Pacific trawl fishery and the landbased dragnet fishery.

b/ Including some amounts of rockfishes, Sebastes, spp. other than Pacific ocean perch, except for 1975.

Catches peaked at about 47,000 mt in the Eastern Slope Region in 1961, whereas they peaked at 109,000 mt in the Aleutian Region in 1965. Since then, catches have declined drastically in both regions. This decline is attributed mainly to lower stock abundance caused by the removal of larger, older fish.

Under ideal resource conditions, MSY for the Eastern Slope stock was estimated to be as high as 32,000 mt while that for the Aleutian stock may be as high as 75,000 mt (Chikuni 1975). Whether or not the ecosystem could again support a population large enough to sustain catches of that magnitude is unknown.

No information is available bearing on the MSY of the other rockfish species.

I.6.2 Equilibrium Yield

Since 1960, the Eastern Slope region has produced perch catches in excess of 30,000 mt only twice (1961 and 1968). Following each such instance, c tches fell substantially (Table I.13); after the large 1968 catch, catch and catch rate both dropped to very low levels. An inspection of catch (Table I.13) and catch rate (I.14) indicates that perch stocks of the Eastern Slope Region must not have been able to support a fishery of 10,000-15,000 mt annually without detrimental effects to the already low level of stock abundance.

In the Aleutian Region, there were more abvious signs of overexploitation in the early stages of the fishery when amounts in excess of 90,000 mt were taken consecutively from 1964 through 1966. Since then, except for a high catch in 1970, production has dropped and during the period 1971-75 averaged only 21,200 mt. It is evident that the sustained annual catch of 75,000 mt estimated by Chikuni cannot now be realized.

It was the concensus of Japanese, U.S., and Canadian scientists at the 1975 INPFC meeting, that Pacific ocean perch stocks are at a relatively low level of abundance and generally not in good condition. The opinion is derived from various state of stock indicators including (i) a continuous decline in CPUE after 1968; (ii) drastic reductions in the availability of all sizes of ocean perch through the period 1969-72; (iii) a heavy

Table I.14.—Pacific ocean perch catch and effort data of stern trawlers in the Japanese mothership-longline North Pacific trawl fishery by vessel class in the eastern Bering Sea Slope Region, 1968-1976.

Year	Vessel class[a/] 3	4	5	6	7	8	9
(A) Catch in metric tons.							
1968	895	3,347	695	1,938	378	10,012	1,776
1969	361	3,709	102	258	94	4,037	2,103
1970	77	215	73	55	301	3,168	1,495
1971	96	1,558	35	203	992	1,855	459
1972	0	1,005	317	7	410	313	1,276
1973	-	351	0	199	487	146	242
1974	-	416	90	520	700	609	442
1975	-	552	204	343	784	171	246
1976		257	188	148	704	70	434
(B) Fishing effort in hundred hours trawled.							
1968	104	298	26	18	1	67	46
1969	95	264	17	15	12	95	125
1970	103	293	18	[illegible]	34	122	139
1971	125	411	21	19	35	146	266
1972	120	348	29	13	49	140	198
1973	-	163	13	16	25	118	297
1974	-	147	27	39	37	171.	310
1975	-	303	55	41	38	158	263
1976		286	34	4	11	135	227
(C) Percentage composition in total ocean perch catch by vessel class category.							
1968	4	19	3	10	2	49	9
1969	3	31	1	2	1	34	18
1970	1	4	1	1	6	58	27
1971	2	30	1	4	19	35	9
1972	0	29	9	+	12	9	37
1973	-	21	0	12	33	9	14
1974	-	12	3	15	21	18	13
1975	-	22	8	14	32	7	10
1976		13	10	8	36	4	22
(C) CPUE in mt per hour trawled.							
1968	.08	.13	.26	1.10	2.55	1.50	.39
1969	.03	.14	.06	.18	.08	.42	.17
1970	.01	.01	.04	.23	.09	.26	.11
1971	.01	.04	.02	.11	.28	.13	.02
1972	-	.03	.10	.01	.07	.02	.05
1973	-	.02	-	.12	.14	.01	.01
1974	-	.03	.03	.13	.19	.04	.01
1975	-	.02	.04	.08	.21	.01	.01
1976		.01	.05	.4	.62	.01	.02

a/ No data for classes 1 and 2. 1973 and 1974 data converted to pre-1973 gross tonnage classification of

1 = 71-100, 4 = 301-500 7 = 1501-2500
2 = 101-200 5 = 501-1000 8 = 2501-3500
3 = 201-300 6 = 1001-1500 9 = 3501 and above

dependence in the fishery after 1968 on young-small fish; and (iv) the lack of any evidence of strong year, incoming classes.

In the Eastern Slope Region, catch, fishing effort, and CPUE data indicate that stock abundance has declined severely from the 1960's and has fluctuated at a low level in the 1970's (Table I.14). Although most effort in the Eastern Slope Region is not directed specifically at Pacific ocean perch, and CPUE may not be the best index of abundance, continuing low ocean perch harvests despite high effort levels do suggest relatively low abundance. Also, catch rates have declined to very low levels since the early 1970's at depths beyond 125 m where most of the Pacific ocean perch grounds are found (Figure I.5). The spawning stocks of Pacific ocean perch in the Eastern Slope Region is also considered to be substantially reduced from earlier levels. It is believed that the early extensive ocean perch harvests by Japan and the USSR had removed most of the larger and older fish from the stock, dramatically affecting its reproductive potential. Chikuni (1975) reported that the fecundity of ocean perch in this region (number of eggs) was as follows: 10,000 at age 7, 29,000 at age 10, 75,000 at age 15, 122,000 at age 20, and 162,000 at age 25. Extensive harvests of older, more fecund fish must have severely reduced larval production in later years, but reduced recruitment as yet has not been directly related to a decline in larval production.

In the Aleutian Region, the stock has also declined in abundance. CPUE data from both the Japanese independent stern trawl fishery (Table I.15) and the land-based dragnet fishery (Table I.16) show that abundance has been fluctuating at a very low level relative to earlier years since 1971. For example, class 4 and 7 stern trawlers (301-500 gross tons and 1500-2500 gross tons, respectively), which accounted for the majority of annual ocean perch catches by stern trawlers, suffered severe declines in CPUE from 1968 to 1974 (Table I.15). In both cases, catch rates in 1976 were less than 30% of levels attained in 1968, and, on the basis of catch trends, it is believed that stock abundance in 1968 was already reduced considerably from earlier years.

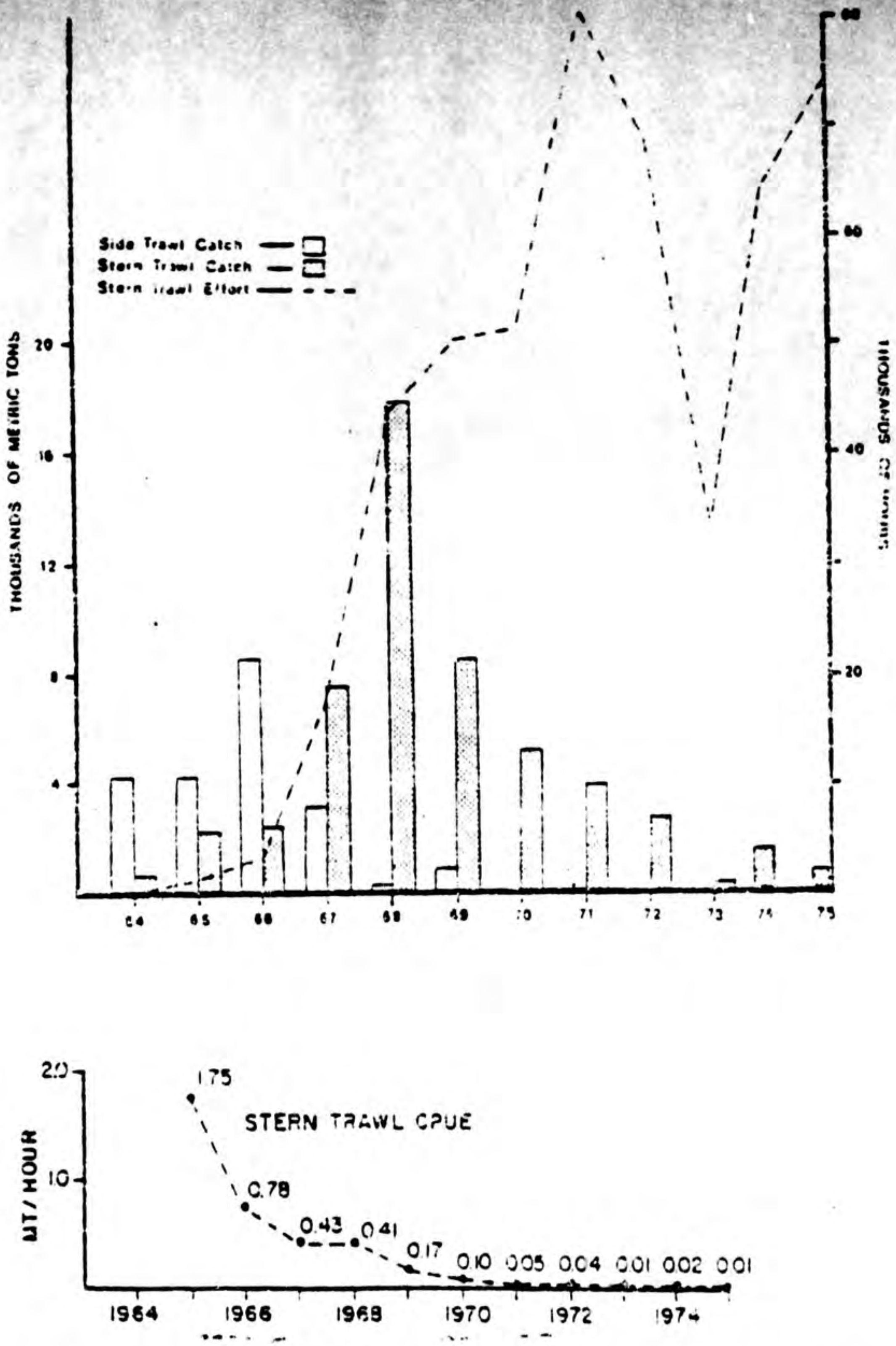

Figure I.5.—Annual catches of Pacific ocean perch by side and stern trawlers, and stern trawl effort by the Japanese mothership, longline, and North Pacific trawl fisheries, in areas of the Eastern Slope Region where depths exceed 125 meters.

Table I.15.— Pacific ocean perch catch and effort data for stern trawlers of the Japanese mothership-longline North Pacific trawl fishery by vessel in the Aleutian Region, 1968–1976.

Year	Vessel class a/ 4	5	6	7	8	9
(A) Catch in metric tons.						
1968	12,157	280	32	2,711	6,787	532
1969	7,290	440	0	4,839	1,125	144
1970	2,384	1,227	0	7,741	249	82
1971	3,322	889	1,038	4,984	2,249	449
1972	3,527	1,318	645	2,035	188	135
1973	4,591	0	995	1,881	0	0
1974	10,196	1,564	1,326	2,507	25	16
1975	3,720	972	764	1,815	666	0
1976	3,976	784	392	1,462	45	0
(B) Fishing effort in number of hours trawling.						
1968	8,575	115	8	216	759	772
1969	1,952	333	0	910	179	38
1970	1,755	600	0	976	161	25
1971	4,543	634	383	720	785	174
1972	6,533	546	492	388	114	56
1973	3,592	0	656	530	36	0
1974	12,249	1,816	964	529	70	22
1975	11,170	1,233	543	521	509	0
1976	8,926	866	629	499	244	0
(C) Percentage composition of total ocean perch catch by vessel class b/						0
1968	54	1	+	12	30	2
1969	51	3	0	34	8	1
1970	20	10	0	66	2	1
1971	26	7	9	38	17	3
1972	45	17	8	26	2	2
1973	61	0	13	25	0	0
1974	63	10	8	16	0	+
1975	46	12	9	22	8	0
1976	59	12	6	22	1	0
(D) Catch (in metric tons) per hour trawled.						
1968	1.4	2.4	4.0	12.6	8.9	0.7
1969	3.7	1.3	-	5.3	6.3	3.8
1970	1.4	2.0	-	7.9	1.5	3.3
1971	0.7	1.4	2.7	6.9	2.9	2.6
1972	0.5	2.4	1.3	5.2	1.6	2.4
1973	1.3	-	1.5	3.5	-	-
1974	0.8	0.9	1.4	4.7	0.4	0.7
1975	0.3	0.8	1.4	3.5	1.3	-
1976	0.4	0.9	0.6	3.3	0.2	-

a/ No data for classes 1, 2, and 3 which are mainly side and pair trawls. 1973 and 1974 data converted to pre-1973 gross tonnage classification of

1 = 71-100
2 = 101-200
3 = 201-300
4 = 301-500
5 = 501-1000

6 = 1001-1500
7 = 1501-2500
8 = 2501-3500
9 = 3501 and above

b/ Totals may fall short of 100% because of rounding method.

Table I.16.--Catch and effort data of stern trawlers of the Japanese land-based dragnet fishery in the Aleutian Region, 1969-76.

Year	Catch of all species in mt	Catch of Pacific ocean perch in mt	Percentage of POP in total catch	Total effort in hours	CPUE of POP in mt per hour
1969	5,478	1,246	23	3,850	.32
1970	4,550	1,956	43	5,040	.39
1971	5,977	1,664	28	6,567	.25
1972	17,801	651	4	17,169	.04
1973	16,230	1,973	12	12,792	.15
1974	24,851	5,571	22	22,593	.25
1975	8,067	1,268	16	8,593	.15
1976	8,514	2,663	31	9,597	.27

Notation: POP is Pacific ocean perch; mt is metric tons.

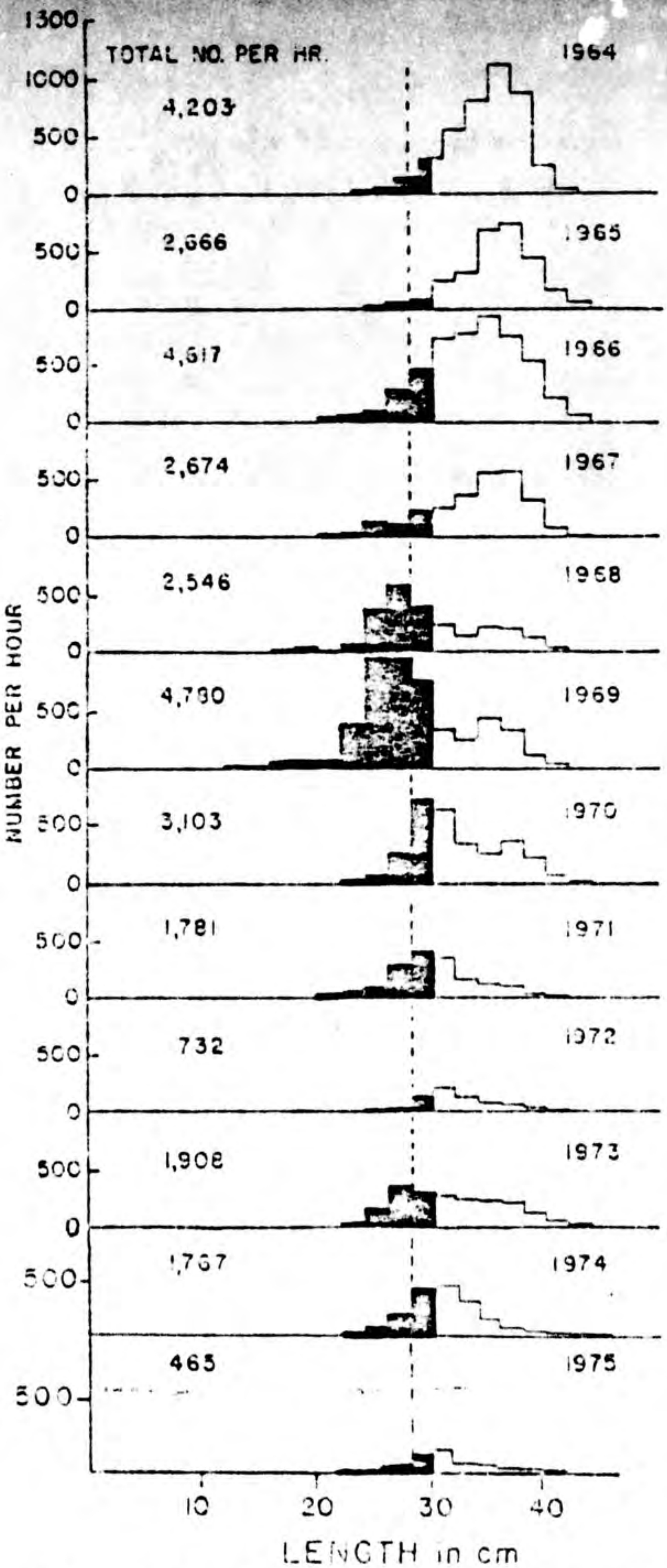

Figure I.6.--Catch per unit effort by size increment for Pacific ocean perch harvested by stern trawlers of the Japanese mothership-longline North Pacific trawl fishery in the Aleutian Region, 1964-75.

Current length-frequency information also indicates a poor condition of ocean perch stocks in the Aleutian Region. In the early years of the fishery (1964-67), the size composition in the Japanese catches was relatively stable and dominated by fish greater than 28 cm (Figure I.6). After that time, there was a large increase in the proportion of fish smaller than 28 cm, due in part to recruitment into the fishery of the strong year-classes of 1961 and 1962 and in part because of a considerable reduction in abundance of the larger perch after 1967. The abundance of these older fish remained low through 1975. Inasmuch as most annual yields since 1967 have consisted of large numbers of fish less than 28 cm and dwindling numbers of older, more fecund fish, the reproductive potential of Aleutian Region ocean perch stocks must also have been reduced. Additionally, recruitment of ocean perch to the fishery occurs at about 6-8 years of age. Thus, year-classes spawning during the peak years of fishing (1964-1966) would have appeared in catches beginning in 1970. As shown by CPUE values for small fish (less than 28 cm) in 1970-75, recruitment was relatively low. Indeed, the 1975 catch rates, measured in terms of number of fish caught per hour trawled, was the lowest on record (Figure I.6).

In summary, it appears clearly evident that Pacific ocean perch stocks from the eastern Bering Sea and the Aleutian regions are at an extremely low level of abundance with no evidence of strong recruitment in recent years. On the basis of fishery information through 1974, it was estimated in the 1977 PMP for the Trawl Fishery of the Bering Sea that equilibrium yield for Pacific ocean perch was 6,500 mt in the eastern Bering Sea and 15,000 mt in the Aleutians. Based on fishery information available since then, no increase in exploitable biomass has occurred.

No information is available which bears on the EY of the other rockfish species.

I. 6.3 Acceptable Biological Catch

The Pacific ocean perch stocks of the Bering Sea/Aleutian Region are badly depleted-current equilibrium yield is believed to be no more

than 20 percent of MSY. Therefore, as was the case in the Gulf of Alaska, the ABC of Pacific ocean perch will be set at half of the current EY in order to balance the need for rebuilding against severe economic dislocation in the foreign trawl fisheries--3,250 mt in the eastern Bering Sea sub-area (Statistical Areas I, II, and III combined) and 7,500 mt in the Aleutian sub-area (Statistical Area IV).

The lack of biological data concerning Other Rockfish requires a more pragmatic consideration of ABC. For this species category, there is virtually no information available bearing on stock abundance or condition. Furthermore, the catch record for this category is incomplete and believed to suffer from past misidentifications or misreportings among the POP and Other Rockfish categories.

The Japanese trawl industry reports that in 1977 the Japanese cath of Other Rockfish in the Berng Sea/Aleutian Region was 11,747 mt and that if the other foreign fisheries in the Region had a similar species composition the total catch of Other Rockfish would have been about 19,000 mt. Species composition data collected by U.S. observers, however, lead to the following estimates of Other Rockfish catches during 1977 (mt):

	Japan	USSR	ROK	Total
Eastern Bering Sea (Stat. areas I,II, III)	47	0	0	47
Aleutian (stat. area IV)	6,084	1,596	0	7,68[illegible]
Total	6,131	1,596	0	7,727

Until additional, accurate fishery information becomes available, the ABC of Other Rockfishes in the Bering Sea/Aleutian Region will be held at the estimated level of the 1977 catch -- 7,727 mt.

I.7 Sablefish (Blackcod)

I.7.1 Maximum Sustainable Yield

The sablefish resource is found in waters off California, northward to the Gulf of Alaska, westward to the Aleutian Region, and into the Bering Sea. The sablefish found in these wide geographical regions are apparently genetically related in the sense that some migrations have been noted to occur between the regions. However, the degree of interchange between regions is noted to be small in relation to the stock size within each region which led Low et al. (1976) and Wespestad et al. (1977) to suggest that management of the resource be conducted by discrete geographical regions. These geographical regions are the eastern Bering Sea, the Aleutian Region, the Gulf of Alaska, waters off Canada, and waters off Washington to California.

Although the sablefish resource should be managed by regions, the long-term productivity in each region is probably related to the overall condition of the resource. Therefore, it is difficult to get an accurate estimation of the MSY within each region by using fishery information of that region alone. To reduce this problem, both Japanese and U.S. scientists have estimated MSY of the resource as a whole. The latest Japanese estimate of MSY for the entire resource from California to the Bering Sea was 69,000 mt (Anon. 1978). The U.S. estimate of MSY was 42,600 to 46,500 mt (Low et al. 1976), using essentially the same general production model, but with a different weighting of data among regions. The MSY esttimate of 69,600 mt appears high in view of the fact that the highest catch in history was 65,500 mt (1972) and that average catches from 1968 to 1975 of 48,200 mt have resulted in continuing and rapid declines in CPUE (Table I.17); accordingly, the high end of the U.S. estimate of overall MSY is considered to be most appropriate -- 46,500 mt.

In order to apportion the overall MSY to individual management regions, the all-nation catch (Table I.17) was averaged over the obvious periods of full fishery development in each: 1961-75 for the Bering Sea/Aleutian Region; 1970-75 for the Northeastern Pacific Ocean (which

Table I.17.--Sablefish landings in metric tons by nation in the Bering Sea and Aleutians and the northeastern Pacific Ocean, 1958-76.

	Northeastern Pacific Ocean						Bering Sea & Aleutians			
Year	United States	Canada	Japan	USSR	Republic of Korea	Subtotal	Japan	USSR	Subtotal	Grand total
1958	2,586	383				2,969	32		32	3,001
1959	3,989	362				4,351	393		393	4,744
1960	5,136	705				5,841	1,861		1,861	7,702
1961	3,040	306				3,346	26,182		26,182	29,528
1962	4,017	428				4,445	28,521		28,521	32,966
1963	2,932	396	1,681			5,009	18,404		18,404	23,413
1964	3,659	637	1,041			5,337	9,237		9,237	14,574
1965	3,304	649	2,107			6,060	8,600		8,600	14,660
1966	3,142	970	3,514			7,626	13,088		13,088	20,714
1967	3,208	591	5,660			9,459	14,840	274	15,114	24,523
1968	2,027	577	17,592			20,196	16,258	4,256	20,514	40,710
1969	2,762	391	22,808			25,961	18,813	1,579	20,392	46,353
1970	2,935	327	28,632	980		32,874	10,904	2,874	13,778	46,652
1971	2,887	328	29,293	762		33,270	14,981	3,000	17,981	51,251
1972	5,636	1,104	38,714	834	308	46,596	16,538	2,406	18,944	65,540
1973	5,710	966	32,519	230	58	39,483	9,270	1,354	10,624	50,107
1974	6,998	504	26,595	202	2,431	33,715	7,587	91	7,678	41,393
1975	8,629	927	26,370	113	6,000 1/	38,621	4,922	117	5,039	43,660
1976			26,802				4,840			

1/ Includes some catch from the Bering Sea and Aleutian Regions.

Source: INPFC Docs. 1776, 1831, 1883, and pers. comm. T. Sasaki, Far Seas Fishery Research Lab., Shimizu, Japan.
ROK and USSR data for 1974 and 1975 from data submitted to the U.S. through bilatera. agreements.
U.S. and Canadian data from PFMC Data Series, Groundfish Section, and from Fishery Statistics of the U.S., Technical Digests 49-67.

actually encompasses the Gulf of Alaska, British Columbia, and Washington-California management regions). The resulting percentages of the total MSY and tonnages (percent x 46,500 mt) are: Northeastern Pacific Ocean - 71% and 33,000 mt; Bering Sea/Aleutian Region - 29% and 13,500 mt.

To further separate this regional MSY to the Bering Sea and Aleutian subareas, a similar calculation was made (using the period 1964-76, Table I.18). Resulting percentages and tonnages are: Bering Sea - 86% and 11,600 mt; Aleutian - 14% and 1,900 mt.

I.7.2 Equilibrium Yield

Catch and CPUE trends clearly indicate that sablefish stocks in the eastern Bering Sea/Aleutian Region are considerably reduced in abundance when compared to earlier years of the fishery. CPUE data analyzed by different procedures by U.S. and Japanese scientists both show declining trends in catch rates (Table I.19) but the trends in the U.S. analysis are much more severe.

The main difference in CPUE computation was the selection of appropriate fishing effort. Without detailed fishing operation data available to them, U.S. scientists attributed all longline fishing effort towards catching sablefish since that is the target species of the fishery. Japanese scientists selected only that portion of the time spent fishing by excluding time spent for travelling, loading, weathering stroms, repairs, and other activities not considered to be associated with production fishing. Differences in resultant CPUE's can not yet be rectified but it is important to note that even though the sablefish catch in the Region during 1973-75 was only 43 percent of the average for the preceeding five years (7,300 vs 18,300 mt), averages for eight of the nine CPUE indicators shown in Table I.19 were lower (some substantially so) during the latter period than during the former. Furthermore, all CPUE indicators continued downward during 1976-77. In other words, even though average annual catch has been reduced more than 50 percent since 1972, abundance (as reflected by CPUE) has continued to decline.

Table I.18.—Historical catches of sablefish in metric tons by area and nation, 1958–76.

Year	Bering Sea Total	Bering Sea Japan 1/	Bering Sea USSR	Aleutian Region Total	Aleutian Region Japan 1/	Aleutian Region USSR
1958	32	32	--	2/	2/	--
1959	393	393	--	2/	2/	--
1960	1,861	1,861	--	2/	2/	--
1961	26,182	26,182	--	2/	2/	--
1962	28,521	28,521	--	2/	2/	--
1963	18,404	18,404	--	2/	2/	--
1964	8,262	8,262	--	975	975	--
1965	8,240	8,240	--	360	360	--
1966	11,981	11,981	--	1,107	1,107	--
1967	13,731	13,457	274	1,383	1,383	--
1968	18,853	14,597	4,256	1,661	1,661	--
1969	18,588	17,009	1,579	1,804	1,804	--
1970	12,501	9,627	2,874	1,277	1,277	--
1971	15,240	12,410	2,830	2,741	2,571	170
1972	15,368	13,231	2,137	3,576	3,307	269
1973	7,615	6,395	1,220	3,009	2,875	134
1974	5,158	5,081	77	2,520	2,506	14
1975	3,422	3,384	38	1,617	1,538	79
1976	3,411 3/	3,267	29	1,705 3/	1,573	61

1/ Japanese catch is reported by fishing year (November-October); all other catches are reported by calendar year.

2/ Included in the Bering Sea catch totals.

3/ Includes catches by ROK, 115 mt in Bering Sea and 71 mt in Aleutian.

Source: INPFC Document 1883 and pers. comm., T. Sasaki, Far Seas Fishery Research Lab., Shimizu, Japan. USSR 1975 data from U.S.-USSR fishery statistic exchange.

Table I.19.—Sablefish catch per unit effort trends in the eastern Bering Sea and Aleutian Region.

	EASTERN BERING SEA				ALEUTIAN REGION				
	CPUE 1	CPUE 2	CPUE 3	CPUE 5	CPUE 1	CPUE 2	CPUE 3	CPUE 4	CPUE 5
1964	61	93	2.4		139	141	3.1		
1965	54	105	3.0		110	163	4.1		
1966	139	166	4.5		229	233	6.3		
1967	210	216	6.2	151	277	275	7.1		154
1968	143	140	5.1	134	165	161	5.9		259
1969	189	187	6.9	142	184	183	7.1		318
1970	231	241	8.7	50	189	241	9.4		112
1971	120	185	5.6	76	165	202	9.4	4.5	222
1972	50	117	3.3	62	203	208	11.6	11.8	123
1973	47	148	6.0	41	192	204	7.7	4.6	115
1974	141	164	7.4	24	187	208	7.8	4.4	44
1975	68	131	4.9	13	98	168	6.0	1.8	30
1976	71	147	5.6	6	78	114	4.5		7
1977			5.4			108	4.0	1.1	

CPUE 1: U.S. estimate, kg per 10 hachi longline units
CPUE 2: Japanese estimate, kg per 10 hachi longline units
CPUE 3: Japanese estimate, mt per vessel-day fishing by longliners
CPUE 4: U.S. estimate, mt per vessel-day fishing by longliners
CPUE 5: U.S. estimate, kg per hour trawling by land-based stern trawlers
Data Sources: CPUE1, CPUE 4, and CPUE 5 from Low (1977) -- U.S. document on sablefish submitted to INPFC
CPUE 2 and CPUE 3 from Anonymous (1978) -- Report of U.S.-Japan meeting on status of stocks

Clearly, an average catch of 7,800 mt cannot currently be sustained by the standing stock of sablefish in the Bering Sea/Aleutian Region.

Considering that the declines in CPUE trends appear to have been less severe in 1976 and 1977, catch levels during that period may be close to the current equilibrium yield. The average catch was about 5,000 mt, 3.500 mt in the Bering Sea Area and 1,500 mt in the Aleutian Area.

I.7.3 Acceptable Biological Catch

Sable fish stocks in this Region have been overfished and are not now capable of producing MSY. Although the source of recruitment to these stocks is not known, neither eggs nor larvae of sablefish have been detected in the Region. It is possible, therefore, that recruitment comes from spawning in the Gulf of Alaska. If so, rebuilding of abundance will be a function of healthy spawning stocks in the Gulf rather than in the Bering Sea/Aleutian Region. Therefore, ABC is considered equivalent to EY-3,500 mt in the Bering Sea Area, 1,500 mt in the Aleutian Area.

I.8 Atka Mackerel

I.8.1 Maximum Sustainable Yield

The fishery for Atka mackerel is relatively new and is conducted primarily by the USSR. The main fishing area is the western Aleutian Islands, with small amounts taken in the eastern Bering Sea. The entire catch hisotry of Soviet catches is as follows:

Year	1970	1971	1972	1973	1974	1975	1976	1977
Catch:	949	--	5,907	1,712	1,377	13,326	13,126	20,975

From the fishery data, it is difficult to approximate MSY. The only source of information that would suggest an MSY level greater than the maximum catch to date of 21,000 mt in 1977 is that provided verbally by Soviet scientists: several large concentrations of Atka mackerel were noted in the Aleutian Region, and from hydroacoustic and trawl samples were estimated to total at least 100,000 mt. From this biomass figure, it was inferred that MSY would equal one-third of the standing stock, or

33,000 mt. Because neither the Soviet data nor the analytical procedures used to estimate biomass and sustainable yield have been made available to scientists of other countries, those estimates must be considered provisional.

I.8.2 Equilibrium Yield

Annual catches of this species have increased from less than 1,000 mt to over 21,000 mt since 1970. Catch rate information is available only for 1977 and 1978 (from U.S. observers aboard Soviet trawlers); catch per hour, for vessels on which Atka mackerel was the target species, averaged 3.9 and 4.1 mt, respectively. By itself, this information could be interpreted to indicate no substantial change in abundance from 1977 to 1978 when annual catches were in excess of 20,000 mt. Two factors, however, must be evaluated before this indication can be considered conclusive.

First, size and age data tkaen by U.S. observers aboard Soviet vessels in both 1977 and 1978 show the bulk of the catch to have been 2-3 year-olds, whereas Soviet research off Kamchatka indicates that this species lives to at least 11 years of age. The lack of older fish in this developing fishery is of concern.

Second, observations of Soviet commercial fisheries and U.S. trawl surveys indicate that Atka mackerel occur in rather large concentrations. The sparse catch per hour information available provides some insight into the density of such concentrations but does not necessarily reflect the size or number of concentrations and, therefore, might not necessarily be indicative of overall abundance.

In light of the above, it is neither possible to estimate EY nor to determine whether current EY is equal to or less than MSY.

I.8.3 Acceptable Biological Catch

In the PMP for 1977 and 1978, the allowable catch of this species was set at 24,800 mt, 75 percent of the unverified Soviet estimate of MSY of 33,000 mt. The information currently available provides no biological basis for changing the allowable catch in 1979; accordingly ABC is considered equivalent to the 1977-78 total allowable catch of 24,800 mt.

I.9 Squid

I.9.1 Maximum Sustainable Yield

Virtually nothing is known about the status of the squid resource except that the current catch of about 10,000 mt does not seem large for a resource that occupies a low trophic level in the food chain and is known to be very abundant throughout the world's oceans. Therefore, it is assumed that this resource is in very good condition and that MSY is at least 10,000 mt.

I.9.2 Equilibrium Yield

Catches of 10,000 mt are believed to be sustainable.

I.9.3 Acceptable Biological Catch

ABC is equivalent to the minimal estimate of MSY -- 10,000 mt.

I.10 Pacific Halibut

I.10.1 Maximum Sustainable Yield

Dunlop et al. (1964) estimated that MSY was about 3,000 mt (round weight) in the southeastern Bering Sea (IPHC Areas 4A and 4B).

Historically, this area has been the most productive for the North American setline fishery, and the MSY for the entire eastern Bering Sea (east of 175°W) probably is no more than 5,000 mt. Estimates of MSY are not available for the western Bering Sea as the North American setline catch in this area has been minor (less than 300 mt). Relatively large catches of halibut (over 3,000 mt) in the western Bering Sea were reported by the Japanese setline fishery in the early 1960's. MSY has not been estimated for the Aleutian area; stocks are small relative to those in the Bering Sea and are considered to be a component of stocks in the Gulf of Alaska.

I.10.2 Equilibrium Yield

Halibut stocks have declined sharply in the eastern Bering Sea since the early 1960's. This is indicated by a decline in CPUE in the North American setline fishery (IPHC 1977) and by IPHC surveys of juvenile halibut (Best 1977). Since 1970, stocks of adult halibut appear to have stabilized at a low level and the North American setline catch has averaged about 300 mt. The incidental catch of juvenile halibut in the

eastern Bering Sea peaked in 1971 at about 7,000 mt but has declined since then. Recent surveys indicate an increase in the abundance of juveniles, but abundance is still below that in the early 1960's and the increase will not benefit the setline fishery for several years. Therefore, the equilibrium yield available to the North American setline fishery probably is about the same as the present level of catch, and is well below MSY.

The EY in the western Bering Sea and Aleutians is unknown but probably substantially below MSY.

I.10.3 Acceptable Biological Catch

ABC and OY for Pacific halibut are not applicable to this Plan.

I.11 Other Included Species ("Others")

This category includes all species of finfishes taken by trawls and setlines <u>except</u>: pollock, rockfishes, soles and flounders, sablefish, cod, Atka mackerel, herring, and salmon.

Virtually nothing is known of the population structure, biological attributes, or potential yield of the individual components of this category; therefore, only a pragmatic appraisal of "MSY" is possible.

During the last 5 years of record, the catch of this category has averaged about 4 percent of the combined catch of the other, specified groundfish species. During that period, no indication of declining abundance has been noted; accordingly, it is assumed that the aggregation of stocks in the "Others" category can sustain removals equal to 4 percent of the total catch of the specified species as long as that catch remains less than the 1972 peak of 2,234,500 mt (see Annex IV-4).

Accordingly, "MSY" of this category is considered to be _ 0.04 x 2,234,500 _ 89.400 mt.

I.11.2 Equilibrium Yield

"MSY" is believed attainable.

I.11.3 Accepable Biological Catch

ABC is considered equal to 4 percent of the combined ABC of specified species which, in 1979, will be: 0.04 x 1,388,000 = 55,500 mt.

ANNEX I: LITERATURE CITED

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ANNEX II

Derivation of Expected Domestic Annual Processing Capacity and Intent (DAP) and Harvest

ANNEX II -- Derivation of Expected Domestic Annual Processing Capacity and Intent (DAP) and Harvest

The western Alaska Peninsula and the Aleutian Islands are two of the more expensive locations for business to be conducted in Alaska. It was not surprising to learn during the survey that most of the plant owners in the area either had no firm plans to commence groundfish operations, or were developing in-house experience and expertise at other locations on the coast where costs are considerably less.

Perhaps even more surprising was the magnitude of the amount of product anticipated by the three processors who indicated that they planned to process groundfish. Their combined 1/ estimate of expected domestic annual harvest of Bering Sea/Aleutian groundfish is as follows:

Pollock	10,000 mt
Pacific cod	7,000 mt
Rockfishes	1,100 mt (eastern Bering Sea)
	1,100 mt (Aleutian)
Yellowfin sole	1,000 mt
Turbots	1,000 mt
Other flounders	1,000 mt
Sablefish	500 mt (eastern Bering Sea)
	500 mt (Aleutian)
Others	1,400 mt
Total	24,600 mt

There are no plans, at present for "Joint Venture" agreements.

1/ Individual company projections are not given here because of the proprietary nature of that data.

ANNEX III -- Derivation of Total Allowable Level of Foreign Fishing (TALFF) (metric tons)

Reference: Species group	sub-area 1/	Annex I ABC =OY	Section 13.1 Reserve	Annex II Initial DAH 3/	Initial TALFF
Pollock	BSea	1,000,000	50,000	10,000	940,000
Pollock	Aleutian	100,000	-	-	100,000
Yellowfin sole		117,000	5,850	1,000	110,150
Turbots		90,000	4,500	1,000	84,500
Other flatfishes 2/		61,000	3,050	1,000	56,950
Pacific cod		58,700	2,935	7,000	48,765
Pacific ocean perch	BSea	3,250	162	550	2,538
Pacific ocean perch	Aleutian	7,500	375	550	6,575
Other rockfish		7,727	500	1,100	6,127
Sablefish	BSea	3,500	350	500	2,650
Sablefish	Aleutian	1,500	150	500	850
Atka mackerel		24,800	1,240	0	23,560
Squid		10,000	500	0	9,500
Others		55,500	2,775	1,400	51,325
Total		1,540,477	72,327	24,600	1,443,490

*1/ BS = Bering Sea (Statistical Areas I,II,III combined)

Al = Aleutian Island Area (Statistical Area IV)

2/ Excluding Pacific halibut

3/ Equals DAP, see Annex II

* Includes territorial waters

ANNEX IV

A. All-nation catch in the Bering Sea/Aleutian Regon, by major species groups, for the last 10 years of record.

B. Detailed statistics of the foregn fisheries in the Aleutian area, 1962-77.

C. Detailed statistics of the foreign fisheries in the eastern Bering Sea, 1954-77.

Annex IV-A. All-nation catches in the Bering Sea/Aleutian Region, by major species groups, for the last 10 years of record (1000's mt)1/.

Species/	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 2/
Pollock	702	863	1,257	1,744	1,875	1,759	1,588	1,357	1,238	888.2	921.3
Pacific cod	63.7	53.3	74.6	50.5	47.0	58.6	67.0	55.1	57.8	36.5	37.3
Pacific ocean perch	76.4	53.3	76.8	31.6	38.9	15.5	36.5	25.2	32.6	10.8	7.4
Sablefish	20.5	20.4	13.8	18.0	19.0	10.6	7.7	5.0	8.2	4.6	1.6
Halibut	7.1	6.3	7.7	8.6	5.9	4.3	2.2	1.6	1.2	0.6	4/
Flounders	149.9	236.2	234.9	323.4	237.7	207.1	196.3	200.4	187.2	121.9	208.3
Atka mackerel	3/	3/	1.0	3/	4.7	1.7	1.4	13.3	20.7	21.0	22.4
Others	31.5	14.4	25.9	41.5	134.7	62.3	79.9	61.9	45.6	57.3	73.9
All species	1,051.1	1,247.1	1,691.7	2,216.6	2,362.9	2,119.1	1,979.0	1,719.5	1,591.3	1,140.9	1,272.2

1/ Values in this table may differ slightly from those used elsewhere in this document because of differences in apportioning between species not clearly listed in foreign statistical reports or differences in treating estimates based on U.S. surveillance when catches were not reported.
2/ Preliminary.
3/ Catch, if any, included under "Others".
4/ Unknown at this time

Annex IV-B

—Foreign catches of groundfish in the Aleutian Island region (170°W to 170°E) by calendar year, 1962-76.[1/][2/] (mt)

Species	Nation	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976[3/]
Pollock	Japan	6	1,359	543	663	1,102	1,359	2,680	512	178	626	571	848	1,318	1,519	551
	USSR	—	—	—	—	—	—	—	726	9,490	2,535	866	9,628	21,344	12,262	3,673
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	344
	TOTAL	6	1,359	543	633	1,102	1,359	2,680	1,238	9,668	3,159	1,437	10,476	22,664	13,781	4,568
Pacific cod	Japan	26	601	241	651	154	276	289	220	283	425	435	366	1,334	2,581	3,475
	USSR	—	—	—	—	—		—	—	—	1,653	—	611	45	257	312
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	16
	TOTAL	26	601	241	651	154	276	289	220	283	2,078	435	977	1,379	2,838	3,803
Pacific ocean perch and other rockfish	Japan	214	7,636	29,377	38,204	28,733	10,285	23,889	15,641	14,173	14,809	8,789	9,793	22,317	9,528	9,808
	USSR	—	20,000	61,000	71,000	57,700	45,720	26,584	23,172	53,274	7,190	24,595	3,017	824	8,147	6,951
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	33
	TOTAL	214	27,636	90,377	109,204	86,433	56,005	50,473	38,813	66,447	21,999	33,384	12,810	23,141	17,675	16,792
Blackcod	Japan	—	639	1,496	1,224	1,321	1,608	1,676	1,667	1,246	2,700	3,308	2,690	2,451	1,624	1,424
	USSR	—	—	—	—	—	—	—	—	—	170	269	162	14	79	61
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	71
	TOTAL	—	639	1,496	1,224	1,321	1,608	1,676	1,667	1,246	2,870	3,577	2,852	2,465	1,703	1,556
Atka mackerel	Japan	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	USSR	—	—	—	—	—	—	—	—	—	—	4,515	1,604	1,377	12,078	20,092
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	—	—	—	—	—	—	—	—	—	—	4,515	1,604	1,377	12,078	20,092
Yellowfin sole	Japan	—	2	61	92	98	18	6	20	9	1	—	—	—	—	15
	USSR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	—	2	61	92	98	18	6	20	9	1	—	—	—	—	15
Rock sole	Japan	—	27	152	147	82	25	17	2	2	1	5	2	36	1	21
	USSR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	—	27	152	147	82	25	17	2	2	1	5	2	36	1	21
Flathead sole	Japan	—	14	43	128	25	32	186	2	11	16	4	24	41	1	8
	USSR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	—	14	43	128	25	32	186	2	11	16	4	24	41	1	8
Alaska plaice	Japan	—	—	45	41	—	—	—	—	—	—	—	—	—	—	—
	USSR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	—	—	45	41	—	—	—	—	—	—	—	—	—	—	—
Halibut	Japan	1	67	681	1,268	163	215	333	331	350	387	337	245	363	145	15
	USSR	—	—	—	—	—	—	—	—	—	—	1	4	4	3	2
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	—
	TOTAL	1	67	681	1,268	163	215	333	331	350	387	338	249	367	148	17
Arrowtooth flounder	Japan	CATCHES OF ARROWTOOTH FLOUNDER AND GREENLAND TURBOT COMBINED UNTIL 1970								274	381	1,323	3,705	3,195	784	59
	USSR									—	—	—	—	—	—	1,285
	ROK									—	—	—	—	—	—	6
	TOTAL									274	381	1,323	3,705	3,195	784	1,350
Greenland turbot	Japan	—	7	504	300	63	394	213	228	285	1,750	12,874	8,666	8,788	2,970	1,113
	USSR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	112
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	5
	TOTAL	—	7	504	300	63	394	213	228	285	1,750	12,874	8,666	8,788	2,970	1,230
Other groundfish	Japan	—	513	66	768	131	563	318	2,361	1,181	2,753	3,028	2,630	7,998	8,110	5,630
	USSR	—	—	—	—	—	7,979	8,630	727	9,490	220	19,419	1,614	1,726	178	326
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	241
	TOTAL	—	513	66	768	131	8,542	8,948	3,088	10,671	2,973	22,447	4,244	9,724	8,288	6,197
All groundfish total	Japan	247	10,865	33,209	63,286	31,872	14,773	29,607	20,984	17,992	24,047	30,694	29,169	47,841	27,265	22,119
	USSR	—	20,000	61,000	71,000	57,700	53,699	35,214	24,625	72,254	11,768	49,665	16,440	25,336	33,004	32,914
	ROK	0	0	0	0	0	—	—	—	—	—	—	—	—	—	716
All nations total		247	30,865	94,209	114,286	89,572	68,472	64,821	45,609	90,246	35,815	80,359	45,609	73,177	60,269	55,649

1/ Catch statistics up to 1963 from Forrester et al. 1974 and for 1964-76 from data on file, Northwest and Alaska Fisheries Center, with the following exceptions: Pacific ocean perch and other rockfish - USSR catches for 1963-66 from Chikuni 1975; all flounders except halibut - all national catches, 1963-75 from Wakabayashi and Bakkala 1977.

2/ 0 indicates no fishing, — indicates fishing, but no catch reported.

3/ Japanese catches for November and December 1976 not included; 1976 catches of flounders (except halibut) by USSR and ROK prorated to species based on species composition in Japanese catch.

ANNEX IV B (Cont'd)

Foreign catches of groundfish in the Aleutian Island region (170°W to 170°E by calendar year, 1976-77. 1/ 2/

Species	Nation	1976	1977 3/
Pollock	Japan	1,015	5,870
	USSR	3,673	1,619
	ROK	344	325
	ROC	0	15
	Total	5,032	7,829
Pacific cod	Japan	3,862	3,162
	USSR	312	100
	ROK	16	-
	ROC	0	-
	Total	4,190	3,262
Pacific ocean perch and other rockfish	Japan	11,204	12,708
	USSR	6,951	786
	ROK	33	87
	ROC	0	2
	Total	18,188	13,583
Blackcod	Japan	1,569	1,768
	USSR	61	-
	ROK	71	86
	ROC	0	-
	Total	1,701	1,854
Atka mackerel	Japan	5	585
	USSR	20,092	20,971
	ROK	-	-
	ROC	0	-
	Total	20,097	21,556
Yellowfin sole	Japan	14	100
	USSR	110	-
	ROK	-	-
	ROC	0	-
	Total	124	100
Rock sole	Japan	23	75
	USSR	71	3
	ROK	-	-
	ROC	0	-
	Total	94	78

ANNEX IV B (Cont'd)

Flathead sole	Japan	7	37
	USSR	55	1
	ROK	-	-
	ROC	0	-
	Total	62	38
Alaska plaice	Japan	-	-
	USSR	-	-
	ROK	-	-
	ROC	0	-
	Total	-	-
Pacific halibut	Japan	15	1
	USSR	2	-
	ROK	-	-
	ROC	0	-
	Total	17	1
Arrowtooth flounder	Japan	1,375	2,297
	USSR	-	9
	ROK	5	-
	ROC	0	1
	Total	1,380	2,307
Greenland turbot	Japan	1,953	2,981
	USSR	112	57
	ROK	6	-
	ROC	0	3
	Total	2,071	3,041
Other groundfish	Japan	5,410	10,723
	USSR	326	4,661
	ROK	241	-
	ROC	0	-
	Total	5,977	15,384
All groundfish total	Japan	26,452	40,307
	USSR	31,765	28,207
	ROK	716	498
	ROC	0	21
All nation total		58,933	69,033

Annex IV-C —Foreign catches of groundfish in the eastern Bering Sea (east of 180°) by calendar year, 1954-76.1/ 2/ (mt)

Species	Nation	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Pollock	Japan	—	—	—	—	6,924	32,793	26,097	24,216	58,765	103,353	171,957	229,275
	USSR	0	0	0	0	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	6,924	32,793	26,097	24,216	58,765	103,353	171,957	229,275
Pacific cod	Japan	—	—	—	—	171	2,864	5,679	2,448	6,054	3,879	13,408	14,722
	USSR	0	0	0	0	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	171	2,864	5,679	2,448	6,054	3,879	13,408	14,722
Pac. ocean perch and other rockfish	Japan	—	—	—	—	—	—	1,100	13,000	12,900	17,500	13,588	8,723
	USSR	0	0	0	0	—	—	5,000	34,000	7,000	7,000	7,000	9,000
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	—	—	6,100	47,000	19,900	24,500	20,588	17,723
Blackcod	Japan	—	—	—	—	32	393	1,861	26,183	28,521	18,404	6,165	5,001
	USSR	0	0	0	0	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	32	393	1,861	26,183	28,521	18,404	6,165	5,001
Yellowfin sole	Japan	12,562	14,690	24,697	24,145	39,153	123,121	360,103	399,542	281,103	20,504	48,880	26,039
	USSR	0	0	0	0	5,000	62,200	96,000	154,200	139,600	65,306	62,297	27,771
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	12,562	14,690	24,697	24,145	44,153	185,321	456,103	553,742	420,703	85,310	111,177	5[illegible]10
Rock sole	Japan	—	—	—	—	—	—	—	—	—	1,196	1,432	1,780
	USSR	0	0	0	0	—	—	—	—	—	3,806	1,806	1,898
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	—	—	—	—	—	5,002	3,238	3,678
Flathead sole	Japan	—	—	—	—	—	—	—	—	—	7,079	11,121	3,287
	USSR	0	0	0	0	—	—	—	—	—	22,546	14,167	3,426
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	—	—	—	—	—	29,625	25,288	6,713
Alaska plaice	Japan	—	—	—	—	—	—	—	—	—	233	808	474
	USSR	0	0	0	0	—	—	—	—	—	742	1,030	505
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	—	—	—	—	—	975	1,838	979
Pacific halibut	Japan	—	—	—	—	196	674	6,931	3,480	7,863	7,452	1,271	1,369
	USSR	0	0	0	0	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	196	674	6,931	3,480	7,863	7,452	1,271	1,369
Arrowtooth flounder	Japan	---Catches of arrowtooth flounder and Greenland turbot combined until 1970---											
	USSR												
	ROK												
	TOTAL												
Greenland turbot	Japan	—	—	—	—	—	—	36,843	57,348	58,226	31,565	33 729	7,947
	USSR	0	0	0	0	—	—	—	—	—	—	—	1,800
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	—	—	36,843	57,348	58,226	31,565	33,729	9,747
Other groundfish	Japan	—	—	—	—	147	380	10,260	554	5,931	1,102	736	2,218
	USSR	0	0	0	0	—	—	—	—	—	—	—	—
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	—	—	—	—	147	380	10,260	554	5,931	1,102	736	2,218
All groundfish total	Japan	12,562	14,690	24,697	24,145	46,623	160,225	448,874	526,771	459,365	212,257	303,095	300,835
	USSR	0	0	0	0	5,000	62,200	101,000	188,200	146,600	99,400	86,300	44,400
	ROK	0	0	0	0	0	0	0	0	0	0	0	0
All nation total		12,562	14,690	24,697	24,145	51,623	222,425	549,874	714,971	605,965	311,667	389,395	345,235

Annex IV-C (cont'd)

Species	Nation	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 3/
Pollock	Japan	261,694	550,152	701,124	830,325	1,231,347	1,514,030	1,616,532	1,471,189	1,250,654	1,065,078	912,728
	USSR	—	—	—	33,571	35,590	233,511	213,895	280,005	309,613	216,567	175,539
	ROK	0	0	1,200	5,000	5,000	10,000	9,200	3,100	26,000	[illegible]	84,987
	TOTAL	261,694	550,152	702,324	869,096	1,271,937	1,757,541	1,839,627	1,754,294	1,586,267	1,285,083	1,173,254
Pacific cod	Japan	18,200	31,982	57,915	50,487	70,078	40,555	35,877	40,817	45,915	33,322	29,086
	USSR	—	—	—	—	—	2,486	7,028	12,569	16,547	18,229	17,756
	ROK	0	0	—	—	—	—	—	—	—	—	716
	TOTAL	18,200	31,982	57,915	50,487	70,078	43,041	42,095	53,386	62,462	51,551	47,558
Pac. ocean perch and other rockfish	Japan	16,786	20,598	26,214	16,150	10,392	10,369	5,837	3,147	6,811	3,716	3,163
	USSR	9,000	—	3,087	—	—	—	150	475	31,877	16,465	12,124
	ROK	0	0	—	—	—	—	—	—	—	—	578
	TOTAL	25,786	20,598	29,301	16,150	10,392	10,369	5,987	3,622	38,688	20,181	15,865
Blackcod	Japan	9,502	10,330	10,143	14,454	8,897	12,304	10,643	4,769	4,189	2,776	2,569
	USSR	—	1,237	4,256	1,579	2,874	2,830	2,137	1,192	77	38	29
	ROK	0	0	—	—	—	—	—	—	—	—	115
	TOTAL	9,502	11,567	14,399	16,033	11,771	15,134	12,780	5,961	4,266	2,814	2,713
Yellowfin sole	Japan	45,423	60,429	40,834	81,449	59,851	82,179	34,846	75,724	37,947	59,715	33,328
	USSR	56,930	101,799	43,355	85,685	73,228	78,220	13,010	2,516	4,288	6,060	3,343
	ROK	0	0	—	—	—	—	—	—	—	—	635
	TOTAL	102,353	162,228	84,189	167,134	133,079	160,399	47,856	78,240	42,235	65,775	37,306
Rock sole	Japan	4,037	1,890	2,633	4,285	9,616	20,159	43,055	22,840	17,311	9,682	7,828
	USSR	5,067	2,872	2,617	4,955	10,507	20,260	17,769	995	2,664	1,463	785
	ROK	0	0	—	—	—	—	—	—	—	—	150
	TOTAL	9,104	4,762	5,250	9,240	20,123	40,419	60,824	23,835	19,975	11,145	8,763
Flathead sole	Japan	4,996	10,621	11,851	9,168	20,088	25,538	9,850	17,190	12,989	4,873	6,911
	USSR	6,024	12,816	9,724	9,395	21,064	25,486	5,840	951	2,028	672	692
	ROK	0	0	—	—	—	—	—	—	—	—	132
	TOTAL	11,020	23,437	21,575	18,563	41,152	51,024	15,690	18,141	14,917	5,545	7,735
Alaska plaice	Japan	2,054	1,340	1,223	3,127	1,326	517	171	1,082	2,168	2,407	2,064
	USSR	2,579	2,513	1,396	3,815	2,076	475	119	35	220	207	207
	ROK	0	0	—	—	—	—	—	—	—	—	40
	TOTAL	4,633	3,853	2,619	6,942	3,402	992	290	1,117	2,388	2,614	2,311
Pacific halibut	Japan	2,199	3,756	2,775	2,764	1,735	4,861	955	644	81	137	87
	USSR	—	—	—	—	—	—	490	296	123	137	58
	ROK	0	0	—	—	—	—	—	—	—	—	[illegible]
	TOTAL	2,199	3,756	2,775	2,764	1,735	4,861	1,445	940	204	274	145
Arrowtooth flounder	Japan					9,354	11,603	3,823	4,929	2,823	1,241	1,652
	USSR					3,244	7,189	9,301	4,288	18,650	19,591	16,132
	ROK					—	—	—	—	—	—	32
	TOTAL					12,598	18,792	13,124	9,217	21,473	20,832	17,816
Greenland turbot	Japan	10,842	21,230	19,980	19,231	14,715	30,193	49,813	43,354	58,834	52,625	17,583
	USSR	2,200	2,639	15,252	16,798	4,976	10,271	14,697	11,926	10,820	12,194	8,867
	ROK	0	0	—	—	—	—	—	—	—	—	335
	TOTAL	13,042	23,869	35,232	36,029	19,691	40,464	64,510	55,280	69,654	64,819	26,785
Other ground-fish	Japan	2,239	4,378	2,984	4,182	9,227	29,617	32,370	39,911	47,491	42,531	44,504
	USSR	—	—	19,074	6,277	6,068	3,879	78,523	15,915	12,770	12,314	12,294
	ROK	0	0	—	—	—	—	—	—	—	—	322
	TOTAL	2,239	4,378	22,058	10,459	15,295	33,496	110,893	55,826	60,261	54,845	57,120
All ground-fish total	Japan	377,972	716,706	877,676	1,035,822	1,446,626	1,781,925	1,843,772	1,725,596	1,487,113	1,278,103	1,061,503
	USSR	81,800	123,876	98,761	162,075	159,627	384,607	362,939	331,163	409,677	303,937	247,826
	ROK	0	0	1,200	5,000	5,000	10,000	9,200	3,100	26,000	3,438	88,042
All nation total		459,772	840,582	977,637	1,202,897	1,611,253	2,176,532	2,215,731	2,059,859	1,922,790	1,585,478	1,397,371

1/ Catch statistics up to 1963 from Forrester et al., 1974, and for 1964-76 from data on file, Northwest and Alaska Fisheries Center, Seattle, with the following exceptions: Pacific ocean perch and other rockfish—Japanese catches 1960-63 and USSR catches 1960-66 from Chikuni 1975; blackcod—Japanese catches 1958-63 from Sasaki 1976; and all flounders except halibut--all nation catches, 1954-75 from Wakabayashi and Bakkala 1977.

2/ 0 means no fishing, — means fishing, but no reported catch.

3/ Japanese catches for November and December 1976 not included; USSR and ROK catches of flounders (except halibut) prorated to species based on species composition of Japanese catches.

ANNEX IV C (cont'd)

Foreign catches of groundfish in the eastern Bering Sea (east of 180°) by calendar year, 1976-77.[1/] [2/]

Species	Nation	1976	1977[3/]
Pollock	Japan	986,696	774,450
	USSR	175,539	63,383
	ROK	84,987	39,895
	ROC	0	1,334
	Total	1,247,222	879,062
Pacific cod	Japan	32,009	33,141
	USSR	17,756	178
	ROK	716	-
	ROC	0	2
	Total	50,481	33,321
Pacific ocean perch and other rockfish	Japan	3,300	7,761
	USSR	12,124	90
	ROK	578	478
	ROC	0	-
	Total	16,002	8,329
Blackcod	Japan	2,815	2,801
	USSR	29	-
	ROK	115	9
	ROC	0	53
	Total	2,959	2,863
Yellowfin sole	Japan	52,673	58,139
	USSR	2,908	284
	ROK	655	-
	ROC	0	55
	Total	56,236	58,478
Rock sole	Japan	8,598	4,906
	USSR	1,328	805
	ROK	107	-
	ROC	0	5
	Total	10,033	5,716
Flathead sole	Japan	7,379	7,025
	USSR	795	1,069
	ROK	90	-
	ROC	0	6
	Total	8,264	8,100
Alaska plaice	Japan	3,519	3,118
	USSR	102	516
	ROK	44	-
	ROC	0	3
	Total	3,665	3,637

ANNEX IV C (Cont'd)

Pacific halibut	Japan	88	-
	USSR	58	-
	ROK	-	-
	ROC	0	2
	Total	146	2
Arrowtooth flounder	Japan	1,717	6,758
	USSR	16,132	669
	ROK	2	-
	ROC	0	4
	Total	17,851	7,431
Greenland turbot	Japan	51,677	31,942
	USSR	8,867	3,082
	ROK	425	-
	ROC	0	18
	Total	60,969	35,042
Other groundfish	Japan	13,527	26,950
	USSR	12,294	614
	ROK	322	1,445
	ROC	0	-
	Total	26,143	29,009
All groundfish total	Japan	1,163,998	956,991
	USSR	247,932	70,690
	ROK	88,041	41,827
	ROC	0	1,482
All nation total		1,499,971	1,070,990

Updated footnotes for Annex 4B and 4C , Bering Sea Groundfish MP

1/ Catch statistics up to 1963 from Forrester et al. 1974 and for 1964-76 from data on file, Northwest and Alaska Fisheries Center, with the following exceptions: Pacific ocean perch and other rockfish - USSR catches for 1963-66 from Chikuni 1975; all flounders except halibut - all national catches, 1963-76 from Wakabayashi and Bakkala, 1978.

2/ 0 indicates no fishing, -- indicates fishing, but no catch reported.

3/ Catches of flounders by USSR and ROK are preliminary.

ANNEX V

INFORMATION ON MARINE MAMMAL POPULATIONS

Information on distribution and migration, abundance and trends, feeding habits, and any problems induced by fisheries on seven marine mammal populations in the Bering Sea/Aleutian Region was provided by the Marine Mammal Division of the Northwest and Alaska Fisheries Center and included in this annex. The information is summarized mainly from the annual report of the Department of Commerce on the Administration of the Marine Mammal Protection Act of 1972 for the period of April 1, 1977 through March 31, 1978 (DOC, 1978) and the Final Environmental Impact Statement on Consideration of a Waiver of the Moratorium and Return of Management of Certain Marine Mammals to the State of Alaska, Volumes I and II (DOC and DOI, 1977).

NORTHERN SEA LION (*Eumetopias jubatus*)

Distribution and Migration: The northern (stellar) sea lion is found in continental shelf water from the Sea of Japan and northern Honshu, Japan, northward around the North Pacific Ocean rim to Okhotsk and Bering Sea and southward to the California Channel Islands. Some seasonal movements occur in parts of its range.

Abundance and Trends: Mate (1976) estimated a world population of 250,000 to 325,000 animals. Alaska has 202 known rookeries and hauling grounds. The Alaska population has increased since exploitation diminished in the early 1900's and now exceeds 200,000 according to a 1973 ADFG estimate. However, recent studies in the eastern Aleutian Islands indicate a 50% decline in population sizes since the late 1950's (Braham et al, 1977).

Factors which may have caused this decline include (1) a westward shift in distribution, (2) commercial fisheries interaction, (3) leptospirosis and/or (4) unidentified population control factors.

Feeding Habits: Northern sea lions eat a variety of fish and cephalopods. Based on frequency of occurrence, one study revealed that fish composed 74.2% of the diet, cephalopod - 17.2%, and decapod crustaceans - 8.6%. Analysis based on percentage of total individuals provided a somewhat different picture. Fishes completely dominated the diet at 97.6% of total individuals. Cephalopods followed at 2.0% and decapod crustaceans at 0.6%. Groundfishes constituted 57.7% of the sea lion diet based on frequency of occurrence and 90.8% based on percentage of total individuals (Calkins and Pitcher, 1977). Pollock was the dominate groundfish. Details of the diet are summarized as follows:

Area: Cape Spencer to Scotch Cap on Unimak Island
Northern Sea Lions - 68 Samples

Prey Item	No. of Occurrences	% Occurrences	No. of Individuals	% of Total Individuals
Gadidae	57	49.1	1135	89.2
Pollock	47	40.5	1072	84.3
Pacific cod	6	5.2	33	2.6
Other Gadidae	4	3.4	30	2.3
Scorpaenidae				
Rockfishes	2	1.7	6	0.5
Pleuronectidae	8	6.9	14	1.1
Starry flounder	1	0.9	1	0.2
Rock sole	1	0.9	1	0.1
Yellowfin sole	1	0.9	2	0.2
Flathead sole	2	1.7	2	0.2
Other Pleuronectidae	3	2.5	8	0.4
Total Groundfish	67	57.7	1155	90.8

Problems: Northern sea lions have damaged gear and destroyed fish in halibut longline, salmon purse seine, gillnet, and troll fisheries. Because groundfish make up such a large part of the sea lion's diet, this species will probably be one of the marine mammals most impacted by the groundfish fisheries and will be the species which should bear close watching as groundfish policies are considered. This is important in light of recent declines in populations in the eastern Aleutian Islands.

NORTHERN FUR SEAL (Callorhinus ursinus)

Distribution and Migration: Northern fur seals are found at sea along the continental shelf from the Bering Sea south along both sides of the North Pacific Ocean to latitude 32°N. Most animals are on their breeding grounds from May through November to bear young and to breed.

Abundance and Trends: A program of reducing the population of Pribilof Island fur seals was begun in 1956 with the expectation that the rate of survival would improve and result in an increased yield of pelts. By 1968, the population had been reduced below levels which would yield the maximum sustainable yield. Thus female fur seals were excluded from harvest in expectation that there would be an increase in pup production. However, expected increases have not been observed. The population level of the northern fur seal is estimated to be 1,765,000. There are in excess of 700,000 adults in the eastern Bering Sea in summer.

Feeding Habits: The northern fur seal is an opportunistic feeder, taking squid and a variety of fishes including herring, anchovy, salmon, capelin, saury, walleyed pollock, and mackerel. Fishes are estimated to constitute about 80% of the fur seal diet. Average size of pollock (the dominant food item) observed in fur seal stomachs is 20 cm. Some figures, from McAlister and Perez (1977) indicated the following consumption of groundfish by northern fur seals.

	In the Aleutians	In the Bering Sea
Walleye pollock	9.4%	39.4%
Sablefish	4.8%	1.0%
Other Gadidae		5.7%
Pleuronectidae	___	1.4%
% Groundfish	14.2%	47.5%
% Other fish	75.0%	31.8%
Total Fish	89.2%	79.3%
Total Squid	10.8%	20.7%

Problems: Fur seals and commercial fisheries may compete for the same species of fish.

BEARDED SEAL (*Erignathus barbatus*)

Distribution and Migration: The bearded seal is found in the North Pacific region in the Bering, Okhotsk, and northern Japan Seas. Bearded seals migrate seasonally in association with the advance and retreat of the ice packs. These seals do not normally come ashore.

Abundance and Trends: No satisfactory method of accurately censusing bearded seals has been attempted to date. A 1971 Soviet estimate places the level of the bearded seal populations of the East-Siberian, Chukchi, Bering, Okhotsk, and Japan Seas at 450,000. The Alaska Department of Fish and Game (1973) estimated a population of 300,000 animals in the Bering, Chukchi, East-Siberian, and Beaufort Seas. The population appears to be high and stable (DOC, 1978).

Feeding Habits: The bearded seal consumes several species of invertebrates, primarily crabs, shrimps, clams, and amphipods, and some demersal fishes. One study indicates that fishes constitute about 10% of the bearded seal's diet and another study, performed in the Beaufort Sea, stated that about 25% of this animal's diet is fishes, in this case primarily polar cod.*

Problems: None at the present. Bearded seals consume commercially important pandalid and crangoid shrimps and lithods crabs; however, they do not compete directly for commercial fish nor do they damage fishing gear.

*Lowry, Frost, and Burns. Trophic Relationships Among Ice Inhabiting Seals. Environmental Assessment of the Alaska Continental Shelf, PI Annual Report, March 77, Vol. 1, p. 226.

Area: North and east of Pt. Barrow

Bearded seals: 3 samples

Of the three samples, one consisted of only one shrimp. One of the seals was taken in November and 64% of the contents were invertebrates and 36% of the contents were fish, mostly saffron cod, but also polar cod, sea snail and eelpout. The third seal was taken in August and it contained 83% invertebrates, mostly isopods. Of the fish in the stomach, 53% were polar cod, 38% were sculpins, and 5% were sea snails. The authors concluded that bearded seals eat a diverse diet but the bulk of it is bivalve mollusk, crabs, shrimps, and sculpins.

RINGED SEAL (Phoca hispida)

Distribution and Migration: The ringed seal is circumarctic in distribution throughout the ice pack. In the North Pacific Ocean it is found in the Bering, Chukchi, and Okhotsk Seas and in the permanent ice pack of the Polar Basin. In winter, most ringed seals occupy areas of land-fast ice, but non-breeding adults and juveniles may be found wherever ice occurs. Apparently, animals wintering in the Bering and Chukchi Seas move northward in spring as the ice recedes and southward in autumn as it advances again. In western Alaska, the ringed seal is the dominant nearshore seal during ice-free months.

Abundance and Trends: No satisfactory method of accurately censusing ringed seals, throughout their range, has been attempted to date. The Alaska Department of Fish and Game (1973) estimated the ringed seal population in the Bering-Chukchi Seas to be about 250,000. Annual harvest by both Soviets and Americans in this area are between 12,000 and 16,000 animals per year. Overall, the population in the Bering-Chukchi Seas appears to be high and is probably stable.

Feeding Habits: In western Alaska, this seal feeds mainly on mysids, amphipods, euphasiids, shrimps, saffron cod, polar cod, and sculpin. A recent stomach analysis of ringed seals in the Beaufort Sea reported that about 83% of the ringed seal's diet was invertebrates and about 17% was fish, almost exclusively polar cod.*

Problems: None at present. Little competition is known to exist between ringed seals and man for fishery resources.

*Lowry, Frost, and Burns. Trophic Relationships Among Ice Inhabiting Seals. Environmental Assessment of the Alaska Continental Shelf, PI Annual

Report. March 1977. Vol. 1, p. 226.

Ringed seals - 21 samples.

Fish constituted from 00.0-13% of the food material in various sub-samples. There were 73 polar cod (Boreagradus saida), one saffron cod (Eleginus gracillus), and two capelin (Mallotus villesus) found in all the samples. Invertebrates were the bulk of the contents. The authors concluded that ringed seals eat primarily nektonic creatures, small benthic crustaceans, and small to medium-size schoolingfish. Benthic fish are the minor food item.

HARBOR SEAL (Phoca vitulina)

Distribution and Migration: The harbor seal is found in the North Pacific Ocean from the Bering Sea south to Baja California and southern Japan and Korea. The harbor seal is the predominant nearshore seal in ice-free waters north of latitude 35°N.

Abundance and Trends: Overall, the world population of harbor seals appears to be high and stable. A 1976 estimate indicated a population of 312,500 to 317,500 in the Pacific (Adv. Comm. Mar. Resour. Res., 1976).

Feeding Habits: The diet of the harbor seal, which varies according to season and location of specific populations, includes primarily pelagic, demersal, and anadromous fishes, cephalopods, and crustaceans. About half of this seal's diet is fish.

Problems: These seals damage commercial fishing gear and compete with man for such fish as herring, salmon, smelt, and whitefish. These animals are extremely sensitive to disturbance and may leave an area after continual harassment by people, equipment, or aircraft.

LARGA SEAL (Phoca largha)

Distribution and Migration: The larga seal is found in the Bering, Chukchi, Western Beaufort, Okhotsk, northern Sea of Japan, and the Po Hai Seas. These seals are seasonally dependent upon sea ice for the birth and nurture of their pups. During winter and early spring the entire population is concentrated along the southern edge of the seasonal pack ice, usually in central Bering Sea. These seals move northward and toward the coasts as the seasonal retreat and disintegration of sea ice progresses. During ice-free summer and early fall they occur along the entire coast of northern Alaska.

Abundance and Trends: No satisfactory method of accurately censusing larga seals has been attempted to date. Indirect methods and relative indices of abundances indicate that the population level of this species is high and probably stable. In 1976, the Bering Sea larga seal population was estimated to contain from 135,000 to 200,000 animals. The Okhotsk Sea population estimate is 135,000 to 200,000 animals (DOC, 1978).

Feeding Habit: The diet of these seals, which varies with the season and location, includes primarily pelagic, demersal and anadromous fishes, cephalopods and crustaceans.

Ecological Problems: Competition presently exists between these seals and man with respect to commercially important fishes (i.e., herring, smelt, whitefish, and salmon) and with respect to fishing gear. These seals are extremely responsive to disturbance and will leave a hauling area after only minor harassment.

RIBBON SEAL (Phoca fasciata)

Distribution and Migration: Geographically, the ribbon seal is separable into Okhotsk and Bering-Chukchi Sea populations and interchanges between the two groups are not known to occur. During winter and spring, the entire population is concentrated along the southern edge of the seasonal ice pack. Only a few ribbon seals remain with the ice edge of the seasonal ice pack. Only a few ribbon seals remain with the ice edge as it retreats northward through the Bering Strait. In summer and autumn, ribbon seals are believed to be pelagic, mainly in the ice-free Bering Sea.

Abundance and Trends: The population of ribbon seals is relatively low, having been markedly reduced by commercial sealers of the Soviet Union during the 1960s. In recent years the species has been afforded increased protection by Soviet sealing regulations and its numbers may be increasing again. U.S. citizens harvest very few ribbon seals. The Alaska Department of Fish and Game (1973) estimated that the population probably numbers between 90,000 and 100,000 animals. Soviet estimates indicate a population of 133,000 in the Okhotsk in 1969 (Popov, 1976). Soviet sealers took less than 3,000 ribbon seals in 1973 from Bering and Okhotsk Seas. In Alaska, the native harvest is usually less than 250 per year.

Food Habits: The diet of the ribbon seal during late winter and early spring (in the ice edge zone) includes mainly pelagic and demersal fishes, cephalopods, and small crustaceans. About 40% of this animal's summer diet is fishes and about 90% of its winter diet is fishes.

Problems: Little competition is known to exist between ribbon seals and Man for fishery resources.

ANNEX V: LITERATURE CITED

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MARINE MAMMAL COMMISSION
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18 January 1979

Mr. J. H. Branson
Executive Director
North Pacific Fishery
Management Council
P.O. Box 3136 - DT
Anchorage, Alaska 99510

Dear Mr. Branson:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Fishery Management Plan and Draft Environmental Impact Statement for the Groundfish Fishery in the Bering Sea/Aleutian Islands Area and offers the following comments.

General Comments

As you know, the Fishery Conservation and Management Act (FCMA) and Marine Mammal Protection Act (MMPA) call for an integrated, ecosystem approach to management in order to conserve fishery resources at optimum yield levels and marine mammals at optimum sustainable population levels.
1 While we appreciate the difficulty of the task, we believe that the development of a Plan for the substantial groundfish resources of the Bering Sea/Aleutian Islands Area offers a challenging opportunity to develop and implement such an ecosystem-oriented approach and, as noted below, that the Plan and DEIS could and should be modified to better reflect the currently available data and theory, including uncertainties, that provide a basis for such efforts.

The desirable approach and difficult challenge are identified in the document on page 144 which notes that: "(i)n the ecosystem sense, there is no 'surplus' production in the sea for man to take. The question is mainly one of balance between ecosystem components, i.e. changes in

JAN 23 1979

target species biomasses and the resultant changes in the biomasses of prey, predator, and competitor species." Although it is noted that the determination of such fishery-induced changes is one of the major objectives of the DYNUMES model, neither the Plan nor the discussion reflect any attempt to account for such changes, provide for uncertainties relating to the nature and extent of those changes, or otherwise attempt to strike or even articulate the criteria that will be employed in maintaining the necessary balance among the various components of the ecosystem. As the quoted language indicates, these changes may affect populations of marine mammals and other components of the ecosystem, as well as the target species of fish, themselves. It is therefore in the best interests of all concerned to develop a Plan that calls for sufficiently conservative actions and research to detect significant changes, and, whenever possible, provide for corrective measures before significant changes occur.

Specific Comments

Although relevant theory and data are discussed in several sections of the document, the discussion is not developed or organized so as to yield a clear explanation of the rationale for the Plan. Relevant ecosystem-oriented considerations do not appear to have been incorporated into the actual management regime that is proposed. The comments set forth below address several portions of the discussion in the order in which they appear and are meant to illustrate the need to modify the discussion to better reflect a conservative, ecosystem-oriented approach.

Page 02:

1 The statement at the bottom of the page indicates that the Plan forms the major component of an environmental impact statement "which assesses the effect that implementation of this Plan is expected to have on the environment of the region ...". However, the discussion on page 153 indicates that the authors of the document were "unable to predict the long-term effect on the ecosystem of the current, single species management strategies ..." which form the basis of the Plan.

Pages 03-04:

In light of this inability to predict the long-term effect of the management strategies, it would appear that there is no basis for confidence that the Plan meets the goal of avoiding irreversible or long-term adverse effects upon fishery resources and the marine environment which is
(2) included in paragraph 1 on page 04. Similarly, with respect to the secondary objectives that are identified, we have been unable to find any evidence in the Plan or discussion that the allowable catch limits established by the Plan are based upon "due consideration of other impacted resources" as suggested in paragraph (b) on page 03 or that fishing strategy has been designed "to have minimal impact" on the environment as suggested in paragraph (f) on page 04.

Finally, the document contains numerous statements indicating the inadequacy of available data on the effects of single species management strategies upon the ecosystem
(3) and its various components. Notwithstanding these statements, the management Plan does not appear to include a margin of safety in the determination of allowable biological catches or a mechanism for accessing information and research to remedy the inadequacies, in accordance with the objectives identified in paragraph (e) on page 04.

Page 05:

Although the discussion of the determinants of catch levels indicates that ecological objectives, such as preventing adverse impacts upon marine mammals and other associated species, are to be included in the determination of the
(4) acceptable biological catch (ABC), the discussion of ABC considers only the dynamics of the target species. The discussion in the remainder of the document appears to make no adjustment in ABC to account for impacts on other species.

The discussion of optimum yield (OY) indicates that it, in turn, may deviate from ABC for purposes of ecological objectives but, again, there is no evidence that there have
(5) been any adjustments for such reasons. As you know, the goal of maintaining marine mammals at optimum sustainable population levels is established by the MMPA and, as such, should be considered an ecological objective "established by law" under the criteria discussed in paragraph (d).

Page 104:

The discussion of the socio-economic characteristics of the domestic commercial fishery indicates that the total

domestic commercial catch "is believed to have been no more than 1,500 mt tons in any recent year." Although we recognize that it is not the only relevant consideration, the fact
(6) that the total domestic catch amounts to only 10% of the total catch permitted by the Plan indicates that reduction in the total permissible catch to account for uncertainties and other factors in the determination of OY, as suggested below, would not be apt to result in a significant impact upon the domestic fishery.

Page 139:

Here, again, the discussion indicates that fishery-induced changes in the abundance and distribution of one
(7) species affect the abundance and distribution of other species and that "single species population dynamics' approaches are no longer fully adequate for modern fisheries management." We are, however, unable to determine what, if anything, has been done to account for such changes by adjusting the OY levels.

Page 145:

Some of the information concerning marine mammals which is contained in Table 22 is erroneous or misleading. Walrus do not feed on salmon; harbor seals do not, to our knowledge, feed extensively on the benthos; bearded seals do not, to
(8) our knowledge, feed extensively on fishes; and ringed and ribbon seals are not ecological equivalents as is suggested by grouping them together. The discussion should be supplemented with an explanation of how these estimates of consumption levels were derived to provide a basis for evaluating their utility and reliability.

Page 151:

The discussion on previous pages of the document have indicated the inadequacies in the biological data base concerning the potential effects of fishery-induced changes on both target and associated species. The discussion in the last paragraph of this page recognizes the need for a
(9) conservative approach and suggests that catch levels can be set at levels that are equal to or less than the low end of the MSY/EY ranges and that catch levels so established can be "considered relatively free from the risk of overexploitation." Our review of Table I.1 on page I-2 indicates that the OY has been set at less than EY only for "other included species" and that it is set at or above the low end of the range of MSY values in all but one case. Moreover, the document

contains no explanation of the rationale supporting the determination that exploitation of stocks of fish at MSY levels will be free from the risk of "overexploitation", especially if that term is intended to include, as it should, exploitation at levels that result in adverse impacts upon associated species.

Page 153:

As noted earlier, the discussion in the last paragraph on the page indicates that the authors of the document are unable to predict the long-term effect on the environment of the current, single species management strategies which form the basis of the OY determinations in the Plan. This discussion
10 provides additional reason to question the determination set forth on page 151 that exploitation at MSY levels is "relatively free from risk". The discussion should, at least, be modified to more adequately explain what is meant by "relatively free from risk" and to identify the known risks associated with the management strategies that are proposed.

Page 155:

This discussion of the MMPA illustrates the need to modify the discussion and Plan to reflect and account for the fact that there is a complex relationship between target
11 species of fish, marine mammals, and other associated species in the ecosystem and that the maintenance of the integrity of that relationship is the primary objective of the MMPA and a goal of the FCMA.

The brief discussion on this page suggests, without supporting documentation, that restrictions on killing or harassing seals and sea lions results in an "unknown but probably significant economic loss to setline fishermen", that "large numbers" of seals and sea lions often congregate around trawlers and have been observed attacking halibut, salmon, and crabs, and that the maintenance of large populations of marine mammals -- seals, sea lions, porpoises, and whales -- has a profound impact on the abundance of commercial fish species. The discussion should be supplemented not only to provide more supporting information for these statements, but also to recognize and discuss the obvious fact that maintenance of substantial fisheries may well have had and most probably will have a profound impact upon the abundance of marine mammals that are dependent upon those fish. This, among other issues, is precisely the kind of balancing question that the discussion on page 144 identifies. There is no indication, however, that the authors recognized the need to strike a balance or attempted to determine the relevant factors that must be weighed in achieving it. The discussion should be modified to articulate what, if anything, is proposed with respect to marine mammals and how implementation of the Plan is expected to directly or indirectly affect marine mammals in the area.

Page 163:

(12) This discussion indicates that "having identified no social or economic reasons for reducing the yield of stocks in this fishery below ABC, Optimum Yield for all species will be considered equal to ABC ...". As noted above, the applicable law and the preceding discussion itself clearly indicate that ecological considerations may dictate setting OY at less than ABC. The discussion ignores those considerations as relevant criteria in determining OY and also ignores the discussion in other portions of the document that identify reasons for reducing the yield below ABC levels. The point is that even if there are no social or economic reasons for reducing the yield, there are clear ecological reasons which have already been identified.

Page 195A:

(13) For the reasons set forth above, we believe that the statement in the second paragraph that the management regime is considered to be in conformance with the seven national standards set forth in Section 301 of the FCMA is unsupported and contrary to the discussion in other portions of the document.

Pages 196-198:

(14) The discussion of research needs is confined to a total of less than three pages, all but the last paragraph of which address research on target species of fish, notwithstanding the need for consideration of the associated species and the ecosystem which is acknowledged at various places throughout the document. This discussion should be supplemented to include a list and discussion of specific information needs and a detailed description of the studies (including priorities, methodology, and time schedules) needed to effectively assess and monitor the impacts of the Plan and other factors on the status of non-target species and the ecosystem itself.

Pages 200-204:

As further evidence of the need for a more intensive, integrated approach to the development of an ecosystem- (15) oriented management plan and assessment of its potential impacts, we note that it appears that only one of the listed references deals with marine mammals and that it deals only with the Alaskan fur seal industry through 1950.

Pages 223-224:

The discussion of the unavoidable adverse impacts of the proposed action and alternatives to it, the discussion of the relationship between local short-term use and maintenance and enhancement of long-term productivity, and the discussion of irreversible and irretrievable commitments of resources should all be modified in accordance with the comments set forth above. These modifications should include, but not be limited to, a consideration of alternatives to the proposed action other than continuation of a preliminary fishery management (16) plan. Management by a PFMP does not appear to be the only alternative consistent with the FCMA. It seems to us that OY can and should be reduced so as to account for the effects of fishery-induced changes on target and associated species and the uncertainties relating thereto. The discussion should evaluate the relative value of various adjustments in OY for the several target stocks and clearly explain the reasons for any determination that such adjustments are not consistent with the FCMA.

Conclusion

In summary, the Commission feels that the Plan has not been developed from an ecosystem perspective, that the calculations of allowable catch levels have not included adequate consideration of the complex interactions among ecosystem components, and that required research may be inadequate either to identify optimum yield levels or to detect adverse impacts on target species, dependent species, associated species, or the ecosystem(s) of which they are a part. Consequently, we are (17) concerned that implementation of the Plan, as presently formulated, may result in the depletion of one or more target, dependent, or associated species. While we recognize that available data and theory are inadequate to construct a fully reliable ecosystem model, we do feel that available data and theory have not been fully and adequately considered. Therefore, we recommend that relevant data and theory be re-evaluated to better identify uncertainties associated with the lack of knowledge or understanding and that the allowable catch levels be adjusted, as necessary, to reflect the degree of uncertainty concerning the possible first order and second order impacts of multi-species harvesting on target species, dependent species, associated species, and the ecosystem(s) of which they are a part.

I hope that these comments are helpful. Should members of your staff have any questions concerning either the comments or recommendations, I would suggest that they get in touch with Dr. Robert J. Hofman, the Commission's Scientific Program Director, (202/653-6237).

Sincerely,

John R. Twiss, Jr.
Executive Director

MARINE MAMMAL COMMISSION COMMENT RESPONSE

General Comments	Response
1	The integrated, ecosystem approach to management of the fishery to be conducted in the Bering Sea/Aleutian area is a requirement of both the FCMA and the MMPA. Such an approach is thought to allow the conservation of fishery resources at optimum yield levels and marine mammals at optimum sustainable population levels. While one may debate the wisdom of creating biological conflicts which would appear to inhibit fisheries development for the purpose of enhancing marine mammal populations, the integrated approach is not yet sufficiently developed to the point where the appropriate model can be relied upon for resource management. It is stated (Sec. 10.2, p 130) that such development is from 3-5 years in the future. The FMP is developed, on the basis of available information and research methods, for the conduct of a fishery that will retain balance among the various fish components, be generally conservative and not be detrimental to current marine mammal populations.
Specific comments	
1	The assessment of the effect of the implementation of the plan on the environment is made on page 128 (9.7). Given the present effort level which is known, the anticipated level based on surveys taken and the condition of fish stocks present, the short-term outlook is described as "good". The long-term effects on the ecosystem are not possible to predict with the single-species management strategies in use. The generally conservative nature of the FMP with respect to the ABC's of individual species is thought to allow the development of a domestic fishery on a scale which will allow the development of the integrated ecosystem approach to more accurately predict the interactions of the fishing effort.
2	See below
3	Refer to Sec. 10.2, p 130. ("The manner in which MSY, EY and ABC were derived for each fish stock... has indirectly taken into consideration the volume of fish needed by marine mammals for their sustenance. For example, natural mortality of fish stocks is taken into consideration...(and ...includes the predation component by marine mammals.)

Specific Comments	Response
4	Where the comment is applicable to the effects of the stated ABC of species on the various marine mammals, the optimum sustainable population has not been clearly determined. Without an estimate of the eventual, optimum sustainable population of the seven marine mammals present in the fishery, the determination of ABC for fish species must be predicated on the best information available. In this case, one of the considerations in the setting of ABC is the marine mammal population trend. Marine mammal experts at the Northwest & Alaska Fisheries Center say trends show the level of six species (fur seals excepted) to be above the lower level of OSP. Fur seals may be at or above that level. Having the range for OSP for the marine mammals would be of good value in the determination of ABC for specific fish species.
5	The authors are aware of the ecological objective established by law (MMPA) of maintaining marine mammals at optimum sustainable population levels. The problem posed is the biological conflict which appears to inhibit fisheries development for the purpose of enhancing marine mammal populations (see Response #1 under General Comments): the resolution of OSP for mammals would be a constant with which to work as this conflict is dealt with.
6	The argument that the domestic catch has only been 10% of the allowable catch stated in the FMP, and that a reduction in the total catch permitted can be made, presumably to benefit marine mammals, without interfering with the development of the fishery, fails to take into account the initial assessment of ABC which includes mortality by mammal predation. Past-year averages are a poor indicator of present processor intent.
7	OY levels take into account fishery induced changes in the abundance and distribution of species. MSY is a function of past catches and takes into account trends of distribution and abundance.
8	The Plan Development Team solicited expert advice from the Marine Mammal Division of the Northwest and Alaska Fisheries Center, Seattle, on distribution and migration, abundance and trends, feeding habits and problems induced by fisheries. An ecosystem simulation model is being developed to determine the effects of fisheries interaction on marine mammals; better information from marine mammal experts would result in refining the model for management purposes. (Ref. Sec. 10.2., p 130, FMP).

Specific Comments	Response
9	The stated OY's indicate the considered, conservative approach necessary, utilizing the best available information, to conduct the fishery with adequate safeguards against depletion risks for target and associated species.
10	The term "relatively free from risk" is taken to mean that the fishery will be conducted in a manner that will retain balance among the various fish components, be generally conservative according to information known concerning the fishery, and not be detrimental to current marine mammal populations. The word "relatively" within the term indicates an awareness of the lack of baseline biological data from which to deduce biological certainities. It is hoped that the single species management strategies which form the OY basis can, at some future date, give way to the integrated ecosystem strategy which will allow the general use of the term "free from risk," thereby indicating a level of confidence in the FMP conclusions which is not at this time available.
11	See revised Sec. 10.2, pp 129-134. Supporting documentation could conceivably be derived from fishermen interviews to account for the statement that seals and sea lions congregate around trawlers. As for the maintenance of large populations of marine mammals and their effect on the abundance of commercial fish species, marine mammal experts have said that an adult harbor seal can weigh 300 lbs., a bull Steller sea lion nearly a ton (2,000 lbs), and each eats 5 to 7% of its body weight daily. Other statistics are available. As for the economic loss to fishermen, it is estimated by the State of Alaska, Department of Fish and Game, that the statewide dollar loss to fishermen's gear is nearly $1 million. Estimated damage can include lost time from fishing in addition to gear destruction. As stated in the FMP, the effect on marine mammals of the implementation of the plan should be beneficial since the total catch is set below previous years, thereby leaving more fish for the mammals.
12	See #13 response

General Comments	Response
13	The comment refers to ecological considerations which may dictate setting OY at less than ABC. If the presence of marine mammals in the fishery management area is one of those considerations, every attempt has been made to gather and assess information concerning that presence and to include that assessment in the determination of MSY, ABC, EY and OY. If the ecological reasons include those of a possible but non-predictable nature, ranging from abnormal to cataclysmic, no method has yet been devised to deal with possible eventualities. The FMP conforms, so far as can be determined, to the national standards set forth in Sec. 301 of the FCMA.
14	If it were possible to identify specific information needs and to detail a description of the studies, including priorities, methodology and time schedules, needed to effectively assess and monitor the impacts of the plan and other factors on the status of non-target or associated species and the ecosystem, the modeling for the integrated ecosystem approach would be complete and there would be no questions, only answers. As stated in the FMP, Sec. 10.2, p. 130, that development is 3-5 years in the future.
15	Refer to revised Sec. 10.2 and Annex V.
16-17	The Plan Development Team is aware of the concern in the Marine Mammal Commission members comments that the fishery management plan not incorporate into the proposed conduct of the fishery, any measures which would result in the diminuation of marine mammal stocks. The plan has been drawn using the single species management strategy pending the development and refinement of more precise research and management methods. The present state of the art does not allow the development of a plan based on an integrated ecosystem model which replaces the present tentative, conservative approach with a more positively dynamic statement.

-End-

Clement V. Tillion, Chairman
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F3C

September 4, 1979

Mr. William G. Gordon, Director
Office of Resource Conservation & Management
National Marine Fisheries Service
3300 Whitehaven Street, Page #2
Washington,D.C. 20235

Dear Bill:

I am enclosing the revisions to the Fishery Management Plan for the Groundfish fishery of the Bering Sea/Aleutian Island Area (FMP) approved by the Council on August 24th. They are being submitted in the form of errata changes requiring replacement of full pages in the plan you are currently reviewing. I believe that these revisions respond fully to your comments and objections to the plan as originally submitted for Secretarial review.

The section on domestic annual harvest has been completely revised. Since we had no new figures to work with for the 1980 plan year we continued to use the original figure of 24,600 mt for DAP. In addition we have established two more categories within DAH; the nonprocessed market (DNP) and expected joint venture processing needs (JVP). Annex II, pages A-58 through A-59c fully explain the derivation of those figures and establish DAH at 56,100 mt.

The procedure for deriving DAH and a new section providing for periodic reevaluation and release of DAH to TALFF during the plan year is found in Section 12.2. 'Expected Domestic Annual Harvest (DAH)' pages 150 and 150-A. Establishment of that evaluation and release procedure required a change in Section 13.2 'Total Allowable Level of Foreign Fishing (TALFF)' on page 151.

The preceding changes,combined with additional reporting requirements for U. S. processors, joint venture fishermen, and nonprocessed fish fishermen, found on page 157 of the revisions, should respond fully to P. L. 95-354. The reporting requirements in the plan are very general and are intended to be supported by regulations similar to those proposed in the Secretary's amendment to the Gulf of Alaska Groundfish FMP. The Council does not expect the regulations to be very specific on the types of information that must be reported by American processors. They feel that the present system of canvassing American and joint venture

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processors, combined with fishermen interviews and village surveys, will be adequate for estimating future DAH needs, particularly when they can be combined with the current catch reporting system established by the plan so that past performance can be accurately measured. To date, of course, there is little or no past performance to be reviewed so surveys will continue to be important in the near future.

The revision of Section 14.3.2.3 A(i) 'Area Closures,' permits joint venture processing operations to within three miles of the baseline from which the territorial sea is measured.

The ABC/OY for "other species" has been raised from 55,500 mt to 74,248 mt. No change was considered necessary in MSY which remains at 89,400 mt. The language affecting these changes is in Annex I.11 'Other Included Species ("Others").' Since it appears that calculating the OY for "others" at 4% of the combined ABC for specified species might conflict with the attainment of the OY's for some of the target species, and recognizing that the category "other" can sustain a catch at least as high as 4% of total MSY, the scientists consider it safe to base ABC for "others" on 5% of the combined ABC for specified species, rather than the 4% originally provided in the plan.

In addition to raising the ABC for "others" the revisions establish a fourth category of species, hereafter referred to as "nonspecified species." That concept is explained in Section 11 'Optimum Yield (OY),' pages 140 through 140b and in Annex VI (new), page A-81. It should be noted that the listing of nonspecified species in Annex VI is not exclusive. Those groups listed are intended to serve as examples of those found in this category. Removal of these groups from the category "other" increases the amount of "other" species that can be caught in the process of attaining OY for a targeted species.

In summary, we have redefined DAH and the reporting requirements to respond to P. L. 95-354; added a review and release mechanism for DAH during the plan year, similar to that now used for reserve; allowed joint venture processing within 12 miles but outside of 3 miles; established a higher ABC for "other species" so that the incidental catch of those species will not hamper the attainment of allocations for other species; and established a fourth category under OY to be called "nonspecified species."

These revisions to the FMP were reviewed by the Scientific and Statistical Committee and the Advisory Panel and were the subject of considerable comment during a public hearing period at the Council meeting. They were advertised in the Federal Register, in the news media and in a Council Newsletter sent out prior to the Council meeting.

We will work closely with NOAA General Counsel in developing the regulations to implement these revisions. Some of the plan revisions are left deliberately vague so that there is some latitude allowed in the regulatory process. The reassessment and release of DAH is described as periodic in the FMP. The Council felt that tying the Regional Director to a bi-monthly or other review schedule was not particularly necessary but would have no objection if the regulations specified exact times and release procedures within those guidelines set out in the plan.

Please continue your review of this FMP. The proposed schedule in your letter of August 21, 1979 will be great if we can attain it.

Sincerely,

Mark H Hutton

for: Jim H. Branson
Executive Director

Enclosures

cc: Terry Leitzell, AA
Roland Finch, F
Harry Rietze, FAK
H.A.Larkins, F111
Richard Marasco, F111

ERRATA FOR THE GROUNDFISH FISHERY

IN THE

BERING SEA/ALEUTIAN ISLAND AREA

Page 140 - 11.0 Optimum Yield (OY)

1. Remove both paragraphs
   Insert new material as pages 140, 140a, 140b.

Page 150 - 12.2 Expected Domestic Annual Harvest (DAH)

1. Remove page 150
   Replace with change 1, page 150 and 150a

Page 151 - 13.2 Total Allowable Level of Foreign Fishing (TALFF)

1. Remove page 151
   Replace with change 1, page 151

Page 157-58 - (14.3.1.5 Statistical Reporting Requirements)

1. Remove page 157-158
   Replace with change 1, page 157 and insert original page 158

Page A-2 - Table I-1

1. Remove Page A-2
   Replace with change 1, page A-2, Table I-1

Page A-55 - I.11 Other Included Species ("Others")

1. Remove Page A-55
   Replace with change 1, page A-55

Page A-58 - Annex II (Title Page)

1. Remove Page A-58
   Replace with change 1, page A-58

Page A-59 - Annex II

1. Remove page A-59
   Replace with change 1, page A-59, A-59a, and A-59b

Page A-60 - Annex III

1. Remove page A-60 (Table)
   Replace with change 1, page A-60 (Table)

Page A-81 - (new page)

1. Add new page A-81 - Annex VI - establishing
   4th category of species "Unspecified"

Page vi - (Table of Contents)

Add to page VI -

ANNEX VI -- SPECIES CATEGORIES WHICH APPLY TO THE BERING SEA/ALEUTIAN GROUNDFISH FISHERY.

ANNEX MATERIALS

Change 1
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11.0 OPTIMUM YIELD (OY)

There are four categories of species and species groups (Annex VI) that are likely to be taken by the groundfish fishery of this region, to each of which the optimum yield concept is applied somewhat differently:

1. Prohibited Species--those species and species groups which must be immediately returned to the sea by vessels operating in the groundfish fishery; ~~with regard to this fishery, OY is zero.~~ Records of catch of each species must be maintained.

2. Target Species--species and species groups which are commercially important, targeted upon by the groundfish fishery, and for which a sufficient data base exists that allows each to be managed on the basis of its own biological, social, economic, and ecological merits. A specific OY applies to each species or species group. Records of catch of each species must be maintained.

3. Other Species -- species and species groups which currently are of only slight economic value and not generally targeted upon. This category, however, contains species with economic potential or are important ecosystem components, but sufficient data is lacking to manage each separately. Accordingly, a single OY, equal to 5 percent of the combined OY's for the "Target Species", applies to

Change 1
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this category as a whole. Records of catch of this category as a whole must be maintained.

4. Non-specified Species--species and species groups of no current or foreseeable economic value and which are taken by the groundfish fishery only as an accidental bycatch to target fisheries. Virtually no data exists which would allow population assessments, but occasional records from U.S. observers aboard foreign vessels and from U.S. research vessels show no noticeable decline in abundance. The OY for this category is that amount which is taken incidentally while fishing for target species, whether retained or discarded. No record of catch is necessary. (Note: If observer or enforcement records show that any species in this category is being actively targeted upon or that the abundance of any species is becoming substantially reduced, that species will be transferred to either the Target Species or Other Species category and subject to an absolute OY.)

With the expectation over the near term of only a modest domestic involvement in this fishery (see Section 12.0 below), and having identified no social or economic reasons for reducing the yield of stocks in this fishery below ABC, Optimum Yield for all but the "Non-specified" species will be considered equal to ABC, as shown in Annex I.

It should be noted, especially by foreign participants in the fishery, that such economic factors as higher catch rates or greater average size

than can be expected when production is at the level of ,
seasonal availability to this fishery by domestic fishing
be introduced as OY considerations if they are considered
U.S. fishery development, and can be shown to not have an ι
impact on the U.S. consumer.

12.2 Expected Domestic Annual Harvest (DAH)

Expected domestic annual harvest (DAH) is the estimated portion of the U.S. groundfish harvest which will be utilized by domestic processors (DAP), the estimated portion which will enter non-processed markets (DNP) and the estimated portion, if any, delivered to foreign processors (JVP) which are permitted to receive U.S. harvested groundfish in the Fishery Conservation Zone.

U.S. groundfish processing capacity is currently estimated to be 54,350 metric tons annually (Section 12.1.1). U.S. commercial fishing fleet capacity is currently estimated to be 156,518 metric tons (Section 12.1.2). Neither of these estimates, however, allow a projection of the domestic intent to catch and process except to define physical maximums. In order to estimate DAP all processors located in or adjacent to this region were surveyed to determine their specific plans for handling groundfish during the plan year. The results of this survey are given in Annex II.

Non-processed fish (DNP) is derived from estimates of the quantities and species of groundfish that enter non-processed fish markets. The principle utilization is for pot bait in the crab fisheries with lesser quantities used as bait in the longline fisheries. Minor quantities are used in this region for direct household consumption (subsistence fisheries). Determination of DNP is based on reported sales, interviews with fishermen who utilize groundfish catches for bait and surveys of communities in the region whose inhabitants utilize groundfish for direct consumption. Projected utilization in the plan year takes account of changing demands related to changes in magnitude of the crab fisheries, the primary users in this category.

JVP is the U.S. harvested portion of the OY in excess of the capacity and intent of U.S. processors to utilize or for which actual domestic markets are not available that will be delivered to foreign processors who are authorized to receive such U.S. harvested fish in the Fishery Conservation Zone. Estimates of utilization in this category are derived from surveys of the companies who intend to have joint venture operations in the Bering Sea during the plan year. The results of that survey are given in Annex II.

Since estimates of future production by processors are made without benefit of any previous processing or harvesting experience in this fishery it is difficult, if not impossible, for them to be completely accurate. It is generally recognized by those processors making the estimates that their figures are optimal and based on assumptions that frequently may not materialize. Machinery or installation delays, changes in markets, better than normal alternative fisheries for the fishing fleets (or processors) may all effect their actual production. Therefore, a DAH reassessment system and release mechanism is established through this plan and by regulation to allow adjustments in DAH during the plan year.

Production by U.S. fishermen and processors shall be reassessed periodically based on:

1. production to date during the year;
2. current fishing and production activity; and
3. projections for additional production during the remainder of the year based on demonstrated capacity, both in processing and harvesting sectors.

Releases from DAH to TALFF shall be made by the NMFS Regional Director after consultation with the Council. No release or transfer shall be made if such release is likely to have an adverse biological, economic, or social consequence.

13.0 ALLOCATIONS BETWEEN FOREIGN AND DOMESTIC FISHERMEN

13.1 Reserve

As mentioned in Section 12.2 and Annex II, U.S. participation in the fishery in the near future is expected to consist of a relatively modest catch for crab bait and limited pilot efforts for foodfish production.

In order to prevent OY's from being exceeded without preventing unexpected domestic fishery development; i.e. an unanticipated increase in U.S. catching capability and intent, 500 mt or 5 percent of the OY (whichever is the greater) of each species will be held in reserve for allocation late in the year on the basis of domestic need. Specific reserve amounts are shown in Annex III.

Unless specifically withheld by the NMFS Regional Director acting with the advice of the Council, up to 25 percent of the reserve of each species will be released to TALFF every two months, beginning with the end of the second month of the fishing year, with the intention that by the end of the eighth month of the fishing year, all of the reserve will either be made available to foreign fishermen or reserved for domestic use.

13.2 Total Allowable Level of Foreign Fishing (TALFF)

The initial TALFF for each species will be determined by the equation TALFF = OY - DAH - RESERVE. TALFF may increase during the year as reserves are apportioned between domestic and foreign fishermen or, if after reassessment during the year it is found that not all of it will be used by U.S. processors and harvesters, DAH may be released to TALFF. Initial TALFF's are shown in Annex III. The estimation of DAH is shown in Annex II.

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Change 1
8/24/79

eastern Bering Sea peaked in 1971 at about 7,000 mt but has declined since then. Recent surveys indicate an increase in the abundance of juveniles, but abundance is still below that in the early 1960's and the increase will not benefit the setline fishery for several years. Therefore, the equilibrium yield available to the North American setline fishery probably is about the same as the pt level of catch, and is will below MSY.

The EY in the western Bering Sea and Aleutians is unknown but probably substantially below MSY.

I.10.3 Acceptable Biological Catch

ABC and OY for Pacific halibut are not applicable to this Plan.

I.11 Other Included Species ("Others")

This category includes all species of finfishes taken by trawls and setlines except: pollock, rockfishes, soles and flounders, sablefish, cod, Atka mackerel, herring, salmon and those species classed as "non-specified species" (11.0 (4)). A partial listing of which is shown in Annex VI.

Virtually nothing is known of the population structure, biological attributes, or potential yield of the individual components of this category; therefore, only a pragmatic appraisal of "MSY" is possible.

During the last 5 years of record, the catch of this category has averaged about 4 percent with highs of 5-to-8 percent of the combined catch of the other, specified groundfish species. During that period, no indication of declining abundance has been noted; accordingly, it is assumed that the aggregation of stocks in the "others" category can sustain removals equal to at least 4 percent of the total catch of the specified species as long as that catch remains less than the 1972 peak of 2,234,500 mt (see Annex IV-4).

Accordingly, "MSY" of this category is considered to be - 0.04 x 2,234,500 - 89,400 mt.

I.11.2 Equilibrium Yield

"MSY" is believed attainable.

I.11.3 Acceptable Biological Catch

ABC is considered euqal to 5 percent of the combined ABC of specified species which will be: 0.05 x 1,484,977 = 74,248 metric tons.

Change 1
8/24/79

Annual data compilations, in the above format, should be available to the Secretary by May 31 of the following year. In addition, preliminary catch data -- by species and by major statistical area (i.e. Areas I, II, III, IV) -- should be compiled by month and made available to the Secretary by the end of the following month.

Arrangements, including financing and schedule of implementation, for the collection, compilation, and summarization of these fishery data will be developed through consultations between officials of NMFS, State of Alaska, and other states in which landings of catch from this fishery are likely.

(B) Processor Reports

All processors of groundfish shall report information necessary for periodic reassessment of DAP. The regulations implementing this plan specify the information to be reported and the time schedule for reporting.

(C) Joint Venture Reports

Persons delivering U.S. caught groundfish to foreign processing vessels shall report information required for periodic reassessment of that portion of the DAH to be delivered to foreign processors (JVP). The regulations implementing this plan specify the information to be reported and the time schedule for reporting.

(D) Non Processed Fish

Persons catching or delivering non-processed fish for use as bait or for direct consumption shall report information necessary for periodic reassessment of DNP. The regulations implementing this plan specify the information to be reported and the time schedule for reporting.

14.3.1.6 Limited Entry

Implementation of a limited entry program will not be necessary for this fishery during the first few years that it operates under this plan. However, a limited entry program should be designed by the Council during the early stages of domestic fishery development so that it can be implemented well before the time that the fishery becomes fully or over-captitalized.

14.3.2 Foreign

14.3.2.1 Permit requirements

All foreign vessels operating in this Management Unit must have on board a permit issued by the Secretary of Commerce. Required by FCMA.

14.3.2.2 Prohibited species

No retention of salmon, steelhead trout, halibut, or Continental Shelf Fishery Resources to prevent covert targetting on species of special importance to U.S. fishermen.

14.3.2.3 Area closures

A. General

(i) No harvesting year-round within 12 miles of the baseline used to measure the territorial sea except in the western Aleutian Islands as described in Appendix III. To prevent conflicts with U.S. fixed gear and small inshore fishery vessels and to prevent catch of localized inshore species important to U.S. commercial and subsistence fishermen. If joint venture operations are permitted foreign ships receiving fish from American fishermen may operate to within three miles of the baseline used to measure the territorial sea. However, when operating within that area between 3 and 12 miles of the baseline used to measure the territorial sea such foreign processors may not receive fish from foreign fishing vessels.

Change 1
8/24/79

ANNEX II

Derivation of Expected Domestic Annual Harvesting Capacity

Change 1
8/24/79

ANNEX II.1 Expected Domestic Annual Processing Capacity (DAP)

The western Alaska Peninsula and the Aleutian Islands are two of the more expensive locations for business to be conducted in Alaska. It was not surprising to learn during the survey that most of the plant owners in the area either had no firm plans to commence groundfish operations, or were developing in-house experience and expertise at other locations on the coast where costs are considerably less.

Perhaps even more surprising was the magnitude of the amount of product anticipated by the three processors who indicated that they planned to process groundfish. Their combined 1/ estimate of expected domestic annual harevst of Bering Sea/Aleutian groundfish is as follows:

Pollock	10,000 mt
Pacific cod	7,000 mt
Rockfishes	1,100 mt (eastern Bering Sea)
	1,100 mt (Aleutians)
Yellowfin sole	1,000 mt
Turbots	1,000 mt
Other flatfishes	1,000 mt
Sablefish	500 mt (eastern Bering Sea)
	500 mt (Aleutians)
Others	1,400 mt
Total	24,600 mt

II.2 Estimate of U.S. Harvest of Fish for Non-Processed Markets (DNP)

Surveys of the needs for bait and subsistence fish were made through interviews with fishermen, processors and villagers. The expected catch is approximately 1,500 metric tons in the following categories:

Pollock	500 mt
Pacific cod	200 mt
Yellowfin sole	200 mt

1/ Individual company projections are not given because of the proprietary nature of that data.

Change 1
8/24/79

Other flatfishes	200 mt
Others	400 mt
Total	1,500 mt

II.3 Derivation of Expected U. S. Harvest Delivered to Foreign Processors (JVP)

Testimony at the June, 1979 Council meeting indicated an interest by both domestic fishermen and foreign atsea processors for developing a "joint venture" fishery for groundfish in the Bering Sea/Aleutian region during the plan year. A subsequent telephone canvass of those operators expressing an interest in buying fish from American fishermen for foreign processors at-sea developed the following estimates:

Pollock	70,000 mt
Cod	20,000 mt
Yellowfin sole	5,000 mt
Turbots	500 mt
Other flatfishes	1,500 mt
Pacific ocean perch	2,200 mt
Rockfish	950 mt
Sablefish	900 mt
Atka mackerel	1,350 mt
Squid	500 mt
Others	1,700 mt
Total	30K mt

Rather than establish JVP at the full estimate of the joint venture operators of 104,600 mt, recognizing that because of the problems inherent in beginning this type in an area untried by American fishermen their goals may be unreachable in the immediate future, the estimate will be reduced by approximately the amounts held in reserve as shown in Annex III (p. A60) to a total of 30,000 mt. If the amounts required during the year by domestic processors (DAP) joint venture processors (JVP) or person's involved in the nonprocessed markets (DNP) exceed the amounts established in this Annex the amount of resource held in reserve is expected to be enough to satisfy those needs.

The amount established for JVP is therefore:

Pollock	9,050 mt
Cod	17,065 mt
Yellowfine sole	850 mt
Turbot	75 mt
Other flatfish	100 mt
Pacific ocean perch	1,660 mt
Other rockfish	450 mt
Sablefish	400 mt
Atka Mackerel	100 mt
Squid	50 mt
Others	200 mt
Total	30,000 mt

Section 12.0 Catch and Capacity Descriptors, estimates U.S. commercial fishing fleet capacity at 156,518 metric tons (Section 12.1.2). Since that survey was done there has been a considerable amount of new construction capable of entering the groundfish fishery, some of it developed specifically for that fishery, that could increase that capacity figure.. The DAH (DAP+DNP+JVP), as estimated in this Annex, is 56,100 mt, well below estimated fleet capacity. The performance of joint venture operations during 1979 in the Gulf of Alaska, while below expectations, clearly revealed the potential for rapid expansion. In recognition of this potential and the probable expansion of joint ventures to the Bering Sea in 1980, and consistent with the provisions of P.L. 95-354, the plan provides an initial JVP amount of 30,000 metric tons of all species combined for the 1980 plan year, January 1 - December 31, 1980. Should the performance of joint ventures fail to meet expectations or the demands of DAP exceed expectations, the JVP will be reduced accordingly. The JVP and DAP surpluses not required in the DAH will be made available to the TALFF during the plan year as indicated in Section 12.2.

Change 1
8/24/79

ANNEX III -- Derivation of Total Allowable Level of Foreign Fishing

(TALFF) (Metric Tons)

Reference: Species group	Sub-area 1/	Annex I ABC = OY	Section 13.1 Reserve	Annex II Initial DAH 3/	Initial TALFF
Pollock	Bering Sea	1,000,000	50,000	19,550	930,450
Pollock	Aleutian	100,000	3 4/	--	100,000
Yellowfin sole		117,000	5,850	2,050	109,100
Turbots		90,000	4,500	1,075	84,425
Other flatfishes 2/		61,000	3,050	1,300	56,650
Pacific cod		58,700	2,935	24,265	31,500
Pacific ocean perch	Bering Sea	3,250	162	1,380	1,708
Pacific ocean perch	Aleutian	7,500	375	1,380	5,745
Other rockfish		7,727	500	1,550	5,677
Sablefish	Bering Sea	3,500	350	700	2,450
Sablefish	Aleutian	1,500	150	700	650
Atka mackerel		24,800	1,240	100	23,460
Squid		10,000	500	50	9,450
Others		74,249	3,712	2,000	68,537
Total		1,559,226	73,324	56,100	1,429,802

*1/ BS Bering Sea (Statistical Areas I, II, III combined).

AL Aleutian Island Area (Statistical Area IV).

2/ Excluding Pacific halibut.

~~3/ Equals DAP, see Annex II.~~

3 4/ This OY calculated for the offshore pollock population in deep water is discuss in Annex I (p. A-13). No reserve is considered necessary at this time since th is little U.S. capability for a pelagic trawl fishery and resource abundance o continental shelf is expected to keep any U.S. effort on that component identi as "B.Sea."

* Includes territorial waters.

Table 1.1--MSY, EY, and ABC Values for Groundfish in the Bering Sea/Aleutian Region during 1979 (1000's mt)

Species	Sub-area 1/	MSY	EY	ABC=OY	(1978 OY)	(1978-79 change)
Pollock	BS	1,100-1,600	1,000	1,000	(950)	(+50)
	AL	?	?	100		
Yellowfin sole	--	169-260	117	117	(106)	(+11)
Turbots	--	100	90-95	90	(139)	(+12)
Other Flatfishes	--	44.3-76.8	=MSY	61		
Cod	--	58.7	=MSY	58.7	(58)	(+0.7)
Pacific ocean perch	BS	32	6.5	3.25	(6.5)	
	AL	75	15	7.5	(15)	
Other rockfish	--	?	?	7.7		4/
Sablefish	BS	11.35	3.5	3.5	(5)	(-1.5)
	AL	1.85	1.5	1.5	(1.5)	(0)
Atka mackerel	--	33	Unknown	24.8	(24.8)	(0)
Squid	--	$\geq$ 10	$\geq$ 10	10	(10)	(0)
Pacific halibut	--	5	0.3	2/	--	--
Other included species	--	89.4	89.4	74.2	(93.6)	(-19.4)
Total 3/	--	1,702.2-2,325.7	1,446.5-1,484.0	1,559.23	(1,409.4)	(+149.83

1/ BS = Eastern Bering Sea Area (Statistical Areas I, II, III combined).

AL = Aleutian Area (Statistical Area IV).

2/ Subject to separate FMP.

3/ Excluding Pacific halibut.

4/ Included under "others" in 1978.

BS/A

ANNEX VI -- SPECIES CATEGORIES WHICH APPLY TO THE BERING SEA/ALEUTIAN GROUNDFISH FISHERY

Prohibited Species 1/	Target Species 2/	"Other" Species 3/	Non-Specified Species 4/
FINFISHES			
Salmonids	Pollock	Sculpins	Eelpouts (family Zoarcidae)
Pacific Halibut	Cod	Sharks	Poachers (family Agonidae) and alligator fish
	Flounders	Skates	Snailfish, Lumpfishes, Lumpsuckers (family Cyclopteridae)
	Herring	Eulachon	Sandfishes (*Trichodon* sp.)
	Atka mackerel	Smelts	Rattails (family Macrounidae)
	Sablefish	Capelin	Ronquils, Searchers (family Bathymasteridae)
	Rockfishes		Lancetfish (family Alepisanvidae)
			Pricklebacks, Cockscombs, Warbonnet Shanny (family Stichaeidae)
			Prowfish (*Zaprora sile*[illegible]
			Hagfish (*Eptatretus* sp.)
			Lampreys (*Lampetra* sp)
			Blennys, Gunnels, (Various small bo dwelling fishes of the family Stichaeidae and Pholidae)

Prohibited Species 1/	Target Species 2/	"Other" Species 3/	Non-Specified Species 4/	
INVERTEBRATES				
King crab	Squids	Octopus	Anemones	Jellyfishes
Tanner crab			Starfishes	Tunicates
Coral			Egg cases	Sea cucumber
Shrimp			Sea mouse	Sea pen
Clams			Sea slug	Isopods
Horsehair crab			Sea potato	Barnacles
Lyre crab			Sand dollar	Polychaetes
			Hermit crab	Crinoids
			Mussels	Crab - unidentified
			Sea urchins	Misc. - unidentifie
			Sponge-unident.	

1/ Must be returned to the sea, no fee.
2/ OY for each items; fee as i fee schedule.
3/ Aggregate OY for group equal to 5% of total OY of line items~~; fee based on $47/mt ex-vessel value.~~
4/ List not exclusive; includes any species not listed under Prohibited, Target, or "Other" categories; no fee charged.

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

HOUSE RESEARCH AGENCY
Pouch Y - State Capitol
Juneau, Alaska 99811
465-3991

MEMORANDUM March 12, 1980

TO: Representative Fred Zharoff

FROM: Peter B. Froehlich PBF

RE: HB 767 (Disclosure of Alien Affiliates in Alaska Businesses)
Research Request No. 96

This memorandum is in response to your recent request that this agency perform a sectional analysis of HB 767 concerning disclosure of alien affilates in Alaska businesses. You also requested a comparison of HB 767 and SB 312 concerning corporate dissolution, reinstatement and fees. That comparative analysis will be provided next week as previously arranged.

In summary, it appears that this bill would improve the completeness and accuracy of the State's information concerning alien affiliates in Alaska business. It would also make other changes in the Alaska Business Corporation Act, which have no apparent specific connection to alien affiliates in Alaska business. In fact only 7 of the 16 substantive sections of the bill appear to have a specific application on alien affiliates, while the remaining 9 sections apply to all corporations equally. Therefore, it may be desirable to broaden the scope of the title of the bill to more clearly comply with the requirement of Article II, § 13 of the Alaska Constitution that the subject of each bill be expressed in its title.

HB 767 would amend 13 sections or subsections of AS 10.05. the Alaska Business Corporation Act, and would add five new sections or subsections. The existing provisions of the Act dealing with alien affiliates were enacted in 1975.

Section 1 of the bill would amend AS 10.05.250 in three respects. First, it would change the last word in the current title of the section, Reorganization; Disclosure of Alien Interests, to "Affiliates". Second, it would substitute the words "alien affiliates" for the current descriptive language "affiliate which is a nonresident alien or corporation whose place of business is outside the U.S." The word "alien" would be defined by § 16 of the bill which would add a new AS 10.05.825(22). Finally, § 1 of the bill would add a third category of information to the two categories now required to be filed before a corporate reorganization (i.e., identities of alien affiliates of the surviving corporation and percent of shares controlled by each). The new third category of information required would be a description of the nature of the affiliation between the surviving corporaton and an alien affiliate.

Representative Fred Zharoff
March 12, 1980
Page 2

Sections 2 and 3 of the bill would amend AS 10.05.225(a) which lists the requirements to be included in articles of incorporation by all corporations. Section 2 would add to AS 10.05.255(a)(3) the requirement that articles include an activity code number from the code established under new AS 10.05.703 which would be enacted by § 10 of the bill. This new numerical code would be adopted by the commissioners of Revenue and of Commerce and Economic Development and would be a numerical list of business activities. Section 3 of the bill ‹ ld change the language of the requirement of AS 10.05.255(a)(13) that articles include the identity of any alien affiliate and add a requirement of a description of the nature of the affiliation. The new language corresponds to that of AS 10.05.250 as it would be amended by § 1 of the bill.

Sections 4 and 5 of the bill would amend AS 10.05.519(a) which lists the circumstances under which the Commissioner of Commerce and Economic Development may dissolve a corporation involuntarily. Section 4 would shorten the allowable delinquency period for annual reports, license fees, and penalties from 6 months to 3 months. (It was shortened from 12 to 6 months in 1976.) Section 5 of the bill would add material misrepresentation as cause for involuntary dissolution.

Sections 6 and 7 of the bill would amend AS 10.05.615 which lists the required contents of applications by foreign corporations for certificates of authority to transact business in the state. [Foreign corporations, under current AS 10.05.825(4), are corporations for profit organized under any laws other than those of Alaska.] Section 6 would add to AS 10.05.615(5) the requirement that applications include an activity code number from the code established under new AS 10.05.703 (§ 10 of the bill). The language of this change is identical to that of § 2 of the bil concerning articles of incorporation. Section 7 of the bill would change the language of AS 10.05.615(12) which requires applications for certificates to include the identity of alien affiliates to correspond with the changes §§ 1 and 3 of the bill would make to AS 10.05.250 and 255(a)(13), respectively. Section 7 would also add the requirement of a description of the nature of the alien's affiliation just as would §§ 1 and 3.

Sections 8 and 9 of the bill would amend AS 10.05.702 concerning annual reports. Section 8 would amend AS 10.05.702(3) to add the requirement that annual reports include an activity identification code under new AS 10.05.703 (§ 10 of the bill). This change corresponds to §§ 2 and 6 of the bill concerning artiles of incorporation and applications for certificates of authority, respectively. Section 9 of the bill would change the language of AS 10.05.703(8) which requires annual reports to include the identity of alien affiliates to correspond with the changes of §§ 1, 3 and 7 make to other reporting requirements including the addition of a requirement of a description of the nature of the affiliation.

Section 10 of the bill would add two new sections to the Act. New AS 10.05.700 would require any domestic (Alaska) or foreign (non-Alaska) corporation which publishes a stockholder report to submit it with its annual report to the commissioner. New AS 10.05.703 would require the commissioners of Revenue and of Commerce and Economic Development to adopt a code list of business activities to be followed by corporations in complying with the reporting requirements added by § 2 of the bill re articles of incorporation [AS 10.05.255(a)(3)], by § 6 re applications for certificates of authority [AS 10.05.615(5)], and by § 8 re annual reports [AS 10.05.702(3)].

Section 11 of the bill would amend AS 10.05.771 to provide that the penalty for not timely filing an annual report is 10% of the franchise tax for each month of violation rather than the single flat 10% penalty provided in current statute.

Sections 12 and 13 of the bill would amend AS 10.05.783 and 786 to delete the $500 maximum fine for failure to answer interrogatories promptly and for signing required documents knowing them to be materially false. Under AS 11.81.250(c) of the new criminal code, the deletion of the penalty would result in the categorization of this offense as a Class A misdemeanor under the new criminal code. Under AS 12.55.035(c) the new maximum fine would therefore be $100,000.

Sections 14-16 of the bill amend and add to the definitions of AS 10.05.825. Section 14 would broadly rewrite the definition of "affiliate" in AS 10.05.825(18). Section 15 would expand the definition of "person" in AS 10.05.825(20), by adding joint venture, company, firms, society and estate to the list of meanings. Section 16 would add two new definitions to AS 10.05.825, "alien" and "state."

Finally, Section 17 of the bill would give it a January 1, 1981 effective date.

Please contact us if we may provide further assistance or information concerning HB 767.

PBF/dp

FRANK ORTH & ASSOCIATES

Economic and Business Consultants • 225 108th Ave. N.E., Suite 311, Bellevue WA 98004 • (206) 455-3507

January 17, 1980

Mr. Myrton R. Charney
Executive Director
Alaska State Legislature
Legislative Affairs Agency
Pouch Y
Juneau, Alaska 99811

Dear Mr. Charney:

It has been requested by Representative Fred Zharoff that a page (enclosed) be inserted into the report Foreign Investment in the Alaska Seafood Industry. It is to be inserted after the title page and before page iii of the Table of Contents; it should appear on the right-hand (odd-numbered) side of the report.

In addition, Representative Zharoff has requested that we send 375 front covers and 375 back covers to you (instead of the 90 fronts and backs I mentioned in my correspondence on January 14). These will be sent under a separate cover and should reach you shortly.

Thank you in advance for your cooperation in this matter.

Sincerely,

Peter W. Rogers
Economic Analyst

PWR:kh
Enclosure
cc: Fred Zharoff

HOUSE INTERIM COMMITTEE ON FOREIGN INVESTMENT

Fred F. Zharoff
Chairman

Richard I. Eliason

Bill Miles

FRANK ORTH & ASSOCIATES

Economic and Business Consultants • 225 108th Ave. N.E., Suite 311, Bellevue WA 98004 • (206) 455-3507

January 17, 1980

Mr. Fred F. Zharoff
Representative District 14
Pouch V
State Capitol
Juneau, Alaska 99811

Dear Fred:

Enclosed please find the page to be inserted into the report, the letter to Mr. Charney and a list of parties to whom the report should be sent. I hope that the insert is what you had in mind.

Please contact me if you have any further questions or comments on the above items or any other matter.

Sincerely,

Peter

Peter W. Rogers
Economic Analyst

PWR:kh
Enclosures

STATE OF ALASKA
THE LEGISLATURE
LEGISLATIVE AFFAIRS AGENCY

POUCH Y - STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3800

MEMORANDUM

November 8, 1979

TO: A.A.'s ALL INTERIM COMMITTEES

FROM: Richard G. Berg, Director RB
Administrative Services

SUBJECT: Budget Authorizations

Many of our interim committees are fast approaching the "peril point" of their budget authorizations. As many of you intend to operate through December, this is to remind you of the need for tight liaison with our accounting staff.

We are unable to authorize payments--salary or otherwise--if your budget authorization is met or exceeded. Accounting control is on a cash basis for the most part; and, therefore, expenditures do not reflect on reports until paid.

Further, as you plan closure of your offices, anticipate returning travel request booklets and reconciled petty cash accounts to us as early as possible.

RGB:mm

Fred:
The balance for
Foreign Investment Committee
was $ 1,806.51 as of 10/31/79.
Merle

Foreign Investments

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

SUBPORT BUILDING
JUNEAU, ALASKA 99801

November 30, 1979

Fred F. Zharoff, Chairman
Foreign Investment Committee
Alaska State Legislature
House of Representatives
Pouch V
Juneau, Alaska 99811

Dear Mr. Zharoff:

In response to your request of September 27, 1979, attached is the computer report showing 1977 aggregate statewide fisheries production. The report has broken Alaskan processors into the five groups specified in your letter, and gives net weight and value figures for each species and production type. Canned production has been converted from the number of cases into the number of pounds.

It should be noted that the report contains custom processing data; that is, any fish that were processed for a given company by another company. If, for example, Whitney-Fidalgo Seafoods has fish custom processed for them by Peter Pan Seafoods or Alaska Packers, the production would appear in the report group which included Whitney-Fidalgo. Under these circumstances the actual processing could be performed by a U.S./Canadian invested company, but would be included in the Japanese invested report category. The reverse could also occur. This situation was discussed with Mr. Pat Dougherty at the beginning of the project; he indicated at that time that he understood the situation, but wished the Department to footnote its existence in writing.

Mr. Dougherty also informed the Department that Franklin Orth and Associates of Bellevue, Washington, would be analyzing the report. A copy has been forwarded to Bellevue.

I hope you will find the report suitable to your needs. The report was prepared by the Department's Computer Services Section under the direction of Mr. Don Wanie and Ms. Lori Svensson. They can be reached at 465-4150 if any questions should arise.

Sincerely,

Ron Skoog

Ronald O. Skoog, Commissioner
Department of Fish and Game

cc: Don Wanie, ADF&G
Franklin Orth & Associates

11-K11LH

Page 2 is the
first valid page
of the report.
AJS

RUN DATE : 11/01/79

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

***** S U M M A R Y *****

PROCESSOR GROUPS	NET WEIGHT (LBS.)	% OF TOTAL	VALUE	% OF TOTAL
AT LEAST 25% JAPANESE OWNERSHIP	88,558,414	26.16	$163,119,989	25.38
LESS THAN 25% JAPANESE OWNERHIP	34,883,656	10.31	$53,914,122	8.39
UNIDENTIFIED OWNERSHIP	25,433,301	7.51	$48,465,832	7.54
CANADIAN-U.S. OWNERSHIP	149,958,749	44.30	$311,110,883	48.41
INDIVIDUAL OWNERSHIP	39,662,092	11.72	$66,090,873	10.28
** TOTAL FOR ALL **	338,496,212	100.00	$642,701,699	100.00

AT LEAST 25% JAPANESE OWN

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
BOTTOM FISH GEN	FROZEN	WHOLE/DRESSD	92,878	$24,901
PACIFIC COD	FROZEN	WHOLE/DRESSD	28,145	$20,755
TURBOT	FROZEN	WHOLE/DRESSD	3,575	$1,430
LING COD	FROZEN	WHOLE/DRESSD	33,589	$22,457
ROCKFISH	FROZEN	WHOLE/DRESSD	140,756	$64,820
HALIBUT	FROZEN	WHOLE/DRESSD	6,318,671	$9,505,972
HERRING	SALT/PICKLED	ROE	76,912	$40,379
HERRING EGGS KP	SALT/PICKLED	ROE	49,000	$58,800
BAIT HERRING	FROZEN	WHOLE/DRESSD	232,770	$28,597
BAIT HERRING	FROZEN	BAIT	1,260,944	$17,429
HERRING EGGS	FROZEN	ROE	12,428	$16,351
HERRING EGGS	SALT/PICKLED	ROE	75,876	$342,421
GENERAL SALMON	FROZEN	WHOLE/DRESSD	139,537	$629,425
GENERAL SALMON	FROZEN	ROE	614,953	$2,438,347
GENERAL SALMON	SALT/PICKLED	ROE	1,617,102	$5,347,589
KING SALMON	FROZEN	WHOLE/DRESSD	2,088,878	$4,898,618
KING SALMON	CAN-CONV	WHOLE/DRESSD	49,794	$61,865
RED SALMON	FROZEN	WHOLE/DRESSD	5,703,168	$10,610,076
RED SALMON	SALT/PICKLED	WHOLE/DRESSD	750,024	$1,800,476
RED SALMON	CAN-CONV	WHOLE/DRESSD	6,880,966	$13,535,190
COHO SALMON	FROZEN	WHOLE/DRESSD	2,010,885	$3,498,595
COHO SALMON	CAN-CONV	WHOLE/DRESSD	347,898	$558,392
PINK SALMON	FRESH	WHOLE/DRESSD	758,571	$326,186
PINK SALMON	FROZEN	WHOLE/DRESSD	1,141,218	$882,261
PINK SALMON	CAN-CONV	WHOLE/DRESSD	19,538,261	$26,183,731
CHUM SALMON	FRESH	WHOLE/DRESSD	12,855	$6,428
CHUM SALMON	FROZEN	WHOLE/DRESSD	4,689,010	$4,903,714
CHUM SALMON	CAN-CONV	WHOLE/DRESSD	4,757,758	$5,890,377
SMELT	FROZEN	WHOLE/DRESSD	607	$212
SHEEFISH	FROZEN	WHOLE/DRESSD	14,298	$8,719
SABLEFISH	FROZEN	WHOLE/DRESSD	447,869	$880,034
ABALONE	FROZEN	WHOLE/DRESSD	5,242	$13,105
DUNGENESS CRAB	FROZEN	WHOLE/DRESSD	257,990	$213,044
DUNGENESS CRAB	FROZEN	SECTION/TAIL	35,952	$46,118
DUNGENESS CRAB	FROZEN	MEAT	385	$424
DUNGENESS CRAB	CAN-CONV	MEAT	5,395	$14,050
GEN KING CRAB	FROZEN	WHOLE/DRESSD	29,299	$75,049
GEN KING CRAB	FROZEN	SECTION/TAIL	10,274,861	$30,487,170
GEN KING CRAB	FROZEN	MEAT	2,717,555	$14,945,681
GEN KING CRAB	CAN-CONV	MEAT	10,421	$59,529
TANNER CRAB	FROZEN	SECTION/TAIL	8,894,114	$10,604,138
TANNER CRAB	FROZEN	MEAT	1,266,383	$3,911,642
TANNER CRAB	CAN-CONV	MEAT	483,935	$2,079,337
GENERAL SHRIMP	FROZEN	WHOLE/DRESSD	1,705,196	$1,343,543
GENERAL SHRIMP	FROZEN	SECTION/TAIL	1,190,774	$2,399,245

RUN DATE : 11/01/79

DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

AT LEAST 25% JAPANESE OWN

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
GENERAL SHRIMP	CAN-CONV	WHOLE/DRESSD	276,528	$617,250
GENERAL SHRIMP	CAN-CONV	SECTION/TAIL	1,015,190	$2,908,097
AT LEAST 25% JAPANESE OWNERSHIP			88,558,414	$163,119,989

LESS THAN 25% JAPANESE OW

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
PACIFIC COD	FROZEN	WHOLE/DRESSD	22,150	$16,613
ROCKFISH	FROZEN	WHOLE/DRESSD	22,712	$12,130
HALIBUT	FROZEN	WHOLE/DRESSD	388,598	$595,142
BAIT HERRING	FROZEN	BAIT	1,281,000	$179,340
GENERAL SALMON	FRESH	ROE	82,711	$413,552
GENERAL SALMON	FROZEN	ROE	2,020,115	$6,470,794
KING SALMON	FROZEN	WHOLE/DRESSD	760,367	$1,844,641
KING SALMON	CAN-CONV	WHOLE/DRESSD	53,815	$84,331
RED SALMON	FROZEN	WHOLE/DRESSD	1,146,291	$2,118,648
RED SALMON	CAN-CONV	WHOLE/DRESSD	6,132,206	$12,120,517
COHO SALMON	FROZEN	WHOLE/DRESSD	738,551	$1,609,203
COHO SALMON	CAN-CONV	WHOLE/DRESSD	316,515	$506,020
PINK SALMON	FRESH	WHOLE/DRESSD	108,653	$56,553
PINK SALMON	FROZEN	WHOLE/DRESSD	696,565	$617,367
PINK SALMON	CAN-CONV	WHOLE/DRESSD	14,499,246	$19,073,828
CHUM SALMON	FROZEN	WHOLE/DRESSD	1,652,350	$2,064,842
CHUM SALMON	CAN-CONV	WHOLE/DRESSD	5,025,616	$6,113,398
STEELHEAD TROUT	FROZEN	WHOLE/DRESSD	2,392	$4,784
SABLEFISH	FROZEN	WHOLE/DRESSD	13,863	$12,419
LESS THAN 25% JAPANESE OWNERHIP			34,883,656	$53,914,122

RUN DATE : 11/01/79

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

UNIDENTIFIED OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
HALIBUT	FRESH	WHOLE/DRESSD	121	$180
HALIBUT	FROZEN	WHOLE/DRESSD	1,272,351	$1,931,512
HERRING EGGS KP	FRESH	ROE	57,689	$46,685
HERRING EGGS KP	SALT/PICKLED	ROE	75,520	$141,648
BAIT HERRING	FROZEN	WHOLE/DRESSD	140,000	$28,000
BAIT HERRING	FROZEN	BAIT	2,013,435	$308,306
HERRING EGGS	FRESH	ROE	163,500	$23,700
HERRING EGGS	FROZEN	ROE	2,670,879	$1,018,205
GENERAL SALMON	FRESH	ROE	16,672	$44,820
GENERAL SALMON	FROZEN	WHOLE/DRESSD	10,850	$27,665
GENERAL SALMON	FROZEN	ROE	114,227	$410,669
GENERAL SALMON	SALT/PICKLED	ROE	23,254	$125,389
KING SALMON	FRESH	WHOLE/DRESSD	92,742	$147,032
KING SALMON	FROZEN	WHOLE/DRESSD	2,773,264	$8,865,971
KING SALMON	CAN-CONV	WHOLE/DRESSD	754	$3,296
KING SALMON	CAN-SMOKED	WHOLE/DRESSD	4,321	$25,024
RED SALMON	FRESH	WHOLE/DRESSD	25,333	$29,458
RED SALMON	FROZEN	WHOLE/DRESSD	2,497,467	$4,342,233
RED SALMON	SALT/PICKLED	WHOLE/DRESSD	581,321	$1,011,290
RED SALMON	SMOKE/KIPPER	WHOLE/DRESSD	500	$1,500
RED SALMON	CAN-CONV	WHOLE/DRESSD	14,474	$29,173
RED SALMON	CAN-SMOKED	WHOLE/DRESSD	4,914	$29,600
COHO SALMON	FRESH	WHOLE/DRESSD	38,210	$39,457
COHO SALMON	FROZEN	WHOLE/DRESSD	1,925,555	$4,396,164
COHO SALMON	SMOKE/KIPPER	WHOLE/DRESSD	240	$300
COHO SALMON	CAN-CONV	WHOLE/DRESSD	24	$48
PINK SALMON	FRESH	WHOLE/DRESSD	2,220	$1,680
PINK SALMON	FROZEN	WHOLE/DRESSD	738,947	$625,265
PINK SALMON	SALT/PICKLED	WHOLE/DRESSD	2,396	$10,215
CHUM SALMON	FRESH	WHOLE/DRESSD	72,633	$42,891
CHUM SALMON	FROZEN	WHOLE/DRESSD	1,044,852	$1,302,551
CHUM SALMON	CAN-SMOKED	WHOLE/DRESSD	24	$58
SHEEFISH	FROZEN	WHOLE/DRESSD	803	$281
SABLEFISH	FROZEN	WHOLE/DRESSD	23,000	$23,000
RAZOR CLAMS	FRESH	WHOLE/DRESSD	400	$750
WTHRRN SCALL	FROZEN	WHOLE/DRESSD	22,103	$50,837
DUNGENESS CRAB	FROZEN	WHOLE/DRESSD	546	$683
DUNGENESS CRAB	FROZEN	SECTION/TAIL	254	$276
DUNGENESS CRAB	FROZEN	MEAT	20,409	$71,000
GEN KING CRAB	FROZEN	WHOLE/DRESSD	10,732	$26,451
GEN KING CRAB	FROZEN	SECTION/TAIL	6,424,819	$19,549,774
GEN KING CRAB	FROZEN	MEAT	15,141	$81,726
TANNER CRAB	FROZEN	SECTION/TAIL	1,906,516	$1,984,243
TANNER CRAB	FROZEN	MEAT	431,584	$1,278,779
GENERAL SHRIMP	FROZEN	WHOLE/DRESSD	537	$5,229

UNIDENTIFIED OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
GENERAL SHRIMP	FROZEN	SECTION/TAIL	197,718	$386,736
UNIDENTIFIED OWNERSHIP			25,433,301	$48,465,832

CANADIAN-U.S. OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
PACIFIC COD	FRESH	WHOLE/DRESSD	1,771	$2,213
PACIFIC COD	FROZEN	WHOLE/DRESSD	111,454	$60,610
PACIFIC COD	BYPRODUCTS	BAIT	962	$635
LING COD	FRESH	WHOLE/DRESSD	91	$123
ROCKFISH	FRESH	WHOLE/DRESSD	3,068	$3,681
OCTOPUS	FROZEN	BAIT	598	$646
HALIBUT	FRESH	WHOLE/DRESSD	41,030	$81,613
HALIBUT	FROZEN	WHOLE/DRESSD	4,128,878	$5,629,592
HALIBUT	BYPRODUCTS	MEAL	15,300	$2,[illegible]
HALIBUT	BYPRODUCTS	OIL	9,075	$1,361
HERRING	FROZEN	WHOLE/DRESSD	2,791,202	$1,418,498
HERRING	BYPRODUCTS	MEAL	259,800	$50,141
HERRING	BYPRODUCTS	OIL	55,566	$8,335
HERRING EGGS KP	SALT/PICKLED	ROE	169,673	$289,038
BAIT HERRING	FROZEN	BAIT	913,762	$133,719
HERRING EGGS	FROZEN	ROE	897,639	$887,560
HERRING EGGS	SALT/PICKLED	ROE	155,010	$757,828
GENERAL SALMON	FRESH	ROE	262,878	$977,451
GENERAL SALMON	FROZEN	ROE	1,205,088	$5,270,099
GENERAL SALMON	SALT/PICKLED	ROE	1,364,224	$5,313,755
GENERAL SALMON	SMOKE/KIPPER	ROE	32,274	$112,959
KING SALMON	FRESH	WHOLE/DRESSD	247,165	$451,929
KING SALMON	FROZEN	WHOLE/DRESSD	1,555,386	$4,276,108
KING SALMON	SALT/PICKLED	WHOLE/DRESSD	59,210	$166,745
KING SALMON	SMOKE/KIPPER	WHOLE/DRESSD	100	$560
KING SALMON	MILD CURED	WHOLE/DRESSD	217,636	$184,564
KING SALMON	CAN-CONV	WHOLE/DRESSD	300,363	$647,504
KING SALMON	CAN-SMOKED	WHOLE/DRESSD	240	$1,350
RED SALMON	FRESH	WHOLE/DRESSD	788,157	$1,419,830
RED SALMON	FROZEN	WHOLE/DRESSD	5,921,675	$10,172,617
RED SALMON	SMOKE/KIPPER	WHOLE/DRESSD	3,000	$12,000
RED SALMON	CAN-CONV	WHOLE/DRESSD	19,427,700	$41,096,171
RED SALMON	CAN-SMOKED	WHOLE/DRESSD	1,200	$6,250
RED SALMON	BYPRODUCTS	BAIT	82,873	$74,580
RED SALMON	BYPRODUCTS	MEAL	390,900	$59,026
COHO SALMON	FRESH	WHOLE/DRESSD	24,902	$45,556
COHO SALMON	FROZEN	WHOLE/DRESSD	2,793,003	$5,407,316
COHO SALMON	SALT/PICKLED	WHOLE/DRESSD	405	$243
COHO SALMON	CAN-CONV	WHOLE/DRESSD	390,491	$605,344
COHO SALMON	CAN-SMOKED	WHOLE/DRESSD	720	$3,750
PINK SALMON	FRESH	WHOLE/DRESSD	51,432	$39,006
PINK SALMON	FRESH	ROE	4	$231
PINK SALMON	FROZEN	WHOLE/DRESSD	1,210,739	$598,277
PINK SALMON	SALT/PICKLED	WHOLE/DRESSD	403	$22
PINK SALMON	SMOKE/KIPPER	WHOLE/DRESSD	700	$1,400

CANADIAN-U.S. OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
PINK SALMON	CAN-CONV	WHOLE/DRESSD	21,258,534	$28,504,258
PINK SALMON	CAN-SMOKED	WHOLE/DRESSD	420	$2,000
CHUM SALMON	FRESH	WHOLE/DRESSD	507,610	$625,379
CHUM SALMON	FRESH	ROE	3	$173
CHUM SALMON	FROZEN	WHOLE/DRESSD	3,999,894	$5,341,108
CHUM SALMON	SALT/PICKLED	WHOLE/DRESSD	15,341	$9,205
CHUM SALMON	SMOKE/KIPPER	WHOLE/DRESSD	1,410	$5,960
CHUM SALMON	MILD CURED	WHOLE/DRESSD	68,794	$28,375
CHUM SALMON	CAN-CONV	WHOLE/DRESSD	8,589,657	$10,752,957
CHUM SALMON	CAN-SMOKED	WHOLE/DRESSD	720	$3,450
CHUM SALMON	BYPRODUCTS	OIL	144,425	$20,653
SHEEFISH	FRESH	WHOLE/DRESSD	632	$465
SABLEFISH	FROZEN	WHOLE/DRESSD	150,661	$118,637
RAZOR CLAMS	FROZEN	WHOLE/DRESSD	3,000	$2,708
ABALONE	FRESH	WHOLE/DRESSD	150	$668
DUNGENESS CRAB	FRESH	WHOLE/DRESSD	12,023	$12,575
DUNGENESS CRAB	FRESH	SECTION/TAIL	3,624	$8,886
DUNGENESS CRAB	FROZEN	WHOLE/DRESSD	22,583	$16,900
DUNGENESS CRAB	FROZEN	SECTION/TAIL	142,003	$120,426
GEN KING CRAB	FRESH	WHOLE/DRESSD	410	$1,760
GEN KING CRAB	FRESH	SECTION/TAIL	1,520	$6,360
GEN KING CRAB	FROZEN	WHOLE/DRESSD	370,775	$1,170,119
GEN KING CRAB	FROZEN	SECTION/TAIL	25,628,562	$79,671,513
GEN KING CRAB	FROZEN	MEAT	2,999,610	$20,644,700
GEN KING CRAB	CAN-CONV	WHOLE/DRESSD	89,357	$671,802
GEN KING CRAB	CAN-CONV	MEAT	274,116	$2,178,107
TANNER CRAB	FRESH	WHOLE/DRESSD	406	$760
TANNER CRAB	FRESH	SECTION/TAIL	810	$1,530
TANNER CRAB	FROZEN	WHOLE/DRESSD	1,168,445	$1,001,283
TANNER CRAB	FROZEN	SECTION/TAIL	22,046,866	$28,668,764
TANNER CRAB	FROZEN	MEAT	2,672,924	$9,544,490
TANNER CRAB	CAN-CONV	WHOLE/DRESSD	848,719	$4,579,557
TANNER CRAB	CAN-CONV	MEAT	345,936	$1,331,571
TANNER CRAB	BYPRODUCTS	MEAL	51,600	$2,374
GENERAL SHRIMP	FRESH	WHOLE/DRESSD	33,360	$30,024
GENERAL SHRIMP	FRESH	SECTION/TAIL	15,680	$39,200
GENERAL SHRIMP	FROZEN	WHOLE/DRESSD	3,947,592	$10,658,217
GENERAL SHRIMP	FROZEN	SECTION/TAIL	2,825,320	$5,990,502
GENERAL SHRIMP	CAN-CONV	SECTION/TAIL	4,742,329	$9,018,117
GENERAL SHRIMP	CAN-CONV	MEAT	1,085,119	$3,634,157
CANADIAN-U.S. OWNERSHIP			149,958,749	$311,110,883

INDIVIDUAL OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
BOTTOM FISH GEN	FRESH	WHOLE/DRESSD	5,990	$1,038
BOTTOM FISH GEN	FRESH	BAIT	54,335	$16,614
PACIFIC COD	FROZEN	WHOLE/DRESSD	32,271	$57,560
LING COD	FROZEN	WHOLE/DRESSD	3,223	$2,256
ROCKFISH	FROZEN	WHOLE/DRESSD	14,935	$11,948
HALIBUT	FRESH	WHOLE/DRESSD	3,970	$6,678
HALIBUT	FROZEN	WHOLE/DRESSD	1,852,340	$2,843,093
HERRING	FROZEN	WHOLE/DRESSD	179,370	$69,954
HERRING	FROZEN	MEAT	282,750	$118,755
HERRING EGGS KP	FRESH	ROE	24,680	$37,020
BAIT HERRING	FROZEN	WHOLE/DRESSD	83,360	$20,840
BAIT HERRING	FROZEN	MEAT	3,099,041	$495,847
HERRING EGGS	FROZEN	ROE	2,406,275	$8,381,688
HERRING EGGS	SALT/PICKLED	ROE	23,114	$96,385
GENERAL SALMON	FRESH	ROE	50,181	$241,382
GENERAL SALMON	FROZEN	ROE	603,681	$3,450,890
GENERAL SALMON	SALT/PICKLED	ROE	389,434	$1,593,733
KING SALMON	FRESH	WHOLE/DRESSD	345,872	$618,002
KING SALMON	FROZEN	WHOLE/DRESSD	720,366	$1,815,404
KING SALMON	SALT/PICKLED	WHOLE/DRESSD	85	$357
KING SALMON	SMOKE/KIPPER	WHOLE/DRESSD	1,050	$5,535
KING SALMON	CAN-CONV	WHOLE/DRESSD	2,746	$3,481
RED SALMON	FRESH	WHOLE/DRESSD	373,202	$450,394
RED SALMON	FROZEN	WHOLE/DRESSD	2,593,325	$4,598,896
RED SALMON	SALT/PICKLED	WHOLE/DRESSD	85,407	$328,560
RED SALMON	CAN-CONV	WHOLE/DRESSD	4,833,407	$10,041,811
RED SALMON	CAN-SMOKED	WHOLE/DRESSD	48	$48
COHO SALMON	FRESH	WHOLE/DRESSD	625,360	$662,282
COHO SALMON	FROZEN	WHOLE/DRESSD	1,874,290	$3,722,038
COHO SALMON	SALT/PICKLED	WHOLE/DRESSD	13,690	$32,872
COHO SALMON	CAN-CONV	WHOLE/DRESSD	31,248	$46,410
COHO SALMON	BYPRODUCTS	MEAL	60	$36
PINK SALMON	FRESH	WHOLE/DRESSD	621	$288
PINK SALMON	FROZEN	WHOLE/DRESSD	1,024,851	$1,060,354
PINK SALMON	SALT/PICKLED	WHOLE/DRESSD	153,303	$693,006
PINK SALMON	CAN-CONV	WHOLE/DRESSD	8,297,281	$10,710,335
PINK SALMON	CAN-CONV	SECTION/TAIL	477,576	$694,077
PINK SALMON	BYPRODUCTS	MEAL	10	$5
CHUM SALMON	FRESH	WHOLE/DRESSD	1,896,361	$1,423,574
CHUM SALMON	FROZEN	WHOLE/DRESSD	1,761,768	$2,398,936
CHUM SALMON	SALT/PICKLED	WHOLE/DRESSD	117,729	$606,669
CHUM SALMON	SMOKE/KIPPER	WHOLE/DRESSD	241	$1,310
CHUM SALMON	CAN-CONV	WHOLE/DRESSD	2,982,777	$3,558,785
SMELT	FROZEN	WHOLE/DRESSD	15,225	$7,613
STEELHEAD TROUT	FROZEN	WHOLE/DRESSD	1,588	$545

RUN DATE : 11/01/79

DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

INDIVIDUAL OWNERSHIP

1977 COMMERCIAL PROCESSORS ANNUAL PRODUCTION AS OF 11/01/79

SPECIES	PROCESS	PRODUCT	WEIGHT (LBS.)	VALUE
SHEEFISH	FRESH	WHOLE/DRESSD	14	$7
WHITEFISH	FRESH	WHOLE/DRESSD	20	$5
SABLEFISH	FROZEN	WHOLE/DRESSD	112,349	$81,365
ABALONE	FRESH	WHOLE/DRESSD	3,950	$8,430
ABALONE	FRESH	CHEEK/FLETCH	2,359	$9,925
ABALONE	FROZEN	WHOLE/DRESSD	647	$2,326
DUNGENESS CRAB	FRESH	WHOLE/DRESSD	11,282	$12,586
DUNGENESS CRAB	FROZEN	SECTION/TAIL	86,067	$65,411
GEN KING CRAB	FRESH	WHOLE/DRESSD	1,937	$5,385
GEN KING CRAB	FROZEN	WHOLE/DRESSD	51,000	$52,128
GEN KING CRAB	FROZEN	SECTION/TAIL	621,281	$1,847,741
GEN KING CRAB	FROZEN	MEAT	19,452	$115,194
GEN KING CRAB	CAN-CONV	MEAT	2,517	$9,095
TANNER CRAB	FRESH	WHOLE/DRESSD	1,860	$1,183
TANNER CRAB	FROZEN	SECTION/TAIL	445,616	$367,268
TANNER CRAB	FROZEN	MEAT	272,695	$955,537
TANNER CRAB	CAN-CONV	MEAT	138,027	$621,221
GENERAL SHRIMP	FRESH	WHOLE/DRESSD	11,243	$17,518
GENERAL SHRIMP	FRESH	SECTION/TAIL	2,965	$9,095
GENERAL SHRIMP	FROZEN	WHOLE/DRESSD	483,564	$959,127
GENERAL SHRIMP	FROZEN	SECTION/TAIL	5,810	$22,808
GENERAL SHRIMP	CAN-CONV	SECTION/TAIL	1,005,512	$1,484,142
INDIVIDUAL OWNERSHIP			39,662,092	$66,090,873

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FOR REP. FRED ZHAROFF

RECOMMENDATIONS

We recommend changing language appearing in sections 10.05.250, 10.05.255, 10.05.615 and 10.05.702 from "affiliate which is a nonresident alien or a corporation whose place of incorporation is outside the United States and the percentage of outstanding shares controlled by each affiliate" to "alien affiliate and the percentage of shares controlled by each alien affiliate."

The purpose in amending this wording is to correct a situation where the statute wanders into definitional language when it is clearly unnecessary and probably confusing.

Making this change, of course, demands that a definition for "alien affiliate" replace the existing definition for "affilate." The definitions section is AS10.05.825.

Legal Services is currently drafting amendments to implement these changes.

2

In sections 10.05.615 and 10.05.702, we recommend that the present wording requiring "the name and address of a person owning at least five percent.." be revised to ask for "the name and address of each person owning at least five percent..."

The intent of the legislation creating this requirement was to elicit the names all stockholders with 5 percent or more shareholdings. The present language is at least unclear.

The Division of Banking and Securities has interpreted the law to require all 5 percent or greater shareholders. The division plans to propose legislation next session to make the above-recommended change.

Section § 10.05.702 [redacted] requires that corporations include on their annual reports "a brief statement of the character of the business in which the corporation is engaged in the state." This wording follows closely that used in the Model Business Corporation Act.

We would like the law changed so that companies are required to state their business activities in terms of the Standard Industrial Classification (SIC) Code List. This would mean that the companies would chose among the numbered items on the list those which most closely describe their actual activities.

The SIC is currently used by the Department of Revenue for descriptions of business when issuing business licenses.

The prime benefit of making this change would be to allow the Corporations Section to generate computer lists of corporations engaged in the same businesses. At present, the computer can only generate list of companies that have coincidentally used identical wording to describe their activities. In the particular case of fish processing, a wide variety of descriptions are used, including:

- buying and selling of marine products;
- salmon canning;
- fish processing;
- seafood processing, includes freezing and sale of same;
- seafood buyer;
- canning and processing of fish products;

How to select the classification nearest to your business description:

1. Select the "Division" from the list below.

DIVISION A - AGRICULTURE, FORESTRY & FISHING
DIVISION B - MINING
DIVISION C - CONSTRUCTION
DIVISION D - MANUFACTURING
DIVISION E - TRANSPORTATION, COMMUNICATIONS, ELECTRIC, GAS & SANITARY SVCS.
DIVISION F - WHOLESALE TRADE
DIVISION G - RETAIL TRADE
DIVISION H - FINANCE, INSURANCE & REAL ESTATE
DIVISION I - SERVICES
DIVISION J - PUBLIC ADMINISTRATION
DIVISION K - NONCLASSIFIABLE ESTABLISHMENTS

2. Check the sub-heading as set out under each "division" on the list.
3. Select the title under the sub-heading which best describes your business activity.
4. Write the four-digit number that appears in front of your selection in the space provided on your application beside the preprinted S.I.C. number or question #9 on non-printed application.
5. Numbers ending with 99 will indicate "nec," which means "not elsewhere classified."

DIVISION A. AGRICULTURE, FORESTRY, & FISHING

0100 Agricultural Production-Crops
- 0134 Potatoes
- 0160 Vegetables & Melons
- 0170 Fruits & Tree Nuts
- 0180 Horticultural Specialties
- 0190 General Farms

0200 Agricultural Production-Livestock
- 0211 Beef Cattle
- 0213 Hogs
- 0214 Sheep & Goats
- 0219 General Livestock
- 0240 Dairy Farms
- 0250 Poultry & Eggs
- 0270 Animal Specialities
- 0271 Fur Animals & Rabbits
- 0272 Horses & Other Equines

0700 Agricultural Services
- 0710 Soil Preparation Services
- 0729 Crop Services
- 0722 Crop Harvesting
- 0729 General Crop Services
- 0740 Veterinary Services
- 0741 Veterinary Svcs, Farm Livestock
- 0752 Animal Specialty Services
- 0780 Landscape & Horticultural Svcs.
- 0781 Landscape Counseling & Planning
- 0782 Lawn & Garden Services

0800 Forestry
- 0820 Forest Nurseries
- 0850 Forest Services

0900 Fishing, Hunting, & Trapping
- 0910 Commercial Fishing
- 0912 Finfish
- 0913 Shellfish
- 0919 Misc. Marine Products
- 0920 Fish Hatcheries & Preserves
- 0970 Hunt, Trap, Game Propagation

DIVISION B. MINING

1000 Metal Mining
- 1010 Iron Ores
- 1020 Copper Ores
- 1030 Lead & Zinc Ores
- 1040 Gold & Silver Ores
- 1080 Metal Mining Services
- 1099 Metal Ores, nec.

1100 Anthracite Mining

1200 Bituminous Coal & Lignite Mining

1300 Oil & Gas Extraction
- 1310 Crude Petroleum & Natural Gas
- 1320 Natural Gas Liquids
- 1380 Oil & Gas Field Services
- 1381 Drilling Oil & Gas Wells
- 1382 Oil & Gas Exploration Services
- 1389 Oil & Gas Field Services, nec.

1400 Nonmetallic Minerals, Except Fuels
- 1410 Dimension Stone
- 1420 Crushed & Broken Stone
- 1440 Sand & Gravel
- 1450 Clay & Related Minerals
- 1470 Chemical & Fertilizer Minerals
- 1490 Misc. Nonmetallic Minerals
- 1499 Nonmetallic Minerals, nec.

DIVISION C. CONSTRUCTION

1500 General Building Contractors
- 1520 Residential Bldg Construction
- 1522 Residential Construction, nec.
- 1530 Operative Builders
- 1540 Nonresidential Bldg. Construction
- 1542 Nonresidential Construction, nec.

1600 Heavy Construction Contractors
- 1610 Highway & Street Construction
- 1620 Heavy Construction, Except Highway
- 1622 Bridge, Tunnel, & Elevated Highway
- 1623 Water, Sewer, & Utility Lines
- 1629 Heavy Construction, nec.

1700 Special Trade Contractors
- 1710 Plumbing, Heating, Air Conditioning
- 1720 Painting, Paper Hanging, Decorating
- 1730 Electrical Work
- 1740 Masonry, Stonework, & Plastering
- 1750 Carpentering & Flooring
- 1751 Carpentering
- 1752 Floor Laying & Floor Work, nec.
- 1760 Roofing & Sheet Metal Work
- 1770 Concrete Work
- 1780 Water Well Drilling
- 1790 Misc. Special Trade Contractors
- 1799 Special Trade Contractors, nec.

DIVISION D. MANUFACTURING

2000 Food & Kindred Products
- 2010 Meat Products
- 2020 Dairy Products
- 2030 Preserved Fruits & Vegetables
- 2040 Grain Mill Products
- 2050 Bakery Products
- 2060 Sugar & Confectionary Products
- 2070 Fats & Oils
- 2080 Beverages
- 2082 Malt Beverages
- 2084 Wines, Brandy & Spirits
- 2085 Distilled Liquor, Except Brandy
- 2086 Bottled and Canned Soft Drinks
- 2087 Flavoring Extracts & Syrups, nec.
- 2090 Misc. Foods & Kindred Products
- 2091 Canned & Cured Seafoods
- 2092 Fresh or Frozen Packaged Fish
- 2097 Manufactured Ice
- 2099 Food Preparations, nec.

2100 Tobacco Manufactures

2200 Textile Mill Products
- 2270 Floor Covering Mills
- 2280 Yarn & Thread Mills
- 2290 Misc. Textile Goods
- 2299 Textile Goods, nec.

2300 Apparel & Other Textile Products
- 2380 Misc. Apparel & Accessories
- 2390 Misc. Fabricated Textile Products

2400 Lumber & Wood Products
- 2410 Logging Camps & Contractors
- 2420 Sawmills & Planning Mills
- 2430 Millwork, Plywood, Structural
- 2440 Wood Containers
- 2450 Wood Buildings & Mobile Homes
- 2451 Mobile Homes
- 2452 Prefabricated Wood Buildings
- 2490 Misc. Wood Products
- 2499 Wood Products, nec.

2500 Furniture & Fixtures
- 2510 Household Furniture
- 2520 Office Furniture
- 2540 Partitions & Fixtures
- 2590 Misc. Furniture & Fixtures
- 2599 Furniture & Fixtures, nec.

2600 Paper & Allied Products
- 2610 Pulp Mills
- 2620 Paper Mills, Except Bldg Paper
- 2630 Paperboard Mills
- 2640 Misc. Converted Paper Products
- 2650 Paperboard Containers & Boxes
- 2660 Building Paper & Board Mills

2700 Printing & Publishing
- 2710 Newpapers
- 2720 Periodicals
- 2731 Book Publishing
- 2732 Book Printing
- 2740 Miscellaneous Publishing
- 2750 Commercial Printing
- 2760 Manifold Business Forms
- 2790 Printing Trade Services

2800 Chemicals and Like Products
- 2810 Industrial Inorganic Chemicals
- 2820 Plastics and Synthetics
- 2830 Drugs
- 2840 Soap, Cleaners, & Toilet Goods
- 2860 Industrial Organic Chemicals
- 2870 Agricultural Chemicals
- 2890 Misc. Chemicals Products

2900 Petroleum and Coal Products
- 2910 Petroleum Refining
- 2950 Paving & Roofing Material
- 2990 Misc. Petroleum & Coal Products

3000 Rubber & Misc. Plastics Products
- 3070 Misc. Plastics Products

3100 Leather and Leather Products
- 3110 Leather Tanning and Finishing
- 3130 Boot & Shoe Cut Stock & Findings
- 3140 Footwear, Except Rubber
- 3150 Leather Gloves & Mittens
- 3170 Handbags & Personal Leather Goods
- 3199 Leather Goods, nec.

3200 Stone, Clay, and Glass Products
- 3260 Pottery and Related Products
- 3270 Concrete Gypsum & Plaster Products
- 3280 Cut Stone & Stone Products
- 3299 Nonmetallic Mineral Products, nec.

3300 Primary Metal Industries

3400 Fabricated Metal Products

3500 Machinery, Except Electrical

3600 Electric and Electronic Equipment

3700 Transportation Equipment
- 3710 Motor Vehicles & Equipment
- 3720 Aircraft & Parts
- 3730 Ship & Boat Building & Repairing
- 3750 Motorcycles, Bicycles, & Parts
- 3790 Misc. Transportation Equipment
- 3792 Travel Trailers & Campers

3800 Instruments and Related Products

3900 Miscellaneous Manufacturing Industries
- 3910 Jewelry, Silverware, & Plated Ware
- 3911 Jewelry, Precious Metal
- 3915 Jewelers' Materials & Lapidary Work
- 3930 Musical Instruments
- 3940 Toys & Sporting Goods
- 3960 Costume Jewelry & Notions
- 3990 Misc. Manufactures

DIVISION E. TRANSPORTATION & PUBLIC UTILITIES

4000 Railroad Transportation

4100 Local & Interurban Passenger Transit
- 4110 Local & Suburban Transportation
- 4120 Taxicabs
- 4130 Intercity Highway Transportation
- 4140 Transportation Charter Service
- 4151 School Buses
- 4170 Bus Terminal & Service Facilities

4200 Trucking & Warehousing
- 4210 Trucking, Local & Long Distance
- 4220 Public Warehousing
- 4230 Trucking Terminal Facilities

4300 U.S. Postal Service

4400 Water Transportation
- 4410 Deep Sea Foreign Transportation
- 4420 Deep Sea Domestic Transportation
- 4450 Local Water Transportation
- 4454 Towing & Tugboat Service
- 4459 Local Water Transportation, nec.
- 4460 Water Transportation Services
- 4463 Marine Cargo Handling
- 4469 Water Transportation Svcs., nec.

4500 Air Transportation
- 4510 Certificated Air Transportation
- 4520 Noncertificated Air Transportation
- 4580 Air Transportation Services
- 4582 Airports & Flying Fields
- 4583 Airport Terminal Services

4600 Pipelines, Except Natural Gas
- 4610 Pipelines, Except Natural Gas
- 4612 Crude Petroleum Pipelines
- 4613 Refined Petroleum Pipelines
- 4619 Pipelines, nec.

4700 Transportation Services
- 4712 Freight Forwarding
- 4720 Transportation Arrangement
- 4780 Misc. Transportation Services

4800 Communication
- 4810 Telephone Communication
- 4820 Telegraph Communication

5

4899 Communication Service, nec.

4900 Electric, Gas & Sanitary Services
- 4911 Electric Services
- 4920 Gas Production & Distribution
- 4930 Combination Utility Services
- 4940 Water Supply
- 4950 Sanitary Services
- 4952 Sewerage Systems
- 4953 Refuse Systems

DIVISION F. WHOLESALE TRADE

5000 Wholesale Trade Durable Goods
- 5010 Motor Vehicles & Auto Equipment
- 5013 Automotive Parts & Supplies
- 5014 Tires & Tubes
- 5020 Furniture & Home Furnishings
- 5030 Lumber & Construction Materials
- 5040 Sporting Goods, Toys & Hobby Goods
- 5060 Electrical Goods
- 5070 Hardware, Plumbing & Heating Equip.
- 5080 Machinery, Equipment, & Supplies
- 5090 Misc. Durable Goods
- 5094 Jewelry, Watches, & Precious Stones
- 5099 Durable Goods, nec.

5100 Wholesale Trade-Nondurable Goods
- 5110 Paper & Paper Products
- 5122 Drugs, Proprietaries, & Sundries
- 5130 Apparel, Piece Goods, & Notions
- 5140 Groceries & Related Products
- 5150 Farm-Products Raw Materials
- 5160 Chemicals & Allied Products
- 5170 Petroleum & Petroleum Products
- 5180 Beer, Wine, & Distilled Beverages
- 5190 Misc. Nondurable Goods

DIVISION G. RETAIL TRADE

5200 Building Materials & Garden Supplies
- 5210 Lumber & Other Building Materials
- 5230 Paint, Glass, & Wallpaper Stores
- 5250 Hardware Stores
- 5260 Retail Nurseries & Garden Stores
- 5270 Mobile Home Dealers

5300 General Merchandise Stores
- 5310 Department Stores
- 5330 Variety Stores
- 5399 Misc. General Merchandise Stores

5400 Food Stores
- 5410 Grocery Stores
- 5420 Meat Markets & Freezer Provisioners
- 5430 Fruit Stores & Vegetables Markets
- 5440 Candy, Nut & Confectionary Stores
- 5450 Dairy Products Stores
- 5460 Retail Bakeries
- 5499 Misc. Food Stores

5500 Automotive Dealers & Service Stations
- 5510 New & Used Car Dealers
- 5520 Used Car Dealers
- 5530 Auto & Home Supply Stores
- 5540 Gas Service Stations
- 5550 Boat Dealers
- 5560 Recreation and Utility Trailer Dealers
- 5570 Motorcycle Dealers

5600 Apparel & Accessory Stores
- 5610 Men's & Boys' Clothing & Furnishings
- 5620 Women's Ready to Wear Stores
- 5630 Women's Accessory & Specialty Stores
- 5640 Children's & Infants' Wear Stores
- 5650 Family Clothing Stores
- 5660 Shoe Stores
- 5680 Furriers & Fur Shops
- 5699 Misc. Apparel & Accessories

5700 Furniture & Home Furnishings Stores
- 5712 Furniture Stores
- 5713 Floor Covering Stores
- 5714 Drapery & Upholstery Stores
- 5719 Misc. Home Furnishing Stores
- 5722 Household Appliance Stores
- 5730 Radio, Television, & Music Stores

5800 Eating & Drinking Places
- 5812 Eating Places
- 5813 Drinking Places

5900 Miscellaneous Retail
- 5912 Drug & Proprietary Stores
- 5920 Liquor Stores
- 5930 Used Merchandise Stores
- 5940 Misc. Shopping Goods Stores
- 5941 Sporting Goods & Bicycle Shops
- 5942 Book Stores
- 5943 Stationery Stores
- 5944 Jewelry Stores
- 5945 Hobby, Toy, & Game Shops
- 5948 Luggage & Leather Goods Stores
- 5949 Sewing, Needlework, & Piece Goods
- 5960 Nonstore Retailers
- 5961 Mail Order Houses
- 5963 Direct Selling Organizations
- 5983 Fuel Oil Dealers
- 5984 Liquefied Petroleum Gas Dealers
- 5992 Florists
- 5993 Cigar Stores & Stands
- 5994 News Dealers & Newstands
- 5999 Misc. Retail Stores, nec.

DIVISION H. FINANCE, INSURANCE, & REAL ESTATE

6000 Banking
- 6010 Federal Reserve Banks
- 6020 Commercial & Stock Savings Banks
- 6022 State Banks, Federal Reserve
- 6025 National Banks, Federal Reserve
- 6030 Mutual Savings Banks
- 6040 Trust Companies, Nondeposit
- 6050 Functions Closely Related to Banking

6100 Credit Agencies Other Than Banks
- 6110 Rediscount & Financing Institutions
- 6120 Savings & Loan Associations
- 6130 Agricultural Credit Institutions
- 6140 Personal Credit Institutions
- 6150 Business Credit Institutions
- 6160 Mortgage Bankers & Brokers

6200 Security, Commodity Brokers & Services

6300 Insurance Carriers
- 6310 Life Insurance
- 6320 Medical Service & Health Insurance
- 6330 Fire, Marine, & Casualty Insurance
- 6350 Surety Insurance
- 6360 Title Insurance
- 6370 Pension, Health, & Welfare Funds
- 6390 Insurance Carriers, nec

6400 Insurance Agents, Brokers & Service

6500 Real Estate
- 6510 Real Estate Operators & Lessors
- 6512 Nonresidential Building Operators
- 6513 Apartment Building Operators
- 6514 Dwelling Operators, exc. Apt.
- 6515 Mobile Home Site Operators
- 6530 Real Estate Agents Managers
- 6540 Title Abstract Offices
- 6550 Subdividers & Developers

6600 Combined Real Estate, Insurance, etc.

6700 Holding & Other Investment Offices
- 6710 Holding Offices
- 6720 Investment Offices
- 6730 Trusts
- 6790 Misc. Investing

DIVISION I. SERVICES

7000 Hotels, & Other Lodging Places
- 7010 Hotels, Motels, & Tourist Courts
- 7020 Rooming & Boarding Houses
- 7030 Camps & Trailer Parks

7200 Personal Services
- 7210 Laundry, Cleaning, & Garment Svcs
- 7215 Coin-op Laundry & Cleaning
- 7216 Dry Cleaning Plants, except Rug
- 7217 Carpet & Upholstery Cleaning
- 7220 Photo Studios, Portrait
- 7230 Beauty Shops
- 7240 Barber Shops
- 7250 Shoe Repair
- 7260 Funeral Service & Crematories
- 7299 Misc. Personal Services

7300 Business Services
- 7310 Advertising
- 7320 Credit Reporting & Collection
- 7330 Mailing, Reproduction, Steno
- 7333 Commercial Photography & Art
- 7340 Services to Buildings
- 7341 Window Cleaning
- 7342 Disinfecting & Exterminating
- 7349 Building Maintenance Svcs, nec.
- 7350 News Syndicates
- 7360 Personnel Supply Services
- 7370 Computer & Data Processing Svcs.
- 7390 Misc. Business Services
- 7392 Management & Public Relations
- 7393 Detective & Protective Services
- 7394 Equipment Rental & Leasing
- 7395 Photofinishing Labs
- 7399 Business Services, nec.

7500 Auto Repair, Services, & Garages
- 7512 Passenger Car Rental & Leasing
- 7538 Auto Repair Shops
- 7540 Auto Services, except Repair
- 7542 Car Washes

7600 Misc. Repair Services
- 7620 Electrical Repair Shops
- 7622 Radio & TV Repair
- 7630 Watch, Clock, & Jewelry Repair
- 7640 Reupholstery & Furniture Repair
- 7690 Misc. Repair Shops
- 7692 Welding Repair

7800 Motion Pictures
- 7810 Motion Picture Production & Services
- 7813 Motion Picture Production, except TV
- 7814 Motion Picture Production for TV
- 7819 Services Allied to Motion Pictures
- 7820 Motion Picture Dist. & Services
- 7830 Motion Picture Theaters
- 7833 Drive-In Motion Picture Theaters

7900 Amusement & Recreation Services
- 7910 Dance Halls, Studios, & Schools
- 7920 Producers, Orchestras, Entertainers
- 7929 Entertainers & Entertainment Groups
- 7932 Billiard, Pool Establishments
- 7933 Bowling Alleys
- 7940 Commercial Sports
- 7990 Misc. Amusement, Recreational Svcs.
- 7993 Coin-op Amusement Devices

8000 Health Services
- 8010 Offices of Physicians
- 8020 Offices of Dentists
- 8030 Offices of Osteopathic Physicians
- 8040 Offices of Other Helth Practitioners
- 8041 Offices of Chiropractors
- 8042 Offices of Optometrists
- 8049 Offices of Health Practitioners, nec
- 8050 Nursing & Personal Care Facilities
- 8060 Hospitals
- 8062 General Medical & Surgical Hospitals
- 8063 Psychiatric Hospitals
- 8069 Specialty Hospitals, exc. Psych.
- 8070 Medical & Dental Laboratories
- 8071 Medical Laboratories
- 8072 Dental Laboratories
- 8080 Outpatient Care Facilities
- 8090 Health & Allied Services, nec.

8100 Legal Services

8200 Educational Services
- 8210 Elementary & Secondary Schools
- 8220 Colleges & Universities
- 8230 Libraries & Information Centers
- 8241 Correspondence Schools
- 8243 Data Processing Schools
- 8244 Business & Secretarial Schools
- 8249 Vocational Schools, nec.

8300 Social Services
- 8320 Individual & Family Services
- 8330 Job Training & Related Services
- 8350 Child Day Care Services
- 8399 Social Services, nec.

8400 Museums, Botanical, Zoological Gardens

8600 Membership Organizations
- 8610 Business Associations
- 8620 Professional Associations
- 8630 Labor Organizations
- 8640 Civic & Social Associations
- 8650 Political Organizations
- 8660 Religious Organizations

8800 Private Households

8900 Miscellaneous Services
- 8910 Engineering & Architectural Svcs.
- 8920 Noncommercial Research Organizations
- 8930 Accounting, Auditing & Bookkeeping
- 8999 Services, nec.

DIVISION J. PUBLIC ADMINISTRATION

9100 Executive, Legislative, & General

9200 Justice, Public Order, & Safety

9300 Finance, Taxation & Monetary Policy

9400 Administration of Human Resources

9500 Environmental Quality & Housing

9600 Administration of Economic Programs

9700 National Security & Intl. Affairs

DIVISION K. NONCLASSIFIABLE ESTABLISHMENTS

9900 Nonclass Establishments

- village corporation; and

- fishing and processing crab in United States water and processing in Alaska water.

If the computer is used fully, standardization in areas such as this is unavoidable. Because of its existing, general use, the SIC seems the most logical choice.

The Division of Banking and Securities currently is contemplating the introduction of legislation that would drop the requirement that corporations give their stated capital. This requirement appears in 10.05.615 and 10.05.702.

Stated capital is defined as "the sum of

(A) the par value of all issued shares which have a par value,

(B) the amount of the consideration received by the corporation for all issued shares which do not have a par value, except that part of the consideration allocated to capital surplus as permitted by law, and

(C) such amounts as not included in (A) and (B) of this paragraph which have been transferred to stated capital, whether upon the issue of shares as a share dividend or otherwise, less all reductions made as permitted by law; but not withstanding the manner of designation by the laws under which a foreign corporation is organized, the stated capital of a foreign corporation is determined on the same basis and in the same manner as the stated capital of a domestic corporation for the purpose of computing charges imposed by this chapter, fees and franchise taxes..."

The stated capital requirement also derives from the Model Business Corporation Ac_, which includes it because it is a basis on which franchise and other taxes are determined. Alaska, however, does not base its franchise taxes on stated capital so it seems to serve no purpose.

Employees in the Corporations Section say the stated capital requirement is one of the most misunderstood on the annual report form. Reports often are returned so that corporations can correct their statements of capitalization.

We can discover no benefit to continuing this requirement, and therefore we would concur in the division's desire to abolish it.

We recommend that the Commissioner's office, under the authority granted him in Section 10.05.777 and related sections, begin a policy of spot checking annual reports for accuracy. We would like to see these checks focus on the alien affiliate and 5 percent ownership disclosure requirements.

We reason that without a demonstrated effort at enforcing these provisions, some corporations will not feel compelled to make the required disclosures.

Under 10.05.777, the Commissioner is empowered to require corporate officers to answer specific questions under oath, and to compel submission of such corporate documents as minutes of board of directors meetings and complete lists of stockholders. The Commissioner could choose in a more or less random fashion corporations to submit those documents and answer those questions that would verify responses appearing on the annual reports.

Without further study, we are unable to say whether initiation of a vigorous spot-checking effort is possible under current budgetary and personnel constraints.

We recommend an additional reporting requirement (in sections 10.05.615 and 10.05.702) that corporations doing business in Alaska report the names of all unincorporated businesses in which they exercise control or under whose name they do business.

Such a requirement is necessary to follow completely the trail of alien investment in Alaska. Since current alien investment disclosure laws apply only to corporations registered with the state, businesses that are essentially the unincorporated subsidiaries of alien-invested corporations are not systematically identified.

We recommend that Section 10.05.519 by amended so that a corporation can be involuntarily dissolved by the Commissioner when it is three [redacted] months delinquent in filing an annual report or paying a license fee or penalty. The law now provides that this delinquency must be six months.

Apparently the six-month period was a function of a situation that no longer exists, i.e. when dissolution of a corporation was a legal action carried out by the attorney general's office. The law has been changed so that dissolution is now an administrative procedure.

The fact that this statute has not been adjusted to reflect that change has pointlessly permitted corporations to file annual reports and pay franchise taxes as long as nine months after they are due with relatively insignificant penalties (a maximum of $32.50 for domestics and $37.50 for foreigns).

Our recommendation would reduce by three [redacted] months the period of delinquency necessary to bring about involuntary dissolution. Present law unnecessarily allows the timely and orderly processing of annual reports to be disrupted.

We also recommend that Section 10.05.675 be amended to conform with 10.06.519 by providing that the certificate of authority of a foreign corporation will be revoked within the same time frame as domestics. Current law appears to provide that foreign corporations may have their certificates of authority revoked immediately on Feb. 2 for lateness in filing an annual report or paying fees or taxes.

The present procedure in the corporations section is to treat the revocation of certificates in the same manner as the involuntary dissolutions. It appears likely that dissolutions and revocations will continue to be handled in tandem whether or not this discrepancy is addressed by statute. If it is indeed the desire of the legislature that foreign corporations' delinquencies be dealt with more speedily, and perhaps more harshly, then that wish should be communicated to the Department of Commerce and Economic Development so that policy reflects it. We recommend the following schedule:

Jan. 2 -- annual reports and tax payments of both domestic and foreign corporations due.

Feb. 2 -- annual reports and tax payments of both domestic and foreign corporations delinquent.

March 1 -- foreign and domestic corporations whose annual reports or tax payments are still overdue are mailed letters warning that they will be dissolved or have their certificates of authority revoked in 60 days if they are still not in compliance with the law. (This now occurs on Aug. 30.)

May 1 -- if their annual reports or tax payments are still delinquent, domestic corporations are dissolved involuntarily and foreign corporations have their certificates of authority revoked. (This now occurs on Oct. 30.)

The Commissioner of Commerce and Economic Development is considering a revision of corporations law that would provide for bi-annual reports for business corporations instead of the present annual reports. We are unable to evaluate the effect of such a change on foreign investment data gathering until we have a chance to examine the proposal in detail. We are waiting for circumstances to permit such a review.

Foreign Investments

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT

DIVISION OF BANKING, SECURITIES, SMALL LOANS & CORPORATIONS

POUCH D
JUNEAU, ALASKA 99811

August 24, 1979

Honorable Fred F. Zharoff
Chairman, Foreign
Investment Committee
Box 405
Kodiak, Alaska 99615

Dear Mr. Zharoff:

Enclosed is a copy of the letter recently sent to Alaska Star, Inc., regarding disclosure of its alien affiliates.

While this office does not have the manpower to conduct extensive research of the information provided on the annual reports, I am willing to work with your committee in any way possible. The research of Mr. Pat Dougherty was most helpful in this regard.

We will continue to send you copies of letters similar to the one enclosed as they are sent to the corporations.

If I can be of further assistance, please feel free to contact me.

Sincerely,

Julius J. Brecht

Julius J. Brecht
Director

JJB:aw

Enclosure

08-H14LH

STATE OF ALASKA
DEPARTMENT OF COMMERCE
& ECONOMIC DEVELOPMENT
BANKING & SECURITIES
POUCH D
JUNEAU, ALASKA 99811

September 25, 1979

Mr. Robert M. Thorstenson
President
Icicle Seafoods, Inc.
1569 N.W. 167th Street
Seattle, Washington 98177

Dear Sir:

It has come to our attention that your 1978 annual report may have been deficient.

Specifically, do you have any stockholders who own at least 5% of the company's outstanding stock other than R. M. Thorstenson, T. E. Thompson, Gordon Jensen and Magnus Marters?

It may be helpful for you to review the statutes governing disclosure of 5% shareholders (AS 10.05.702 (8)). You should also be aware of the sanctions which may be imposed for failure to disclose this information (AS 10.05.519).

Your timley attention to clearing up this matter will be appreciated.

Sincerely,

Julius J. Brecht
Director

JJB/tb2/2

cc: Jan Clemetson, Supervisor
Corporations
Section

bcc: Rep. Fred F. Zharoff
Chairman, Foreign
Investments Committee

August 22, 1979

Mr. Robert M. Thorstenson
Alaska Star, Inc.
1569 Northwest 167th
Seattle, Washington 98177

Dear Mr. Thorstenson:

It has come to our attention that your 1978 annual report may have been filled out incorrectly.

Specifically, you reported that A. S. Kawabe Company is the only alien affiliate of Alaska Star, Inc. Our files, however, show that Icicle Seafoods, an 80% owner of Alaska Star, Inc., owns jointly with Mitsubishi International, a company called Sitka Sound Seafoods. If this is indeed the case, the Japanese firm Mitsubishi International should be disclosed as an alien affiliate of Alaska Star, Inc.

It may be helpful for you to review the statutes governing disclosure of alien affiliates (AS 10.05.702 and 10.05.825 including amendments in 1975 and 1976, and definitions) since they are far-reaching in terms of the information that must be reported. You should also be aware of the sanctions which may be imposed for failure to disclose this information (AS 10.05.519).

Your timely attention in clearing up this matter will be appreciated. Please reply directly to the Corporations Section w thin this division.

Sincerely,

Julius J. Brecht
Director

JJB/cwWl
cc: Jan Clemetson, Supervisor
Corporation Section
bcc: Representative Fred F. Zharoff
Chairman, Foreign Investments Committee

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5254

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

March 18, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Robert L. Burgner, Director
College of Fisheries
260 Fisheries Center
University of Washington
Seattle, Washington 98195

Dear Mr. Burgner:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy. Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

College of Fisheries
Fisheries Research Institute

11 March 1980

Mr. F.F. Zharoff, Chairman
House Interim Committee on Foreign Investment
Alaska Legislature
Juneau, AK 99801

Dear Mr. Zharoff:

It would be very much appreciated if you could send me one copy of the following:

Eliason, R.I., and W. Miles. 1980. Foreign investment in the Alaska seafood industry. Frank Orth & Assocs., Inc., and W. Patrick Daugherty, Inc.

I am directly involved in supervising research on Alaska fisheries, and am a scientist member of the International North Pacific Fisheries Commission and a member of the Scientific and Statistical Committee of the North Pacific Fishery Management Council.

Thank you for your attention.

Yours very truly,

Robert L. Burgner

Robert L. Burgner
Director

RLB:as

280 Fisheries Center / Telephone: (206) 543-4650

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4966
465-4951

House of Representatives

March 18, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Wendy Reed
1509 8th Ave. West
Seattle, Washington 98119

Dear Ms. Reed:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Please find enclosed the requested copy of the report. Feel free to comment on this report or related areas of interest.

Sincerely yours,

Lynn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4996
465-4951

House of Representatives

March 25, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Tom Radcliffe
880 Larch St.
Eugene, Oregon 97405

Dear Mr. Radcliffe:

Thank you for expressing your interest in the interim committee report on "Foreign Investment in the Alaska Seafood Industry". Enclosed please find the requested copy. Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Good luck with your studies -

[illegible]
FRED F. ZHAROFF
P.O. Box 406
Kodiak, Alaska 99615
(907) 486-5284

[illegible]
Pouch V
Juneau, Alaska
99811
(907) 465-4996
465-4951

House of Representatives

March 11, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Kurt Grimmer
Washington State Department
of Commissions
312 First Avenue N.
Seattle, Washington 98109

Dear Mr. Grimmer:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy of the report and we apologize for the delay in waiting for the second printing. If you have any comments on this report or other related areas, please do not hesitate to express them to us. Thank you.

Sincerely yours,

Lina M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

March 11, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Jenice Valbert
1425 Bank of California
900 4th Ave.
Seattle, Washington 98164

Dear Ms. Valbert:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy and we apologize for the delay due to re-printing. Please feel free to comment on this report or related areas. Thank you.

Sincerely yours,

Lynn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5284

[illegible]
Pouch V
Juneau, Alaska
99811
(907) 465-4066
465-4061

House of Representatives

March 11, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Intersea Fisheries, Ltd.
4225-23rd Ave. W.
Seattle, Washington 98199

Attention: B.E. Gilman, Vice President

Dear Mr. Gilman:

Thank you for expressing an interest in the interim committee report on Foreign Investment is the Alaska Seafood Industry. Enclosed are the requested copies o. the report. Please feel free to comment on this report or related areas. Thank you.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5284

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

March '1, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Jeff Hendrix and Associates
P.O. Box 190
Anacortes, Washington 98221

Dear Mr. Hendrix and Associates:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy and we apologize for the delay brough on by re-copying. Please feel free to comment on this report or related areas. Thank you.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Representative
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

March 11, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Main Hurdman and Cranston
P.O. Box 21805
Seattle, Washington 98111

Attention: Marilyn

Dear Marilyn:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy and we apologize for the delay that was brought on by a second printing. Please feel free to comment on this report or related areas. Thank you.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

[illegible]
FRED F. ZHAROFF
P.O. BOX 406
KODIAK, ALASKA 99615
(907) [illegible]

[illegible]
POUCH V
JUNEAU, ALASKA
[illegible]
(907) [illegible]
[illegible]

House of Representatives

February 27, 1980

DISTRICT 14:

CELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Fuji Bank Limited
1001 4th Ave
C-First Bldg., Suite 3630
Seattle, Washington 98154

Attn: Mr. T. Sakemi

Dear Mr. Sakemi:

Enclosed please find the request copy of the interim committee report on Foreign Investment in the Alaska Seafood Industry. Thank you for informing us of your interest. Please feel free to send us your comments on this report or related matters.

Sincerely yours,

Linn M. Smith

for Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

February 26, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Geoff Meggs
138 E. Cordova St.
Vancouver, B.C.
Canada V6A1K9

Dear Mr. Meggs:

Thank you for expressing your interest in the Interim Committee report on <u>FOREIGN INVESTMENT IN THE ALASKA SEAFOOD INDUSTRY</u> through Roger Painter of the <u>ALASKA FISHERMEN</u>.

Enclosed please find the requested copy of the report. We hope that it will be of use to you. Please feel free to give us your comments on the report or on related matters. Thank you.

Sincerely yours,

Linn M. Smith

for Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
KODIAK, [illegible]ASKA [illegible]
(9[illegible]) [illegible]-5254.

[illegible]
POUCH V
JUNEAU, ALASKA
99811
(907) [illegible]
[illegible]

House of Representatives

February 26, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Craig Bartlett
Fishermen's News
C3 Bldg., Rm 110
Fishermen's Terminal
Seattle, Washington 98119

Dear Mr. Bartlett:

Thank you for expressing your interest in the Interim Committee report on Foreign Investment in the Alaska Seafood Industry.

Enclosed please find the requested copy of the report, and the legislation that was forthcoming. At this point, House Bill 767 is the only bill which is directly related to the report.

We hope this information will be of use to you. Please feel free to comment on this report, H.B. 767, or related matters. Thank you.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4988
465-4951

House of Representatives

March 3, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Michael Parker, Office Manager
Pacific Fishing
2208 N.W. Market St.
Seattle, Washington 98107

Dear Mr. Parker:

Thank you for informing us of your interest in the interim report on Foreign Investment in the Alaska Seafood Industry.

Because of the great demand for this report, we have run out of copies made in the first printing. A second printing is underway, and when it is completed we will mail the requested copy.

Once again, thank you.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff, Chairman
Interim Committee on Foreign Investment

FFZ:lms

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX [illegible]
KODIAK, ALASKA 99615
(907) 486-5254

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

February 28, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Mr. Alan MacNow
Tele-Press
342 E. 79th St.
New York City, N.Y. 10021

Dear Mr. MacNow:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry.

Enclosed please find the request copies of the study. Please feel free to comment on this report or related matters. Thank you.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff, Chairman
Interim Committee on Foreign
Investments in the Alaska
Seafood Industry

FFZ:lms

Enclosure

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX [illegible]
KODIAK, ALASKA [illegible]
(907) [illegible]

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
[illegible]
(907) [illegible]
[illegible]

House of Representatives

March 3, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Professor Ole A. Mathisen
University of Washington
College of Fisheries
Fisheries Research Institute
260 Fisheries Center
Seattle, Washington 98195

Dear Professor:

Thank you for expressing your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry.

Because of the great demand for this report, we have run out of copies made in the first printing. A second printing is underway, and when it is completed we will mail the requested copy.

Once again, thank you.

Sincerely yours,

Lenin M. Smith

for: Fred F. Zharoff, Chairman
Interim Committee on
Foreign Investment

FFZ:lms

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5254

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

February 25, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Dr. Robert L. Stokes
Institute for Marine Studies
University of Washington, HA-35
3731 University Way Northeast
Seattle, Washington 98105

Dear Dr. Stokes:

As per your request through Frank Orth and Associates, please find enclosed a copy of the "Foreign Investment in the Alaska Seafood Industry" interim committee report. Please feel free to submit to us any comments you may have on this study or related matters. Thank you for your interest.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5284

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

February 25, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Dr. James Bray
Division of Marine Resources
3716 Brooklyn Avenue Northeast
Seattle, Washington 98105

Dear Dr. Bray:

As per your request through Frank Orth and Associates, please find enclosed a copy of the "Foreign Investment in the Alaska Seafood Industry". Please feel free to submit to us any comments you may have on this study. Thank you for your interest.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5284

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

February 25, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Mr. Roger W. Johnson
216 First Avenue South
260 Grand Central on the Park
Seattle, Washington 98104

Dear Mr. Johnson:

As per your request through Frank Orth and Associates, please find enclosed a copy of the "Foreign Investment in the Alaska Seafood Industry" interim committee report. Please feel free to submit to us any comments you may have on this study. Thank you for your interest.

Sincerely yours,

Fred F. Zharoff

Fred F. Zharoff
District 14 Representative

FFZ:lms

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

April 22, 1980

DISTRICT 14:
Bellsflats
Chiniak
Kodiak
Ouzinkie

Western Alaska Fisheries
2020 Bank of California Center
900 4th Ave.
Seattle, Washington 98165

Attention: Kris

Dear Kris:

Thank you for expressing an interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy of the report.

Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

AMERICAN PRESIDENT LINES, LTD.

P.O. BOX C81411 • SEATTLE, WA 98108

March 3, 1980

Mr. Fred F. Zaroff
State Representative, District 14
Pouch V State Capitol
Juneau, Alaska

Dear Representative Zaroff:

I would like to ask if you would please send me a copy of the report done by Frank Orth and Associates, Inc. on the Japanese interests in Alaska seafood processors. This report would be helpful to me in keeping track of which Japanese trading companies are involved in which plants in Alaska.

I am sure that you are aware that American President Lines is making a sizeable investment in Alaska to serve the seafood industry. Since March, 1979 we have started service in both Kodiak and Dutch Harbor. We will complete the new terminal facility in Dutch Harbor later this month which will give Dutch Harbor the most modern ocean transportation facilities west of Kodiak. We can ship only export cargo to the Far East at this time but have hopes of securing domestic authority in the near future to provide additional service to Kodiak and the Aleutian Chain.

Sincerely,

James D. Weimer
James D. Weimer
Manager, Alaska Sales

JDW:ms

15

Intersea Fisheries, Ltd.
4225 - 23rd Ave. W.
Seattle, Washington 98199
(206) 285-5630
Telex: 32-1256

March 6, 1980

Mr. Fred Zharoff
District #14
Pouch V
State of Alaska
Juneau, Alaska 98111

Dear Mr. Zharoff:

Please consider this a request for three copies of the study on Japanese control of the Northwest and Alaska seafood processing industry as completed by Frank Orth & Associates.

I understand the study was made public a week ago and copies are now available.

Thank you,

INTERSEA FISHERIES, LTD.

B. E. Gilman

B. E. Gilman
Vice-President

KR

UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON 98195

College of Fisheries
Fisheries Research Institute

26 February 1980

Mr. F. F. Zharoff, Chairman
House Interim Committee on Foreign Investment
Alaska Legislature
Juneau, Alaska 99801

Dear Mr. Zharoff:

I am asking if you would be kind enough to send me a copy of

R. I. Eliason and W. Miles: "Foreign Investment in the Alaska Seafood Industry", Frank Orth and Associates Inc. and W. Patrick Daugherty Inc. 1980.

The reason is my 34 years' involvement in salmon research in Bristol Bay.

Sincerely yours,

Ole A. Mathisen

Ole A. Mathisen
Professor

OAM:lcs

260 Fisheries Center / Telephone: (206) 543-4650

[illegible]
Seattle, Washington 98107
(206) 789-5333

Pacific Fishing

February 26, 1980

Fred F Zharoff
Pouch V
State Capitol
Juneau, AK 99811

Dear Mr. Zharoff,

Pacific Fishing is a new commercial fishing magazine serving the U.S. west coast. We are interested in obtaining a copy of the study, Foreign Investment in the Alaska Seafood Industry.

Could you please send a copy to the above address? If there is any charge the invoice should be sent to the same address.

Thanking you in advance,

Michal Parker

Michal Parker
Office Manager

WEST COAST FISHERIES DEVELOPMENT FOUNDATION
720 S.W. Washington, Suite 418
Portland, Oregon 97205
Phone (503) 222-3518

WILLIAM S. JENSEN
Executive Director

2-29-80

Dear Mr. Zhoroff,

Thank you for sending a copy of the Orth study of foreign ownership. Attached are title sheets of the two Canadian studies I mentioned to you. If you contact: Mr John Allan
Ministry of the Environment
Parliament Building
Victoria, British Columbia
Canada

I am sure that he can obtain copies for you. If this office can ever be of assistance, please don't hesitate to contact us.

Sincerely,
Bill Jensen

An Economic Study

of the

STRUCTURE OF THE BRITISH

COLUMBIA SALMON INDUSTRY

by MARVIN SHAFFER, Ph.D.

Consulting Economist

April 1979

 This study was prepared under contract for the Salmonid Enhancement Program, 1090 West Pender Street, Vancouver, B. C. V6E 2P1. Financing, technical guidance and coordination of government agency review were provided jointly by the Department of Fisheries and Oceans Canada and the British Columbia Ministry of Environment.

FOREIGN INVESTMENT IN

BRITISH COLUMBIA FISH PROCESSING

Prepared for British Columbia Ministry of Environment

by

Quadra Economic Consultants Ltd.

in association with

McDaniels Research Ltd.

Aug 1979

HOKUYO SUISAN COMPANY, LTD.

Seattle Representative Office
KUNIO ADACHI
2715 48th Avenue S. W.
Seattle, Washington 98116
Tel. (206) 932-2431
Telex: 32-8048

Home Office
9-13 7 - Chome Tsukiji
Chuo-Ku, Tokyo, Japan
Tel. (03) 542-2571
Telex: 252-2987

March 9, 1980

Mr. Fred Zharoff

Pouch 5 - V
State Capital
Juneau, Alaska 99811

Dear Mr. Zharoff

In this writing, I would count on your kindness and courtesy. Will you kindly send me two copies of " FOREIGN INVESTMENT IN THE ALASKA SEAFOOD INDUSTRY ", prepared by Frank Orth & Associates, Inc. and W. Patrick Dougherty, January, 1980.

I enclose a self-addressed label. Please send me a bill for your cost.

Sincerely yours,

Kunio Adachi

Kunio Adachi

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4968
465-4951

House of Representatives

March 24, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

John Allan, Economist
Ministry of Environment
Parliament Buildings
Victoria, British Columbia
CANADA V8V 1X4

Dear Mr. Allan:

Thank you for sending the requested copies of your reports. Please find enclosed a copy of the interim report on "Foreign Investment in the Alaska Seafood Industry". I hope that it will be of some use to you.

Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Fred F. Zharoff
Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Province of
British Columbia

Ministry of
Environment

Parliament Buildings
Victoria
British Columbia
V8V 1X4

March 16/80

Fred F. Zharoff

Chairman

Interim Committee on Foreign Investment

Dear Mr. Zharoff,

Please find enclosed copies of the reports requested in your letter of March 4, 1980

Thank you for your offer to send a copy of the report, "Foreign Investment in the Alaska Seafood Industry." I would very much like to receive this report.

Please excuse my handwriting. I am about to take two weeks of annual leave and wanted to get these reports in the mail as soon as possible.

Perhaps we might exchange future reports and ideas on foreign investment in our respective fisheries.

John Allan
Economist.

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5284

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4986
465-4951

House of Representatives

March 28, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Y. Takaguchi, Director, Secretary
Nippon Suisan (U.S.A.), INC.
3718 Seattle - 1st National Bank Bldg.
1001 - 4th Avenue
Seattle, Washington 98154

Dear Mr. Takaguchi:

Thank you for your letter of March 25, 1980 in which you indicate your interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed are the two (2) copies you requested. Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Linn M. Smith

for Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

[illegible] 25, [illegible]

Mr. Fred [illegible]
[illegible]
[illegible]
State of [illegible]
Juneau, [illegible]

Dear Sir:

We were given your name and address by an associate of [illegible] in regard to [illegible] a volume which you have on hand.

The name of the volume is: [illegible] IN THE ALASKA [illegible] INDUSTRY. Prepared [illegible] House [illegible] Committee on Foreign [illegible] of the [illegible] Prepared by: Frank Orr [illegible] Associates, Inc. and [illegible] Dougherty. January, 195[illegible]

We would like to order [illegible] of the above mentioned. If there are [illegible] charges, please invoice us for same.

Thank you very much for your attention to this matter.

Sincerely,

[illegible] BUREAU [illegible], INC.

[illegible]
[illegible], Secretary

[illegible]

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5284

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4966
465-4931

House of Representatives

April 16, 1980

DISTRICT 14:

Bellsflats
Chiniak
Kodiak
Ouzinkie

Dr. Paul Anton, Dep. Director
Dept. of Commerce & Economic Development
State of Washington
General Administration Bldg.
Olympia, Washington 98504

Dear Dr. Anton:

Thank you for your letter of March 19, 1980 in which you express an interest in the interim report on "Foreign Investment in the Alaska Seafood Industry". Enclosed is the requested copy.

Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Lenin M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

STATE OF WASHINGTON
Dixy Lee Ray
Governor

DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT
General Administration Building, Olympia, Washington 98504
206/753-5630

March 19, 1980

Representative Fred Zharoff
Pouch B
Juneau, AK 99811

Dear Representative Zharoff:

I am interested in obtaining a recent study done by Frank Orth and Associates for the Alaska Legislature entitled "Foreign Ownership of Alaskan Fish Processing Firms."

Could you please forward this publication to me along with any charges that might be acquired.

Sincerely,

Dr. Paul Anton
Deputy Director

PA:34/111

REPRESENTATIVE
FRED F. ZHAROFF
P.O. Box 405
Kodiak, Alaska 99615
(907) 486-5254

While in Juneau
Pouch V
Juneau, Alaska
99811
(907) 465-4906
465-4951

House of Representatives

April 16, 1980

DISTRICT 14:
Bellsflats
Chiniak
Kodiak
Ouzinkie

Andrea G. Coffman, Librarian
Ocean and Coastal Law Center
School of Law
University of Oregon
Eugene, Oregon 97403

Dear Ms. Coffman:

Thank you for expressing your interest in the interim committee report on "Foreign Investment in the Alaska Seafood Industry". Enclosed is the requested copy.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Ocean and Coastal Law Center
School of Law
UNIVERSITY OF OREGON
Eugene, Oregon 97403

503/686-3845

April 7, 1980

Chairman
House Interim Committee on Foreign Investment
Alaska Legislature
Pouch V
State Capitol
Juneau, Alaska 99811

Dear Sir or Madam:

The Ocean and Coastal Law Center would appreciate receiving a copy of the following publication(s) for our library:

FOREIGN INVESTMENT IN THE ALASKA SEAFOOD INDUSTRY. Prepared by Frank Orth and Assoc., Inc., Jan 1980, for The Committee

We are part of the Oregon State University Sea Grant Program sponsored by NOAA. If there is a charge for the publication(s), please send an invoice. However, if the price is more than $5.00 for any one publication, please notify us of the cost before sending the publication.

Thank you very much.

Sincerely,

Andrea G. Coffman

Andrea G. Coffman
Librarian

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5284

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

May 7, 1980

DISTRICT 14:

BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

Mr. John Bishop
National Marine Services
Statistics and Market News Office
100 Westlake Ave. N, Rm. 732
Seattle, Washington 98109

Dear Mr. Bishop:

Thank you for expressing an interest in the interim committee report on Foreign Investment in the Alaska Seafood Industry. Enclosed is the requested copy. Please feel free to comment on this report or related areas of interest.

Sincerely yours,

Linn M. Smith

for: Fred F. Zharoff
District 14 Representative

FFZ:lms

Enclosure

Foreign Inves

The following is a list of names that you requested who would be interested in recieving a copy of the Interim Committee Report on Foreign Investments:

United Fishermans Marketing Assoc.
Jeff Stephans, Manager
P.O. Box 1035

Shrimp Trawlers Assoc.
Al Burch, Manager
P.O. Box 991

Marine Advisory Program
Hank Pennington
Pouch K
Kodiak, Ak.

Kodiak Island Borough
Gary Hovanec, Manager
P.O. Box 1246

City of Kodiak
Clair Harmony, Manager
P.O. Box 1397

Kodiak Daily Mirror
Roger Brigham, Editor
P.O. Box 1307

KMXT, FM
Lin Stafford, News Director
P.O. Box 484

Kadiak Times
Nell Waage, Editor
P.O. Box 2368

Would like to have a copy for the Information Office as well.

Will send other names as I have them. Mary Jo

LIST OF PERSONS AND ADDRESSES TO WHOM ONE COPY OF FOREIGN INVESTMENT IN THE ALASKA SEAFOOD INDUSTRY SHOULD BE SENT

Dr. Robert Siegel, Economist
Economic and Marketing Research Division
National Marine Fisheries Service, NOAA
3300 Whitehaven Street N.W.
Washington, D.C. 20235

Representative Les AuCoin
721 House Annex #1
Washington, D.C. 20515
ATTN: Dan Panshin

Mr. Jay Hastings
610 United Pacific Building
1000 2nd Avenue
Seattle, Washington 98104

Mr. Richard Meier, Deputy Director
Office of Foreign Investment in the U.S.
U.S. Department of Commerce, Room 6093
Washington, D.C. 20230

Senator Ted Stevens
Room 260
Russell Senate Office Building
Washington, D.C. 20510
ATTN: Steve Perles

Representative Don Young
Room 1210
Longworth House Office Building
Washington, D.C. 20515
ATTN: Rod Moore

Mr. John Everett, Director
Fisheries Development Division
National Marine Fisheries Service, NOAA
3300 Whitehaven Street N.W.
Washington, D.C. 20235

Ms. Christine Dawson
Commerce Committee
126 Russell Senate Office Building
Washington, D.C. 20510

Dr. Gene Wunderlich
Senior Agricultural Economist
Economics, Statistics and Cooperative Service
G.H.I. Building, Room 402
500 - 12th Street S.W.
Washington, D.C. 20250

Mssrs. George Kruer and James Bonkamp
Bureau of Economic Analysis, Room 1518
U.S. Department of Commerce
441 G Street N.W.
Washington, D.C. 20230

Mr. Michael Grable, Chief
Financial Services Division
3300Whitehaven Street N.W.
Washington, D.C. 20235

Mrs. Virginia O'Brien, Director
Division of Foreign Costs
M-731, Room 4868
Commerce Building
Washington, D.C. 20230

Mrs. Ruth D. Appleton, Chief
Office of Tender Offers and Acquisitions
Securities and Exchange Commission
500 North Capitol Street
Washington, D.C. 20549

Ten (10) copies to:

Frank Orth & Associates, Inc.
225 - 108th Avenue N.E., Suite 311
Bellevue, Washington 98004

FRANK ORTH & ASSOCIATES

Economic and Business Consultants • 225 108th Ave. N.E., Suite 311, Bellevue WA 98004 • (206) 455-3507

February 22, 1980

TO: Representative Fred Zharoff

FROM: Peter Rogers PR

SUBJECT: Request for copies of "Foreign Investment in the Alaska Seafood Industry"

In the past few weeks, we have received three additional requests for the report. Please send one copy to each of the following persons:

Dr. James Bray
Division of Marine Resources
3716 Brooklyn Avenue Northeast
Seattle, Washington 98105

Mr. Roger W. Johnson
216 First Avenue South
260 Grand Central on the Park
Seattle, Washington 98104

Dr. Robert L. Stokes
Institute for Marine Studies
University of Washington, HA-35
3731 University Way Northeast
Seattle, Washington 98105

Thank you in advance for your cooperation in this matter.

PWR:kh

Fred – This looks good, so far as I can tell. B. Mule

IN THE HOUSE BY THE RESOURCES COMMITTEE

HOUSE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

ELEVENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to the disclosure of alien affiliates in Alaska businesses; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 10.05.250 is amended to read:

Sec. 10.05.250. REORGANIZATION; DISCLOSURE OF ALIEN <u>AFFILIATES</u> [INTERESTS]. Not less than 20 days before the consummation of a corporate reorganization the corporation which is to survive or control shall deliver to the commissioner <u>the following information:</u>

<u>(1)</u> a list of the names and addresses of each <u>alien</u> affiliate of the surviving corporation [WHICH IS A NONRESIDENT ALIEN OR CORPORATION WHOSE PLACE OF INCORPORATION IS OUTSIDE THE UNITED STATES, AND]<u>;</u>

<u>(2)</u> the percentage of outstanding shares controlled by each <u>alien</u> affiliate<u>; and</u>

<u>(3) a specific description of the nature of the affiliation between the surviving or controlling corporation and its alien affiliate</u>

* Sec. 2. AS 10.05.255(a)(3) is amended to read:

(3) the purpose or purposes for which the corporation is organized <u>and the code number from the identification code established under AS 10.05.703 which most closely describes the activity in which the corporation will initially engage</u>;

* Sec. 3. AS 10.05.255(a)(13) is amended to read:

(13) the name and address of each <u>alien</u> affiliate <u>and a specific description of the nature of the affiliation between the corporation</u>

and its alien affiliate [WHICH IS A NONRESIDENT ALIEN OR A CORPORATION WHOSE PLACE OF INCORPORATION IS OUTSIDE THE UNITED STATES].

* Sec. 4. AS 10.05.519(a)(1) is amended to read:

(1) the corporation is delinquent three [SIX] months in filing its annual report or in paying a license filing fee or penalty;

* Sec. 5. AS 10.05.519(a) is amended by adding a new paragraph to read:

(6) a misrepresentation of a material matter has been made in an application, report, affidavit, or other document submitted under this chapter.

* Sec. 6. AS 10.05.615(5) is amended to read:

(5) the purpose the corporation proposes to pursue in the transaction of business in the state and the code number from the identification code established under AS 10.05.703 which most closely describes the activity in which the corporation will engage in the state;

* Sec. 7. AS 10.05.615(12) is amended to read:

(12) the name and address of each alien affiliate, [WHICH IS A NONRESIDENT ALIEN OR A CORPORATION WHOSE PLACE OF INCORPORATION IS OUTSIDE THE UNITED STATES AND] the percentage of outstanding shares controlled by each alien affiliate, and a specific description of the nature of the affiliation between the foreign corporation and its alien affiliate; [.]

* Sec. 8. AS 10.05.702(3) is amended to read:

(3) a brief statement of the character of the business in which the corporation is engaged in the state and the code number from the identification code established under AS 10.05.703 which most closely describes the activity in which the corporation is engaged in the state;

* Sec. 9. AS 10.05.702(8) is amended to read:

(8) the name and address of each alien affiliate, [WHICH IS A

NONRESIDENT ALIEN OR A CORPORATION WHOSE PLACE OF INCORPORATION IS OUTSIDE THE UNITED STATES AND] the percentage of outstanding shares controlled by each <u>alien</u> affiliate<u>, and a specific description of the nature of the affiliation between the corporation and its alien affiliates</u>; [.]

* Sec. 10. AS 10.05 is amended by adding new sections to read:

Sec. 10.05.700. STOCKHOLDER REPORTS. A domestic corporation or foreign corporation which publishes a report to its stockholders shall submit a copy of its most recent stockholder report with the annual report required in AS 10.05.699.

Sec. 10.05.703. IDENTIFICATION CODE. The commissioner of commerce and economic development and the commissioner of revenue shall jointly establish, adopt and publish a numerically coded list of business activities and shall make the list available to the public.

* Sec. 11. AS 10.05.771 is amended to read:

Sec. 10.05.771. PENALTY FOR FAILURE TO FILE ANNUAL REPORT. Each domestic or foreign corporation that fails or refuses to file its annual report within the time set by this chapter is subject to a penalty of 10 percent of the amount of the franchise tax <u>for each month that the corporation fails or refuses to file the annual report</u>. If the amount of the franchise tax as originally assessed is adjusted in accordance with this chapter, the amount of the penalty shall also be adjusted to 10 percent of the amount of the adjusted franchise tax <u>for each month the corporation fails or refuses to file the annual report</u>. The amount of the franchise tax and the amount of the penalty shall be separately stated in a notice to the corporation.

* Sec. 12. AS 10.05.783 is amended to read:

Sec. 10.05.783. FAILURE TO ANSWER INTERROGATORIES. Each domestic or foreign corporation that fails or refuses to answer truthfully and fully within the time prescribed by this chapter interrogatories propounded by the commissioner in accordance with this chapter is guilty of a misdemeanor [AND UPON CONVICTION MAY BE FINED IN AN AMOUNT NOT EXCEEDING $500].

* Sec. 13. AS 10.05.786 is amended to read:

Sec. 10.05.786. PENALTIES IMPOSED UPON OFFICERS AND DIRECTORS. Each officer and director of a domestic or foreign corporation who fails or refuses within the time prescribed by this chapter to answer truthfully and fully interrogatories propounded to him by the commissioner in accordance with this chapter, or who signs any articles, statement, report, application or other document filed with the commissioner which is known to the officer or director to be false in any material respect, is guilty of a misdemeanor [, AND UPON CONVICTION MAY BE FINED IN AN AMOUNT NOT EXCEEDING $500].

* Sec. 14. AS 10.05.825(18) is repealed and re-enacted to read:

(18) "affiliate" includes but is not limited to

(A) a person directly or indirectly owning, controlling or holding with power to vote, five percent or more of the outstanding securities of a person subject to this chapter;

(B) a person five percent or more of whose outstanding securities are directly or indirectly owned, controlled, or held with power to vote by a person subject to this chapter;

(C) a person directly or indirectly controlling, controlled by, or under common control with, a person subject to this chapter;

(D) a director, officer, or partner of a person subject to this chapter; or

(E) a person under whose name business is transacted by another person who is subject to this chapter;

* Sec. 15. AS 10.05.825(20) is amended to read:

(20) "person" means an individual, a corporation, a partnership, an association, a joint-stock company, a joint venture, a company, a firm, a society, an estate, a trust where the interests of the beneficiaries are evidenced by a security, an unincorporated organization, a government, or a political subdivision of a government;

* Sec. 16. AS 10.05.825 is amended by adding new paragraphs to read:

(22) "alien" means

(A) an individual who is not a citizen or national of the United States, or who is not lawfully admitted to the United States for permanent residence, or paroled into the United States under the Immigration and Nationality Act (8 U.S.C. secs. 1101 - 1503), as amended; or

(B) a person, other than an individual, that was not created or organized under the laws of the United States, or whose principal place of business is not located in any state;

(23) "state" means any of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Northern Mariana Islands, Guam, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands, or any other territory or possession of the United States.

* Sec. 17. This Act takes effect January 1, 1981.

Request for

Special Interim

Committee on

FOREIGN INVESTMENTS

Alaska State Legislature

REPRESENTATIVE
FRED F. ZHAROFF
P.O. BOX 405
KODIAK, ALASKA 99615
(907) 486-5254

WHILE IN JUNEAU
POUCH V
JUNEAU, ALASKA
99811
(907) 465-4986
465-4951

House of Representatives

DISTRICT 14:
BELLSFLATS
CHINIAK
KODIAK
OUZINKIE

M E M O R A N D U M

To: Representative Terry Gardiner, Speaker of the House

From: Representative Fred F. Zharoff

Re: Foreign investment

As discussed with you earlier this session, I would like to request an interim committee for the study of foreign investment and involvement in Alaska business. Because the involvement may be quite extensive, it is my goal to focus primarily on foreign involvement as it pertains to fisheries with preliminary investigation into other Alaskan resources, i.e. timber and land.

The study will focus on three (3) main areas. These are the three (3) major areas of concern with me:

1. Ownership: Identifying all fisheries and processing related companies owned or controlled by foreign countries.

2. Alaska's Corporate Disclosure Law: This section of the study would point out discrepancies in the Alaska Disclosure Law, focusing on information or lack of information, the time frame in which such information is gathered or rquested by the State, the utilization of such information, ect.

3. Bottom fisheries involvement: This is important in respect to the quota system. Does foreign involvement in Alaska's processing industries create an incentive, or does it create obstacles or barriers for bottom fisheries development?

This committee, if funded, would be a sub-committee of the Special Interim Committee on Bottom Fisheries, all of which would fall under the guidence of the House Resources Committee. I have discussed this with Alvin Osterback and Frank Orth, Bottom Fisheries Committee Consultant, and they anticipate no problems. The findings of the Foreign Investment Study Committee will, in the end, be coordinated with the Bottom Fisheries Committee.

I have also talked with Pat Dougherty and he is assisting me in this venture. Because of his background in this area and the information he has compiled previously, I request that he be appointed the Administrative Aide to this special committee. I have a good deal of confidence in him and I feel that because our views are compatible he would do a good job.

Enclosed please find:

1. Budget
2. Budget Narrative
3. Memo from Pat Dougherty regarding a foreign investment study
4. H.B. 87 (present status)
5. HCR 1 (present status)
6. Proposed committee member list

Thank you for your consideration.

April 9

MEMO

To: Rep. Fred Zharoff

From: W.P. Dougherty

Subject: Budget for foreign investment study

BUDGET

I. Professional Services

Project manager: 166 hours at $40	$6,640
Principal researcher: 1,000 hours at $25	$25,000
Economic analyst: 330 hours at $25	$8,250
	$39,890 Subtotal

II. Direct Costs

Legal services subcontract: 43 hours at $70	$3,010
Communications:	$2,000
Report preparation:	$500
Secretarial services: 100 hours at $12	$1,200
Fees and contingency:	$5,200
	$11,910 Subtotal

(more)

III. Travel and Per Diem

Seattle-Juneau travel

$207 x four trips (plane fare)	$828
$60/day x seven days x four trips (expenses)	$1,800
$32/day x seven days x four trips (car rental)	$896
	$3,524

Juneau-Washington, D.C. travel

$524 x two trips (plane fare)	$1,048
$60/day x seven days x two trips (expenses)	$840
$37/day x seven days x two trips (car rental)	$518
	$2,406

Subtotal $5,930

I. $39,890

II. $11,910

III. $5,930

$57,230 Total

WPD

BUDGET NARRATIVE

I. PROFESSIONAL SERVICES

The project requires a manager who will be responsible for developing a detailed work plan and schedule for performance, coordinate the activities of the researchers, administer the project funds, report to the client group on the progress of the project, oversee preparation of the final report, and conduct overall review of the work of project participants.

A principal researcher will handle the bulk of the research and investigation for Parts I and II of the study. This includes locating and identifying the processing and fishery-related companies owned or controlled, directly or indirectly, by Japanese corporations. Research will involve a search of Alaska corporate records, SEC filings and other documents, as well as interviews with processors and various industry contacts. The principal researcher also will investigate the state's corporate disclosure policy with several questions in mind: Are the disclosure statutes properly and efficiently enforced? Are data compiled in usable forms? Are they compiled in a timely fashion? How could the information be compiled otherwise, and at what cost? What changes or adjustments would be most desirable from the state's point of view?

The economic analyst will review the recent economic decisions of the state's processors in an effort to determine whether there is a pattern of investment contrary to the goal of a prospering American bottomfish industry. The analyst will design the appropriate research methodology and assess and interpret the results.

II. DIRECT COSTS

The legal services subcontract provides for a legal analysis of the state's disclosure statutes and privacy restrictions. It would attempt to expose loopholes or gaps in the present statutes that thwart the legislative intent of public scrutiny of economic trends and developments. It would assess the effectiveness of current penalties for non-compliance with the law.

(more)

Communications represents the cost of close coordination between an office in Juneau and one in Seattle. It would cover long distance toll charges, delivery services such as Goldstreak, postage, copying, office supplies, and possibly office or equipment rental.

Report preparation includes the cost of reproducing, proofreading, collating, binding and designing the number of copies desired by the client (perhaps 25 - 50).

Secretarial services refers almost exclusively to typing needs. Project demands would include correspondence, memoranda, and preparation of a draft and final report.

Fees and contingency amounts to a percentage (10%) of the total project cost which is charged as compensation for the investment of capital and assumption of commercial risks associated with management of the project. (Essentially this is one form of billing. Some other firms will accomplish the same profit mark-up through a higher charge rate for professional services. It reflects a charge comparable with other firms with like backgrounds and qualifications for similar work.)

III. TRAVEL AND PER DIEM

The two principal points of interest for this study are Juneau, where many of the records and other sources are located, and the Seattle-Olympia area, where the Alaska fishing industry is headquartered and many of the other records are kept. This cost represents the exploitation of all these sources of information as well as allowing for the close coordination of offices in both locales. Possibly by combining Seattle-Juneau travel needs for this project with those of other developing projects, this budget item can be held to a minimum.

A trip to Washington, D.C., by the principal researcher and the project manager is desirable because it would permit the coordination of this project with work being conducted out of the offices of the Alaska congressional delegation. There also are benefits to be reaped by interaction with those federal agencies with oversight responsibilities in the area of foreign investment. (This is particularly true of the Department of Commerce, which has studied foreign investment in the fishing industry, specifically, in the recent past.)

April 9

MEMO

To: Rep. Fred Zharoff

From: W. P. Dougherty

Subject: The foreign investment study

As we discussed Saturday, a study of this nature is long overdue. Japan's influence over the fisheries of Alaska is well known but almost totally unexamined. In the instance of the Alaska fishing industry, the state has a critical need to understand the role of the Japanese in the processing industry before embarking upon a grand program to foster an American bottomfishery. In addition, recent revelations concerning the use and non-use of the state's progressive corporate disclosure laws underscore the helplessness of the state in trying to determine trends in its own economy when such business data are either not available, or not available in a usable form.

In accordance with the guidance you gave me, I will outline here my suggestion for a three-part study costing between $45,000 and $50,000.

PART I. Who owns what?

As a starting place, I suggest that we locate and identify all those processing and fishery-related companies that are owned or controlled, directly or indirectly, by the Japanese. This would involve a search of Alaska corporate records, SEC filings and other documents, as well as interviewing processors and other contacts. I would need to travel to Seattle-Olympia for review of Washington state records and interviews since so much of the Alaska processing industry ultimately resides in Washington. This investigation would provide the state with the only current, specific picture of the way the industry is structured, including the relationships between companies. The cost for Part I would be about $10,000. I would do almost all of the work, with assistance and review by Dr. Frank Orth of Seattle.

PART II. Alaska's corporate disclosure law. How are data compiled, and how are they used?

This is the heart of the study. It is the foundation for the future understanding of industry in the state of Alaska. If the state is ever to put itself on a solid footing from which it can scrutinize and guide development in Alaska, an accurate, timely compilation of relelvant corporate data is absolutely essential. As you know, at present, the state's disclosure statutes are enforced laxly, if at all. Data are compiled in unusable forms, and often so tardily that they are virtually worthless. This portion of the study would examine what is being done now, what could be done and at what cost, and what would be optimally desirable from the state's point of view. We would want to study the degree to which information is related and yet held separately by, for example, the Department of Fish & Game, the Department of Revenue, the Department of Commerce and the Department of Labor. The aim would be to reduce the number of instances in which the left hand doesn't know what the right is doing. We would subcontract for a legal analysis of the disclosure statutes and privacy restrictions to determine the degree to which the state handicaps itself in trying to understand current trends in an industry such as fishing. The cost for this portion of the study would be roughly $25,000, with the work to be performed cooperatively by Frank Orth and myself.

PART III. Analysis of the role of foreign investment on bottomfish investment decisions of domestic processors.

This long-overdue study would attempt to determine whether the investment decisions of Japanese-invested processors are calculated to retard or in any way hamper development of a domestic bottomfish industry. It is clear that the Japanese have a vested interest in protecting their industry by opposing, or at the least not helping, an American bottomfishery. So far no one has looked at their use of capital to determine if they are actually engaged in some form of economic subterfuge. Arthur D. Little Co., for example, completely ignored this question in its recent study for the administration. Obviously, since the companies are unwilling to discuss this matter forthrightly with the state or its representatives, it will be necessary to review their recent economic decisions in an effort to note a pattern of investment contrary to the goal of a growing bottomfish industry. Frank Orth would design a research methodology and use it to complete this analysis. The cost would be about $10,000. I would lend my assistance where needed, as well as reviewing this part of the study.

I hope this overview is helpful to you in envisioning the scope and value of such a study. If additional details would be helpful, please don't hesitate to contact me.

Sincerely,

W. P. Dougherty

Introduced: 1/29/79
Referred: Resources

Funding Information
General Fund $43,000
Other Funds -0-
$43,000

BY THE RULES COMMITTEE BY REQUEST OF THE LEGISLATIVE COUNCIL (for the Interim Committee on Bottomfish)

IN THE HOUSE

HOUSE BILL NO. 87

IN THE LEGISLATURE OF THE STATE OF ALASKA

ELEVENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making a special appropriation to the Legislative Council for the purpose of conducting a study relating to the extent of foreign investment in Alaska's fisheries; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $43,000 is appropriated from the general fund to the Legislative Council for the purpose of conducting a study relating to the extent of foreign investment in Alaska's fisheries.

* Sec. 2. The unexpended and unobligated portion of this appropriation lapses into the general fund June 30, 1980.

* Sec. 3. This Act takes effect July 1, 1979.

Introduced: 1/29/79
Referred: Resources

BY THE RULES COMMITTEE BY REQUEST OF THE LEGISLATIVE COUNCIL (for the Interim Committee on Bottomfish)

IN THE HOUSE

HOUSE CONCURRENT RESOLUTION NO. 1

IN THE LEGISLATURE OF THE STATE OF ALASKA

ELEVENTH LEGISLATURE - FIRST SESSION

Directing the Legislative Council to conduct a study relating to the extent of foreign investment in Alaska's fisheries.

BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF ALASKA:

WHEREAS the fishing industry is one of Alaska's principal businesses; and

WHEREAS the extent of foreign control over Alaska's fisheries has not been accurately determined; and

WHEREAS extensive foreign investment in Alaska's fisheries could have a strong impact on issues which are important to the state, including local employment, tax revenue, bottomfish development and marketing, and others;

BE IT RESOLVED by the Alaska State Legislature that under provisions of AS 24.20.090 and Uniform Rule 48(c) the Legislative Council is directed to conduct a study for the purpose of determining:

(1) the percentage of total annual seafood harvests within the 200-mile fishery conservation zone off the coast of Alaska harvested by fishermen wholly or partly financed by foreign investors;

(2) the percentage of total annual seafood production in the state produced by processors which are wholly or partly owned by foreign investors;

(3) the percentage of total ownership of seafood processors in the state owned by foreign investors.

For the purposes of the study, "foreign investors" includes any alien individual, corporation, partnership, association, joint stock company, trust, unincorporated organization, government subdivision or government that directly, or indirectly through one or more intermediaries, invests in, lends money to, controls or is under common control with a seafood processor or fisherman doing business in the state.

INTERIM COMMITTEE ON FOREIGN INVESTMENT

Professional Servcies:

Project manager: Frank Orth

Prinipal researcher (Admin. Aide): W.P. "Pat" Dougherty

Economic Analyst: Open

Committee Members:

Representative Fred F. Zharoff

Representative Alvin Osterback

Representative Richard Eliason

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.